

Title: The Curious World of Probabilities

Date: Apr 02, 2008 07:00 AM

URL: <http://pirsa.org/08040070>

Abstract: Probabilities and randomness arise whenever we're not sure what will happen next. They apply to everything from lottery jackpots to airplane crashes; email spam to insurance policies; medical studies to election polls. This exploration of odds and oddities will explain how a Probability Perspective can shed new light on many familiar situations in our everyday lives, and how computer algorithms which use randomness can be used to address problems in many branches of science.

Jeffrey Rosenthal is a professor in the Department of Statistics at the University of Toronto and examines odds and statistics in everyday life. His interest in probability theory began at an early age when, as a child, he enjoyed flipping coins, rolling dice and computing probabilities. He followed his passion and earned his BSc in Mathematics, Physics, and Computer Science from the University of Toronto at the age of 20; his PhD in Mathematics from Harvard University at the age of 24; and tenure in the Department of Statistics at the University of Toronto at the age of 29. He is also a fellow of the Institute for Mathematical Statistics.

Professor Rosenthal has been honoured with a Premier's Research Excellence Award, the COPSS President's Award from the Committee of Presidents of Statistical Societies, a Harvard University Teaching Award in 1991, an Arts and Science Outstanding Teaching Award in 1998 at the University of Toronto and the 2006 CRM-SSC Prize in Statistics. He is author of "Struck by Lightning, The Curious World of Probabilities" and "A First Look a Rigorous Probability Theory". He also co-authored "Probability and Statistics: The Science of Uncertainty".

Despite being born on Friday the thirteenth, Rosenthal considers himself a very fortunate person.

"It is a truth very certain that, when it is not in our power to determine what is true, we ought to follow what is most probable." - Rene Descartes (1596-1650), French philosopher and mathematician

# The Curious World of Probabilities

Jeffrey S. Rosenthal

University of Toronto

jeff@math.toronto.edu

<http://probability.ca/jeff/>

## Warm-Up Example: A Survey

“Which medium do you rely on most to keep abreast of the news?”

(1/11)

## Warm-Up Example: A Survey

“Which medium do you rely on most to keep abreast of the news?”

Internet: 62%.

Survey conducted on: globeandmail.com . . .



# Lotteries

Will you win the big jackpot?

(2/11)

## Lotteries

Will you win the big jackpot?

The probability isn't too high ...

(2/11)

## Lotteries

Will you win the big jackpot?

The probability isn't too high ...

But just how unlikely?

## On the Other Hand . . .

Many bad things are also unlikely:

(3/11)

## On the Other Hand . . .

Many bad things are also unlikely:

- Airplane crashes.

## On the Other Hand . . .

Many bad things are also unlikely:

- Airplane crashes.
- Terrorist attacks.

## On the Other Hand . . .

Many bad things are also unlikely:

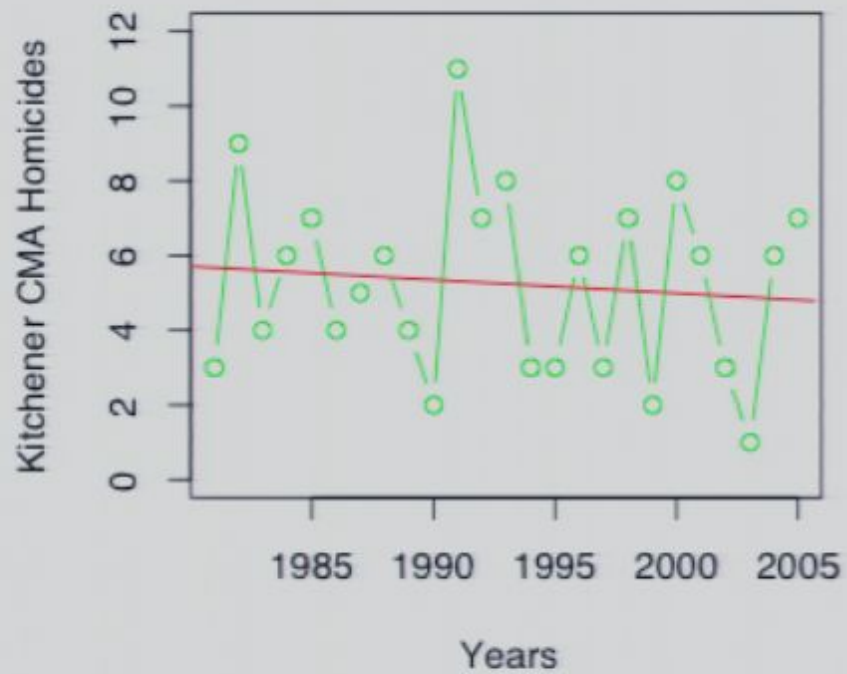
- Airplane crashes.
- Terrorist attacks.
- Homicides.

# Toronto Homicides by Year



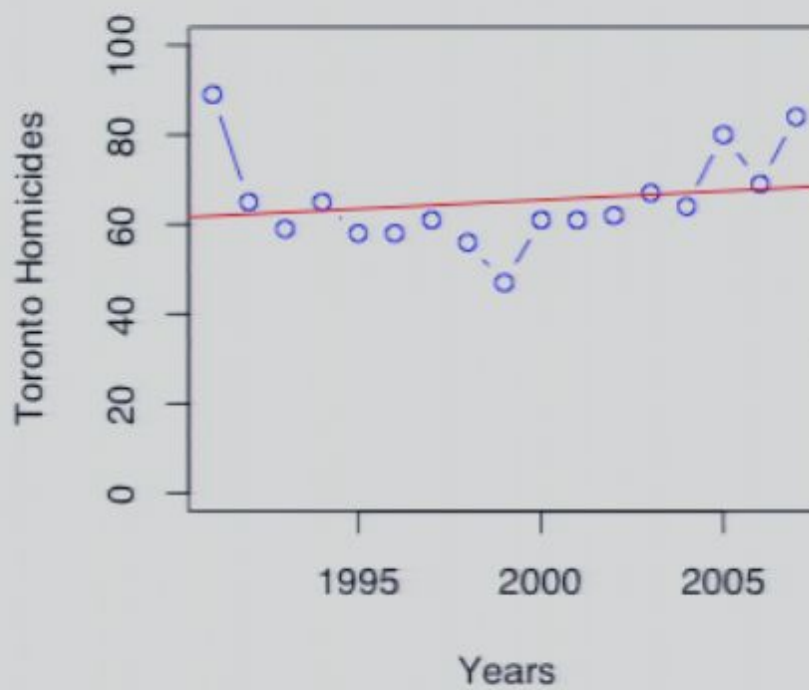


## Kitchener CMA (incl. Waterloo)



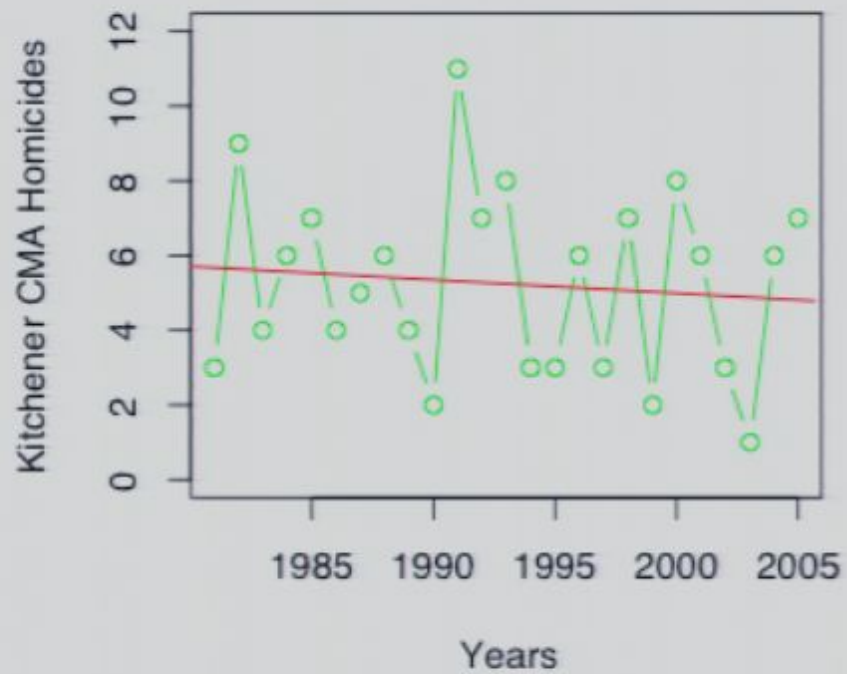
(5/11)

## Toronto Homicides by Year



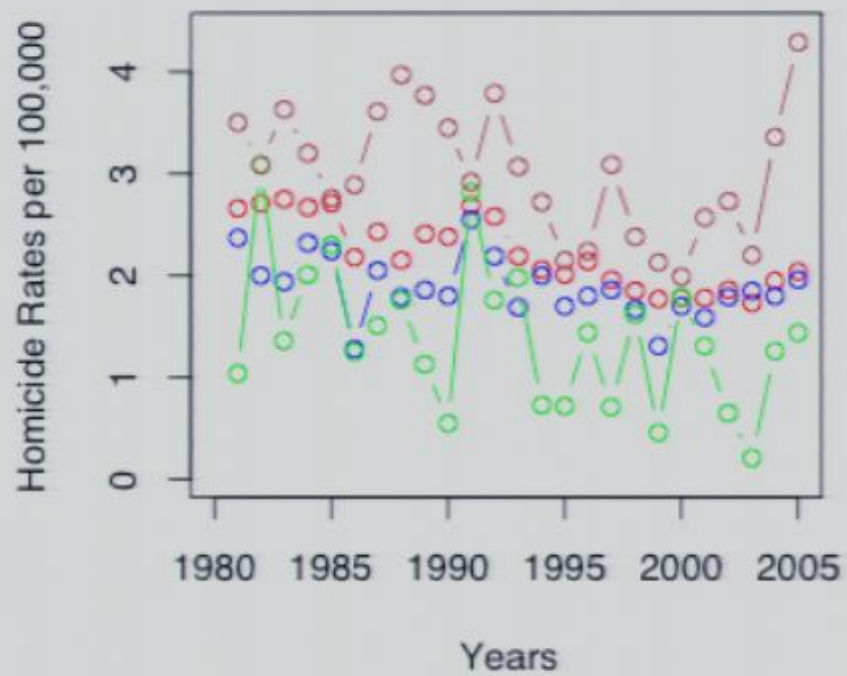
(4/11)

## Kitchener CMA (incl. Waterloo)



(5/11)

# Rates: Edmonton, Canada, Toronto, Kitchner



(6/11)

## Casinos

Example: “craps”.

(7/11)

## Casinos

Example: “craps”.

Probability of winning = 49.29%.

## Casinos

Example: “craps”.

Probability of winning = 49.29%.

What happens in the long run? [APPLET]

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 1  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 0  
Losses-Wins: 0-0



Applet started.

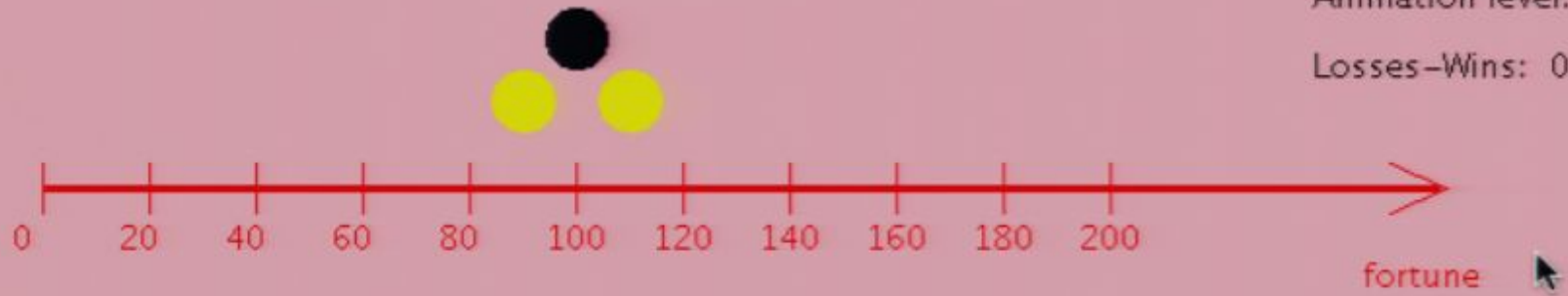


Fortune: \$100  
Win prob: 0.492929  
Number of bets: 1  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 0  
Losses-Wins: 0-0



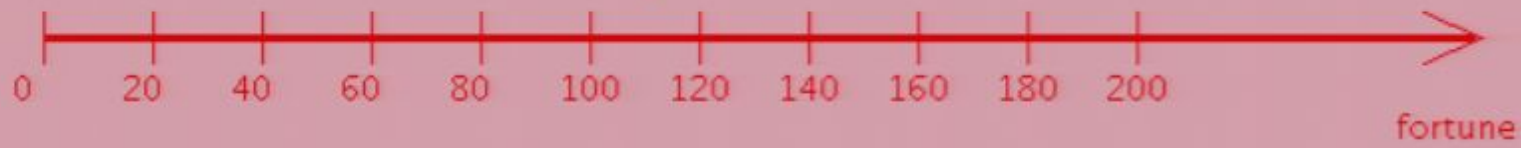
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 1  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 1  
Losses-Wins: 0-0



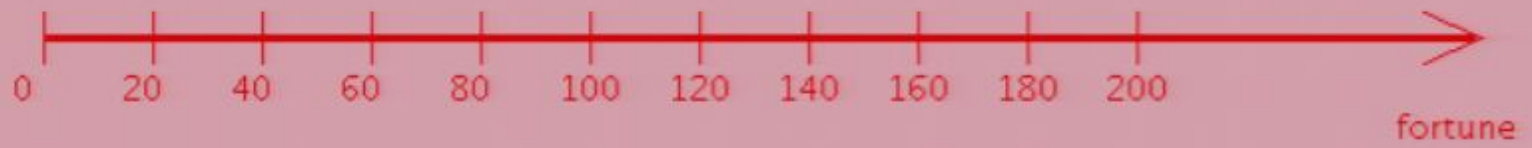
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 1  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 1  
Losses-Wins: 0-0



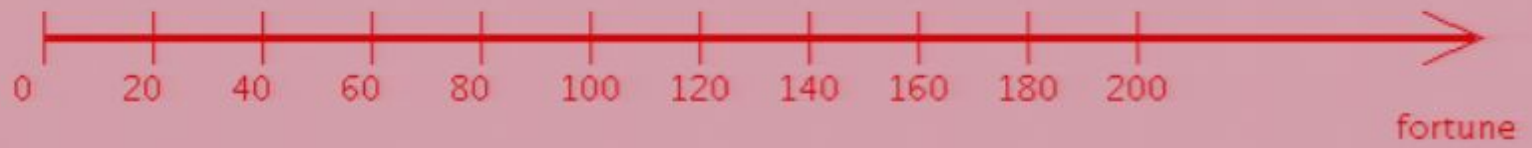
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 2  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 1  
Losses-Wins: 0-0



Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 2  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 1  
Losses-Wins: 0-0



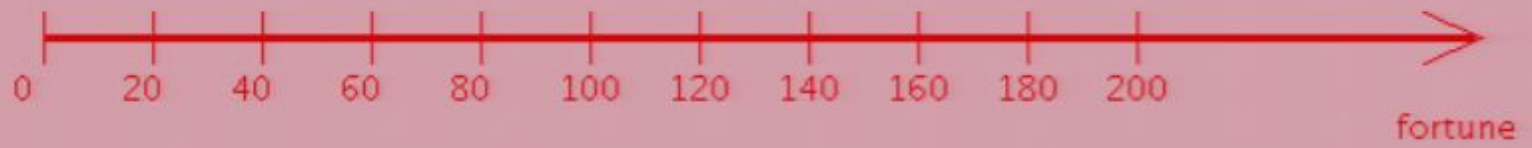
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 2  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 1  
Losses-Wins: 0-0



Applet started.

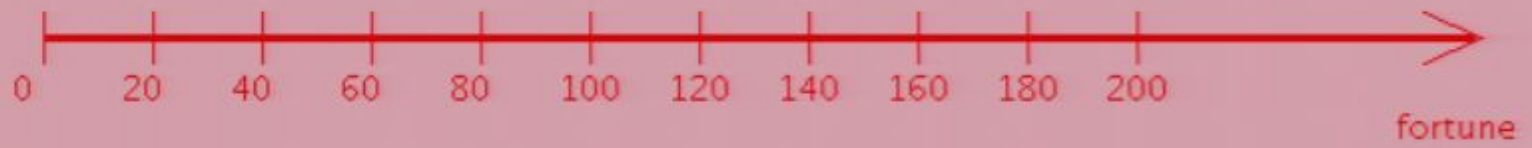
Fortune: \$110  
Win prob: 0.492929  
Number of bets: 2  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 1  
Losses-Wins: 0-0



Applet started.



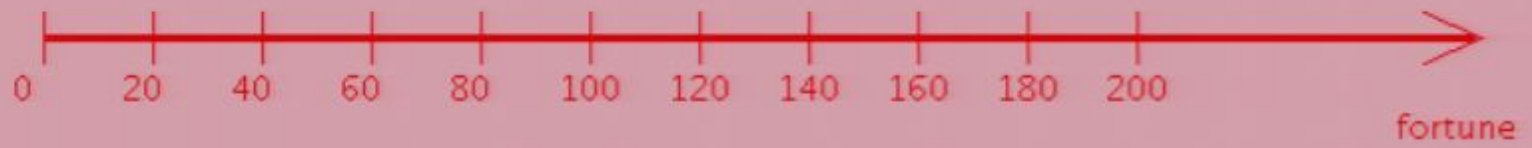
Fortune: \$100  
Win prob: 0.492929  
Number of bets: 3  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



Fortune: \$100  
Win prob: 0.492929  
Number of bets: 3  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 3  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



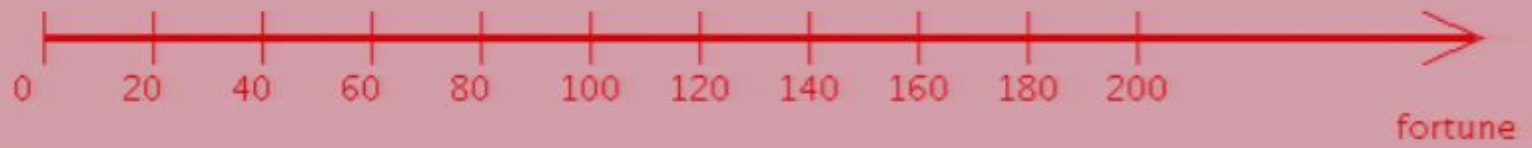
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 3  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



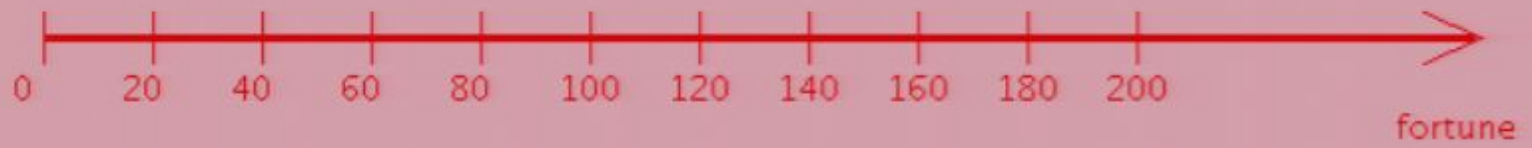
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 4  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 4  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



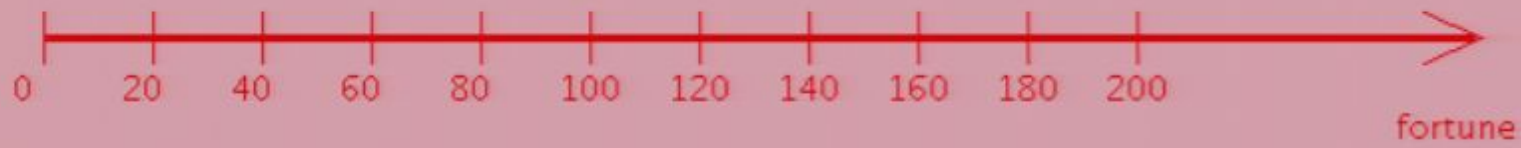
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 4  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

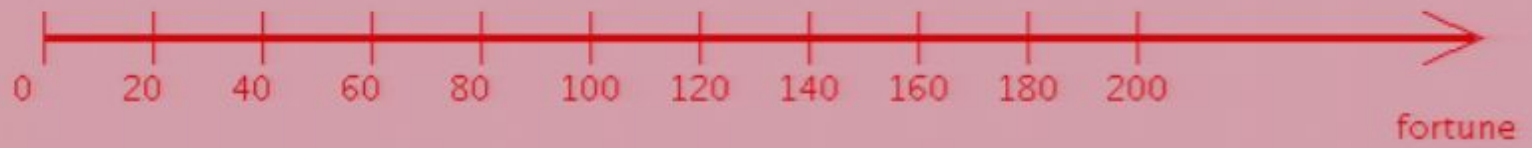
Fortune: \$90  
Win prob: 0.492929  
Number of bets: 4  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



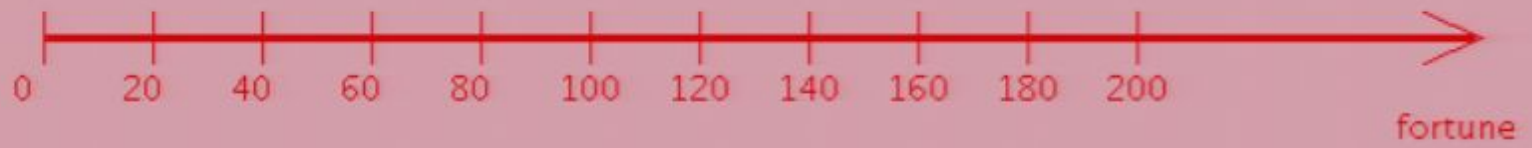
Fortune: \$100  
Win prob: 0.492929  
Number of bets: 5  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

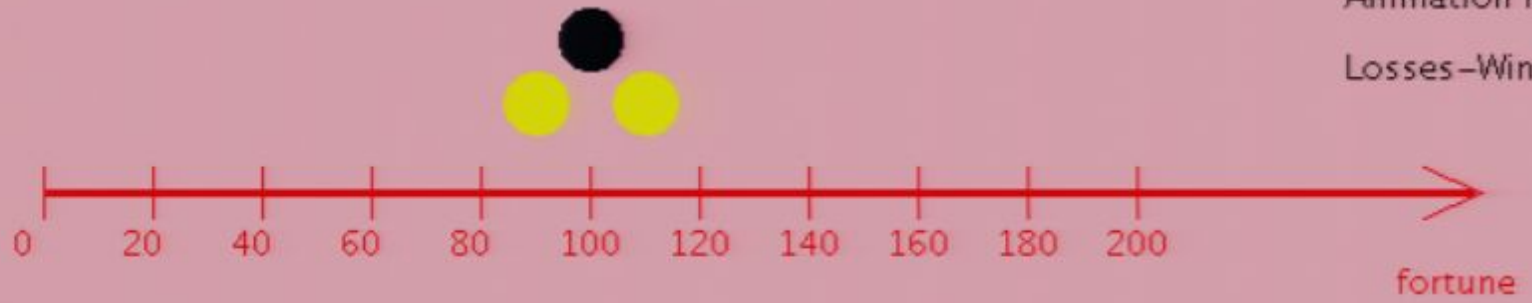


Fortune: \$100  
Win prob: 0.492929  
Number of bets: 5  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 5  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



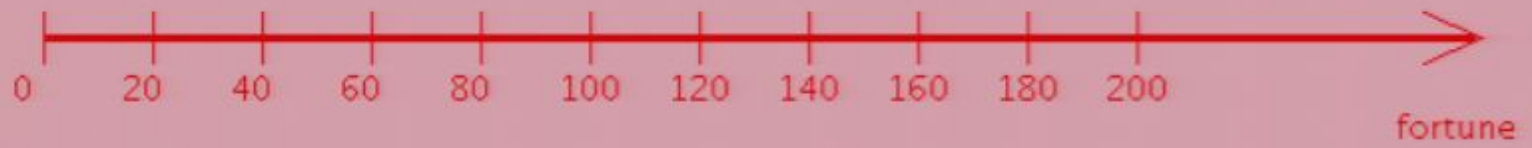
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 5  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



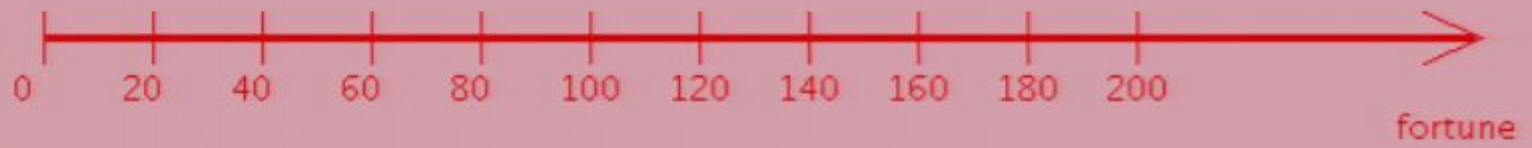
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 6  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



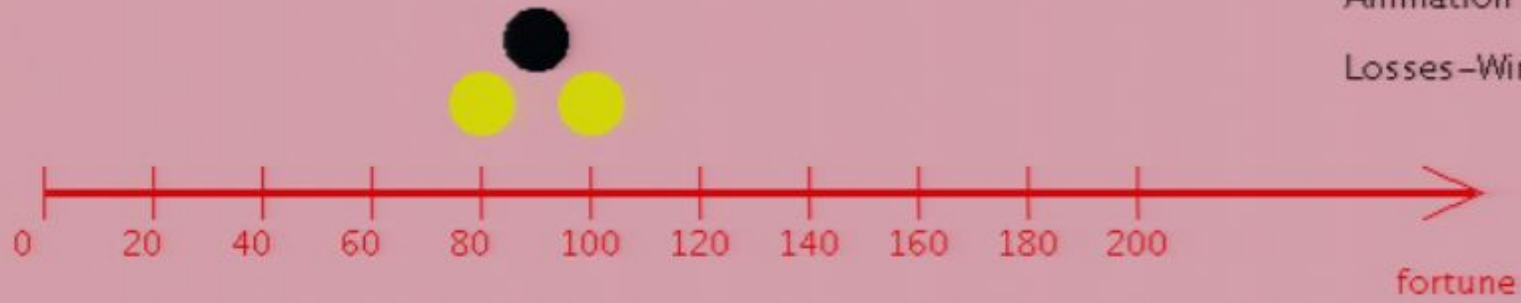
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 6  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



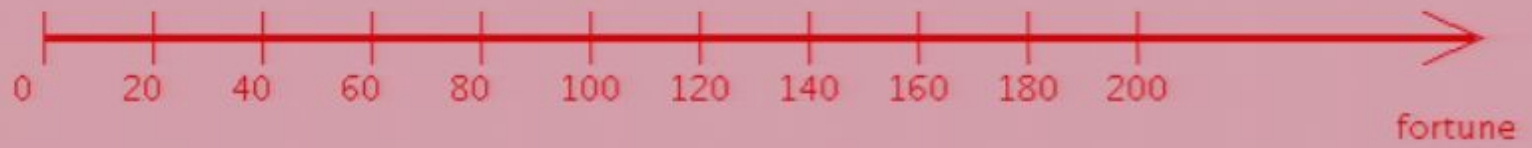
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 6  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

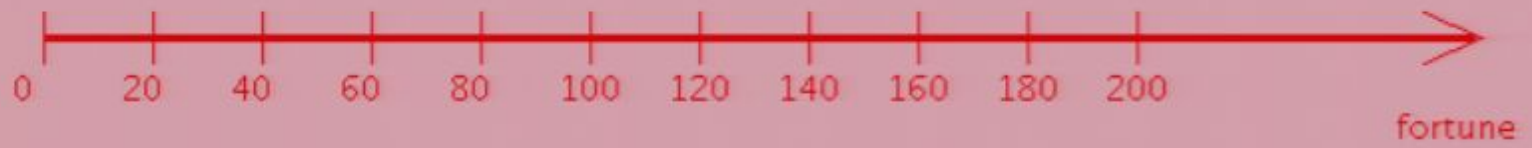
Fortune: \$90  
Win prob: 0.492929  
Number of bets: 6  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



Fortune: \$100  
Win prob: 0.492929  
Number of bets: 7  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



Fortune: \$100  
Win prob: 0.492929  
Number of bets: 7  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 7  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



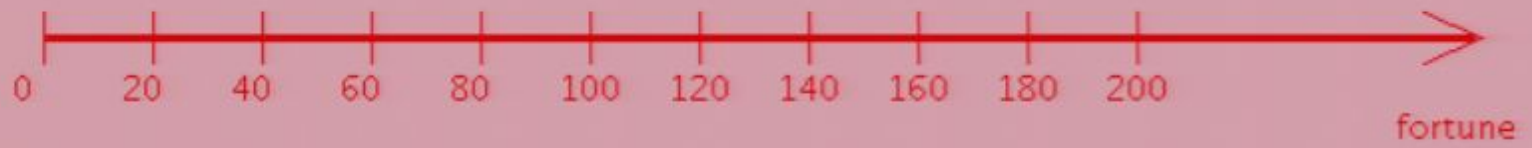
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 7  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



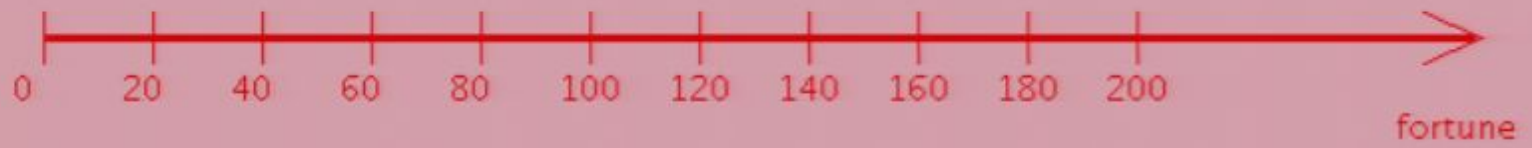
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 8  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



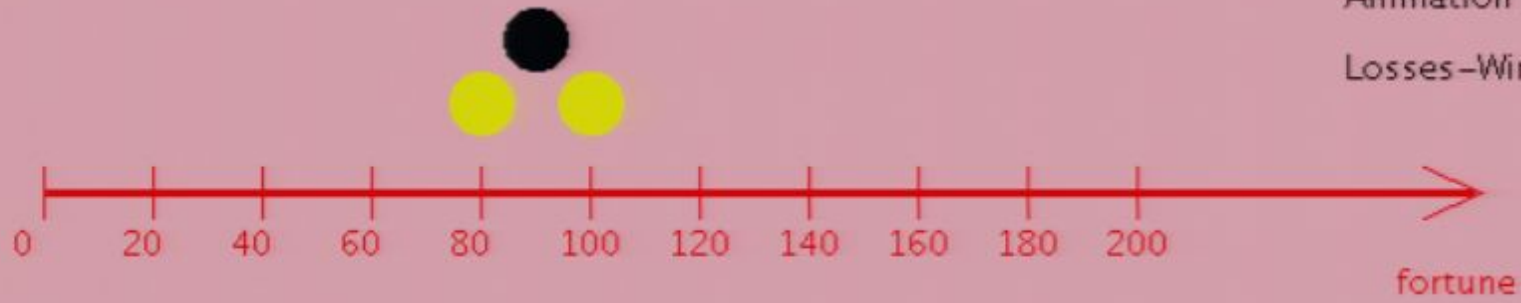
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 8  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



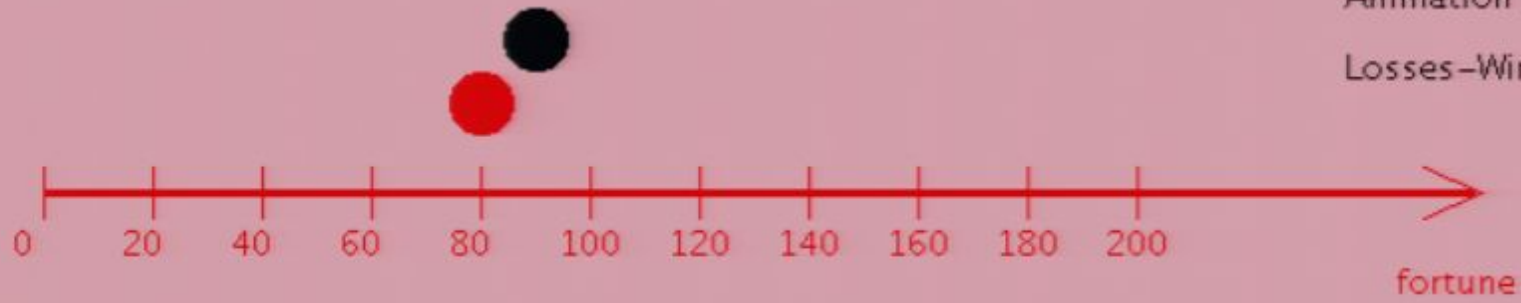
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 8  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

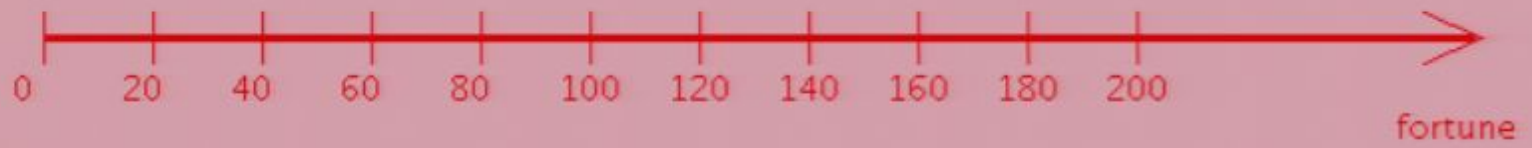
Fortune: \$90  
Win prob: 0.492929  
Number of bets: 8  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



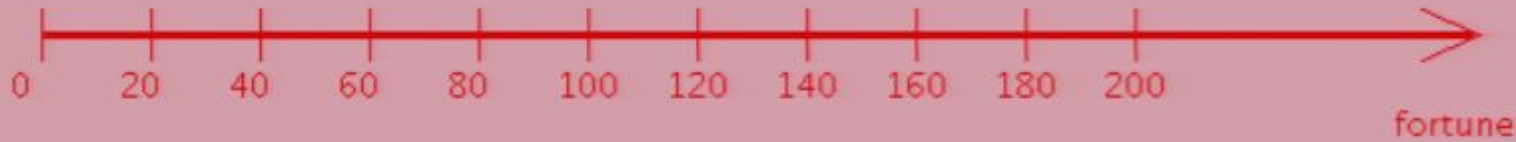
Fortune: \$80  
Win prob: 0.492929  
Number of bets: 9  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

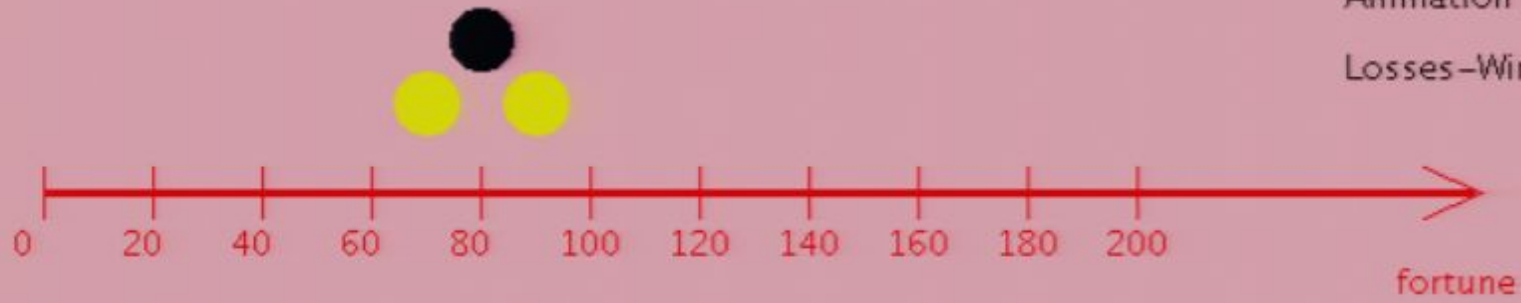


Fortune: \$80  
Win prob: 0.492929  
Number of bets: 9  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 9  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



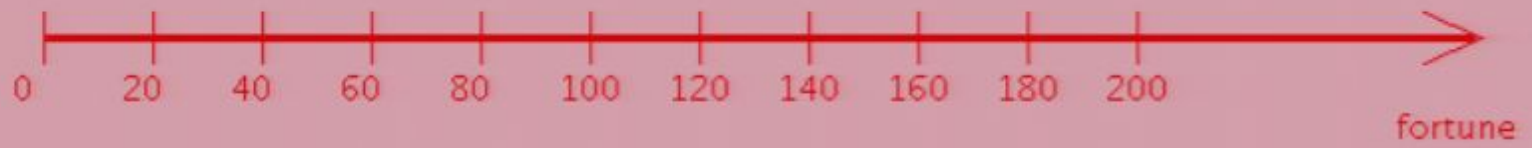
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 9  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



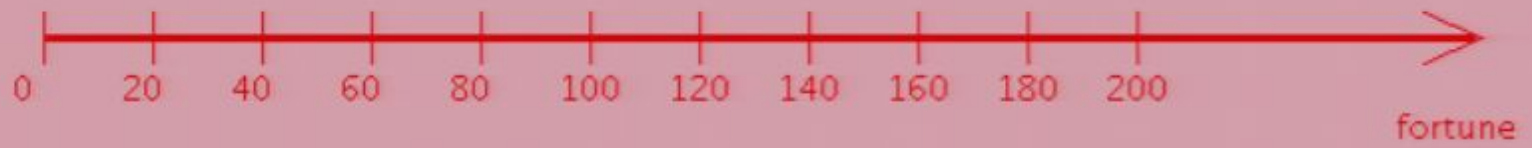
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 10  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



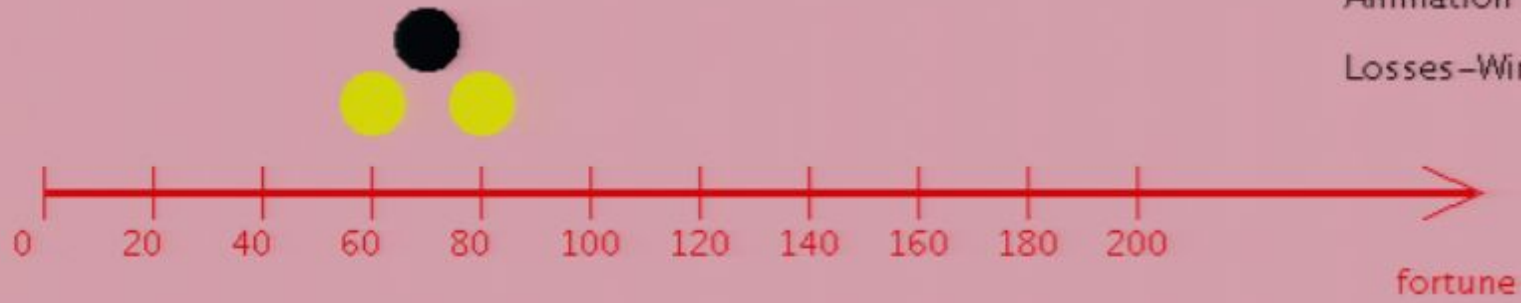
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 10  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



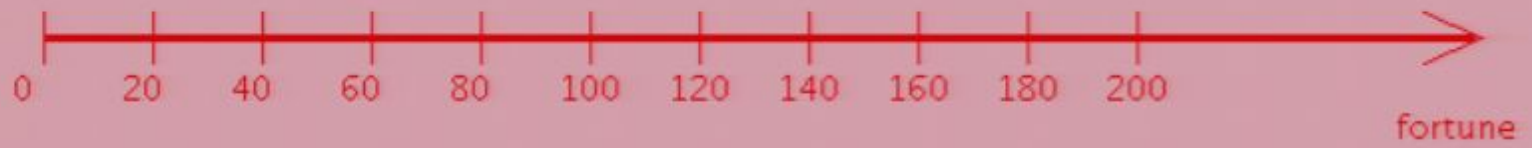
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 10  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

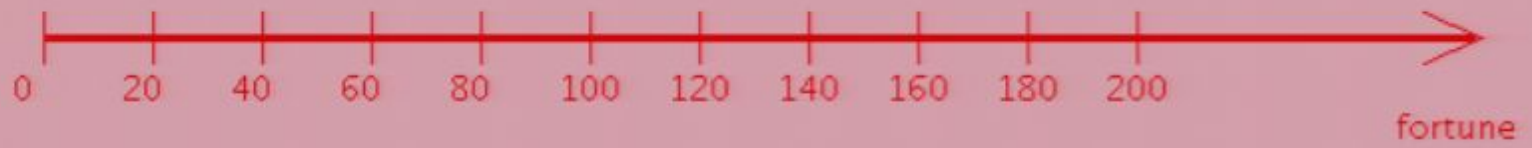
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 10  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



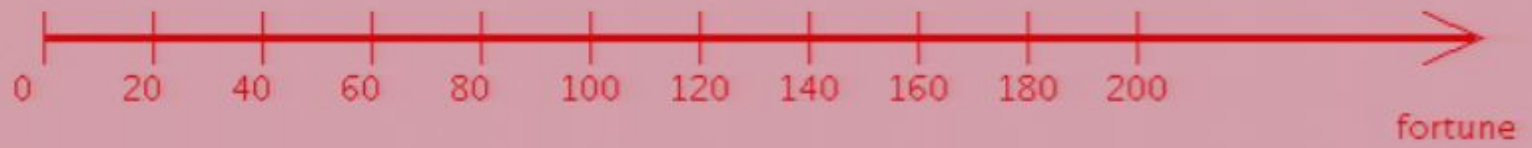
Fortune: \$60  
Win prob: 0.492929  
Number of bets: 11  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

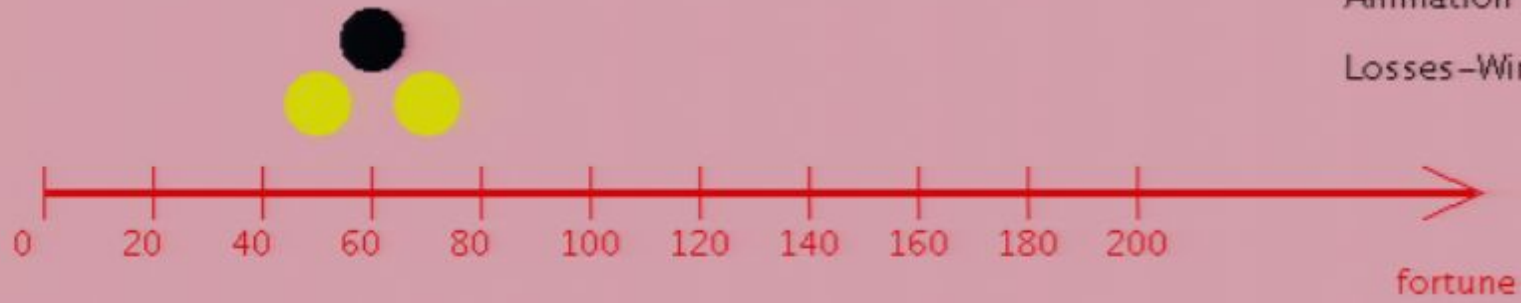


Fortune: \$60  
Win prob: 0.492929  
Number of bets: 11  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



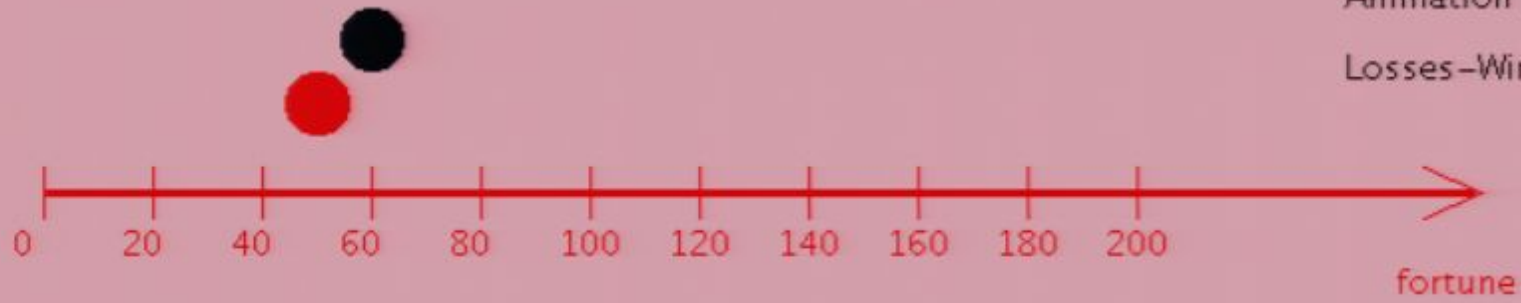
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 11  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



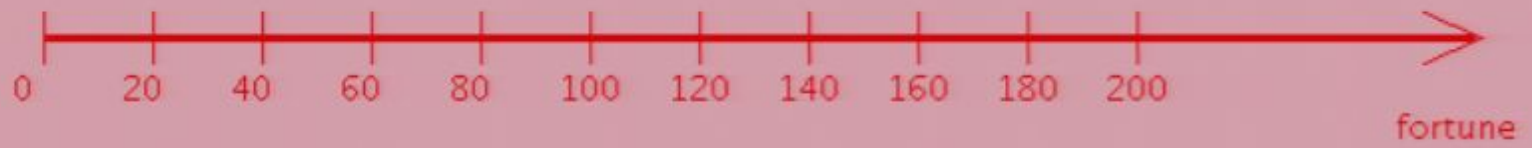
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 11  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



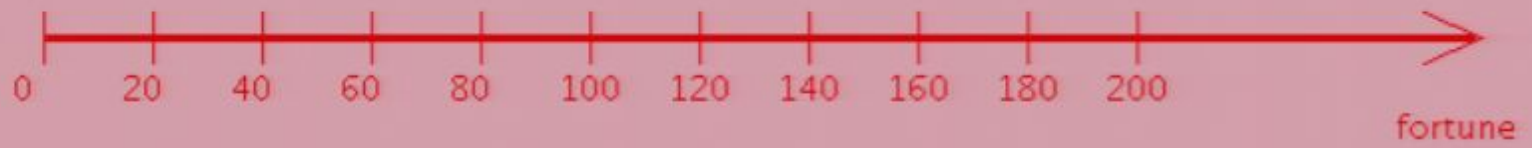
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 12  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 12  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



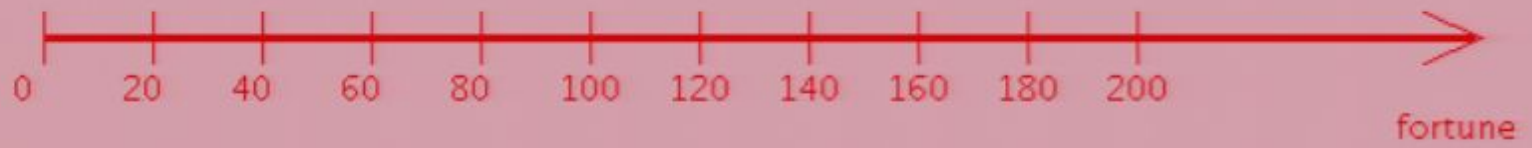
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 12  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

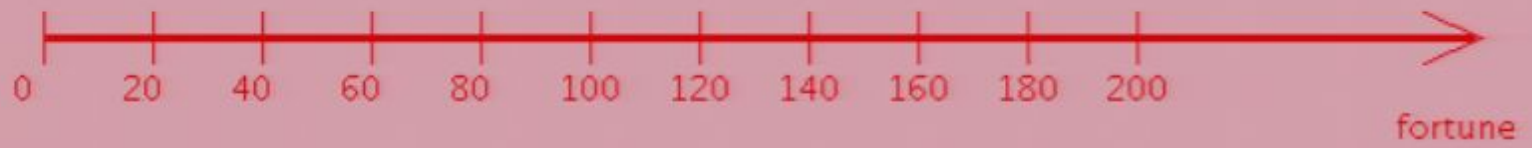
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 12  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



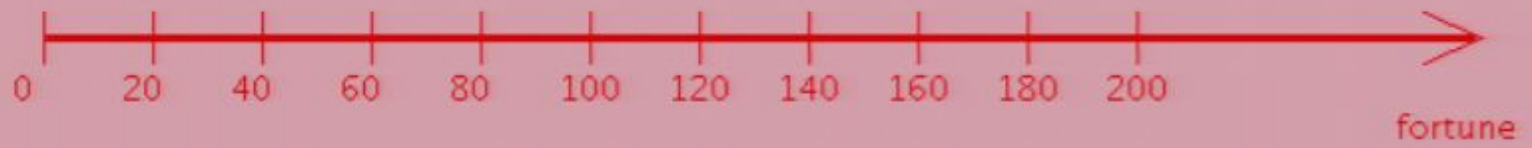
Fortune: \$40  
Win prob: 0.492929  
Number of bets: 13  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

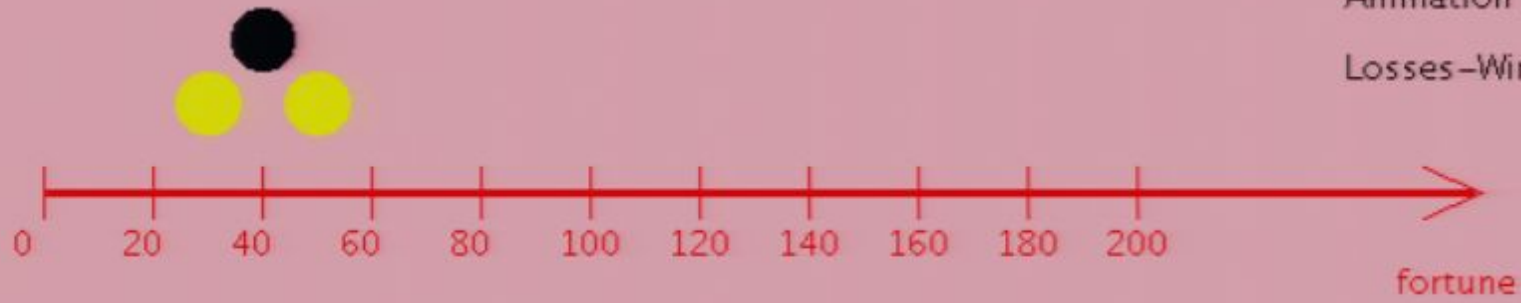


Fortune: \$40  
Win prob: 0.492929  
Number of bets: 13  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



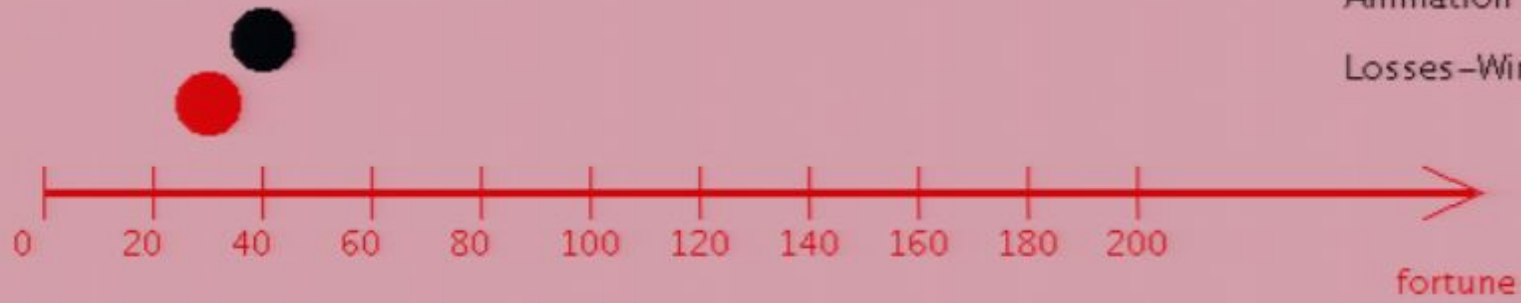
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 13  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



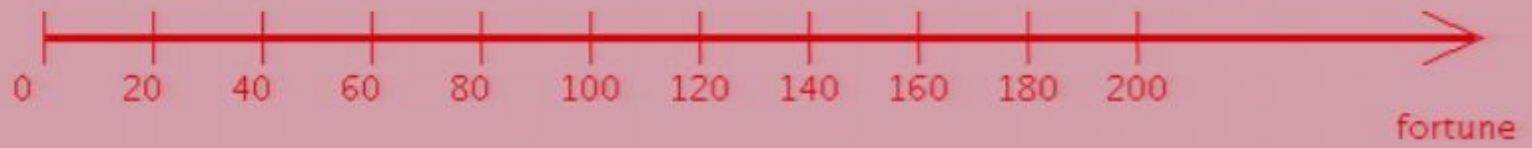
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 13  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



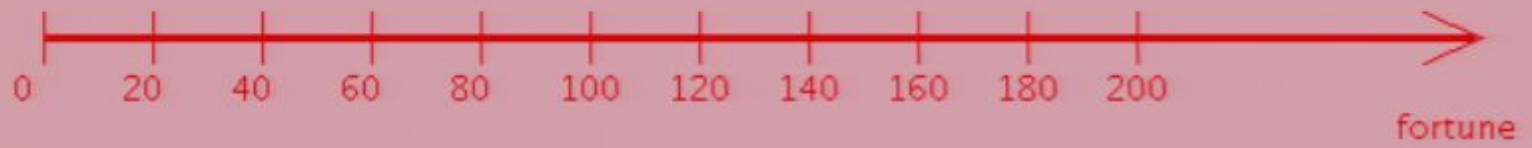
Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 14  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



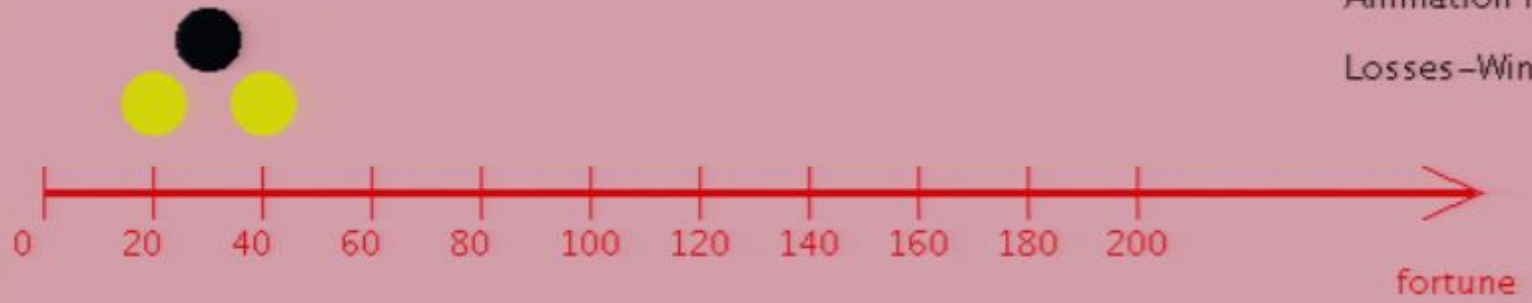
Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 14  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 14  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

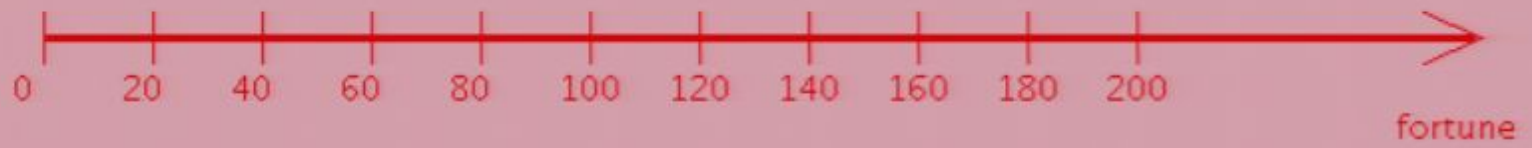
Fortune: \$30  
Win prob: 0.492929  
Number of bets: 14  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



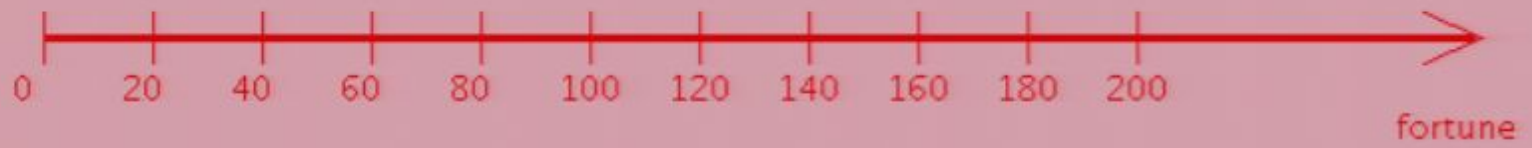
Fortune: \$40  
Win prob: 0.492929  
Number of bets: 15  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

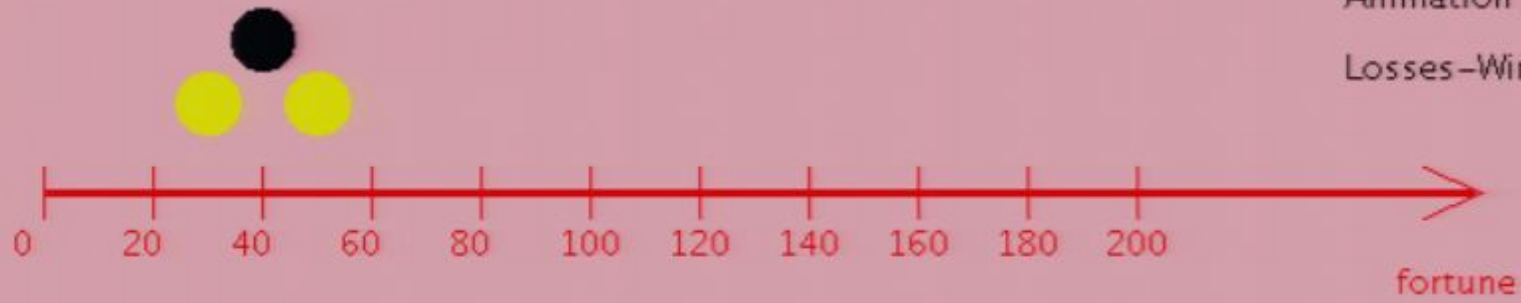


Fortune: \$40  
Win prob: 0.492929  
Number of bets: 15  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



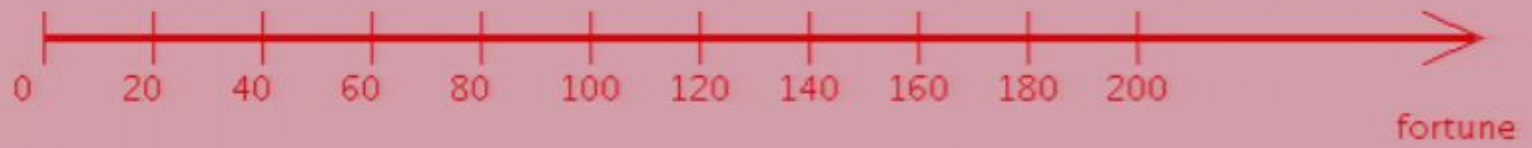
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 15  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



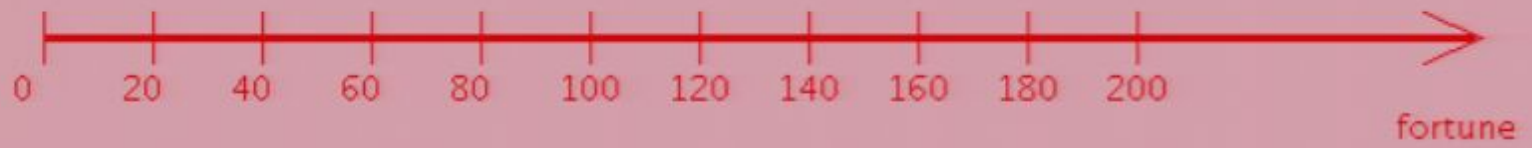
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 15  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



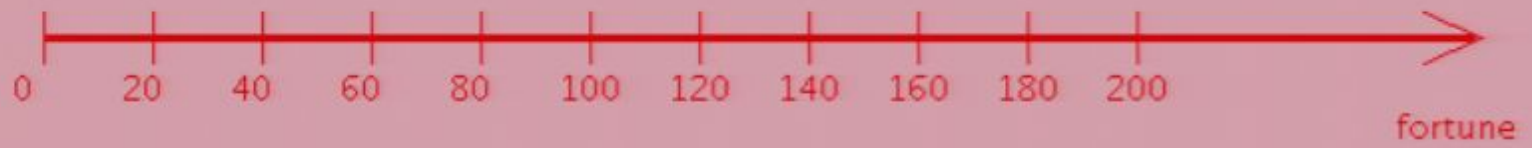
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 16  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



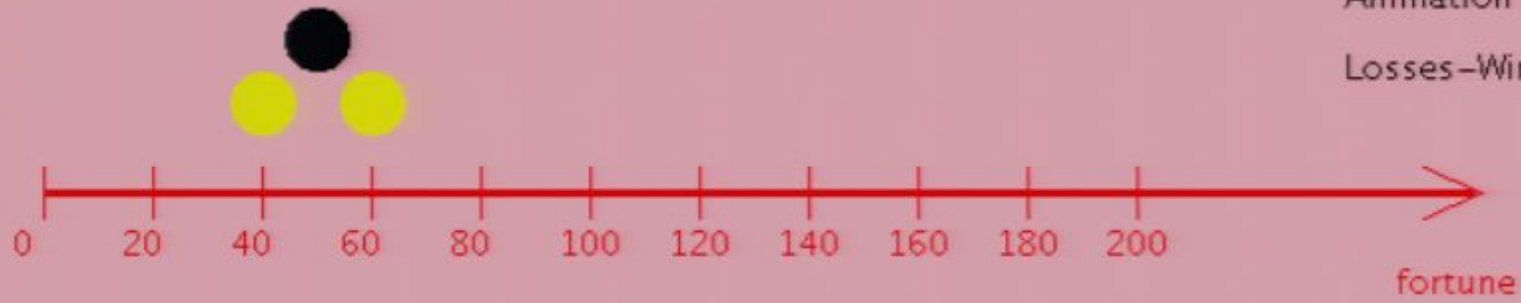
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 16  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



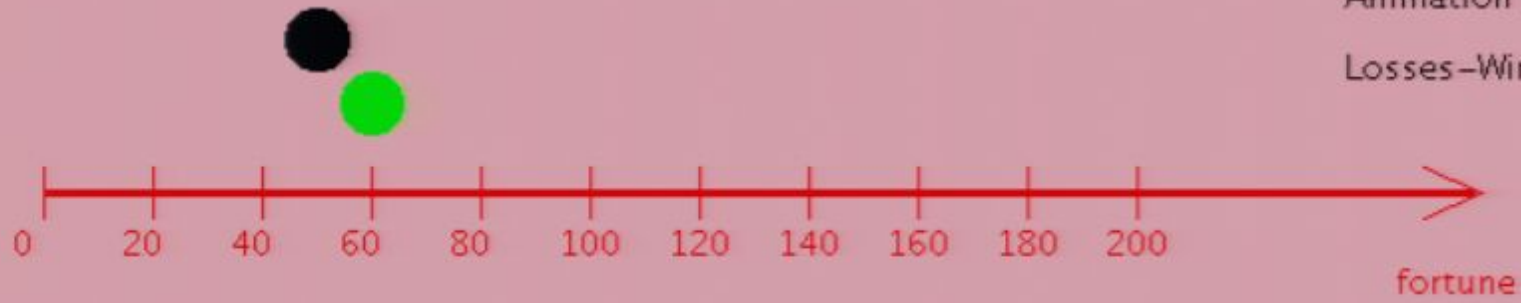
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 16  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

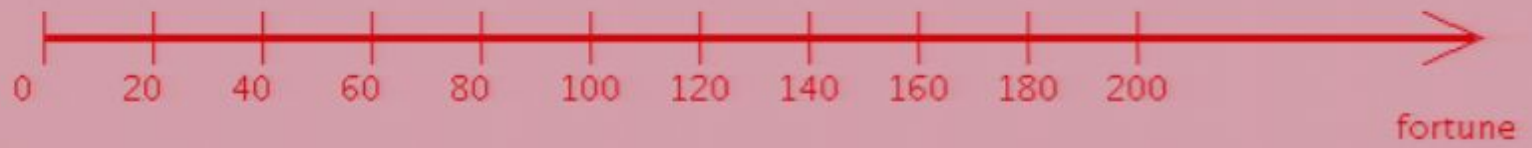
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 16  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



Fortune: \$60  
Win prob: 0.492929  
Number of bets: 17  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



Fortune: \$60  
Win prob: 0.492929  
Number of bets: 17  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



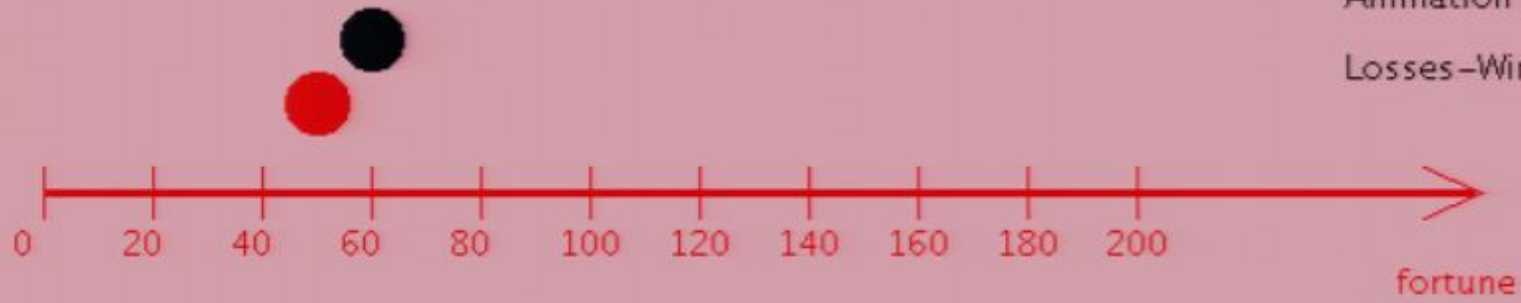
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 17  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



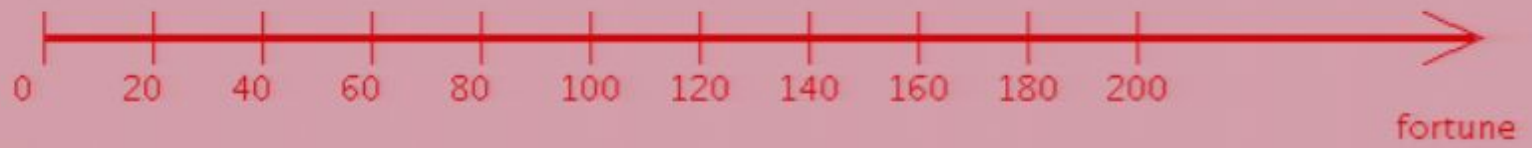
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 17  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



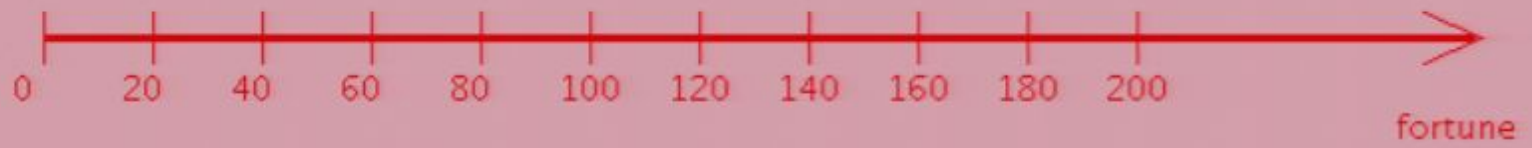
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 18  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



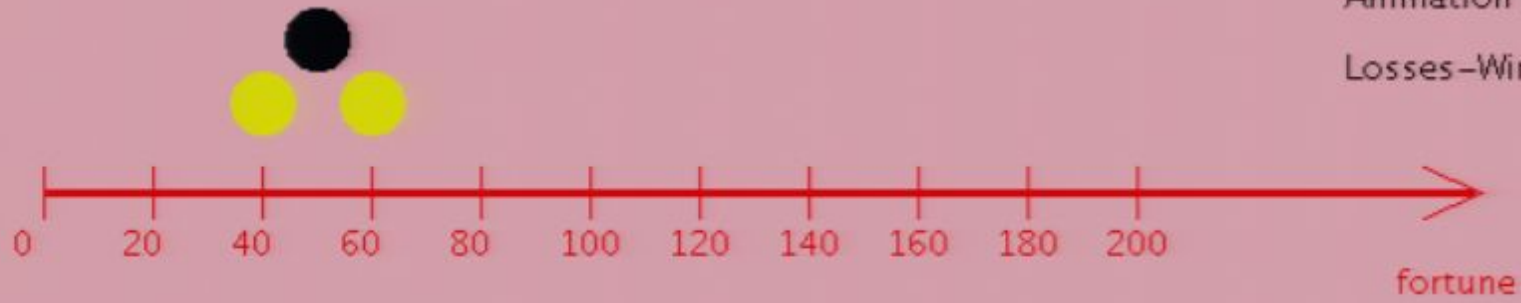
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 18  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



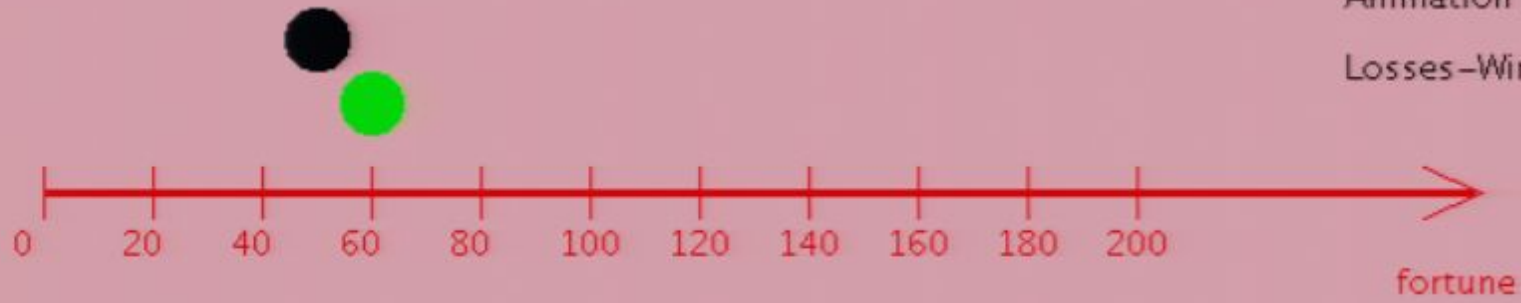
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 18  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

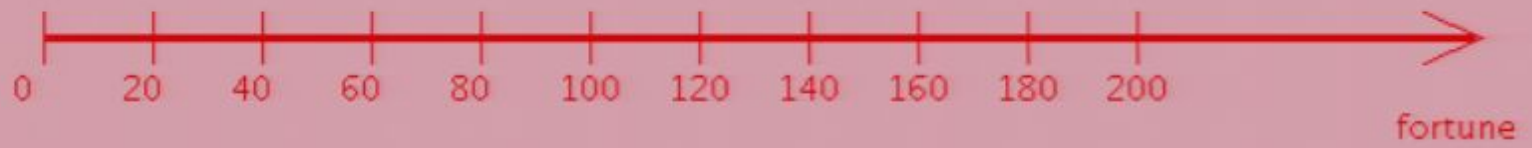
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 18  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



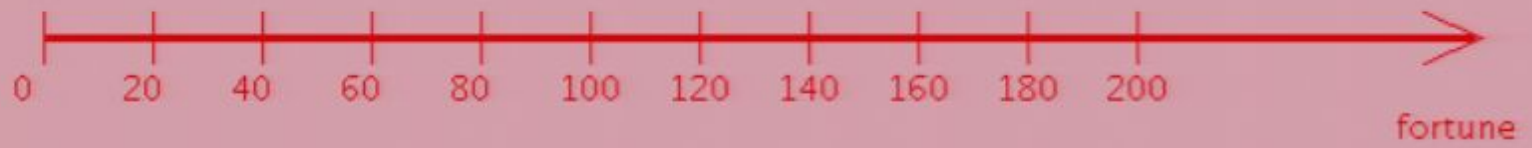
Fortune: \$60  
Win prob: 0.492929  
Number of bets: 19  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



Fortune: \$60  
Win prob: 0.492929  
Number of bets: 19  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



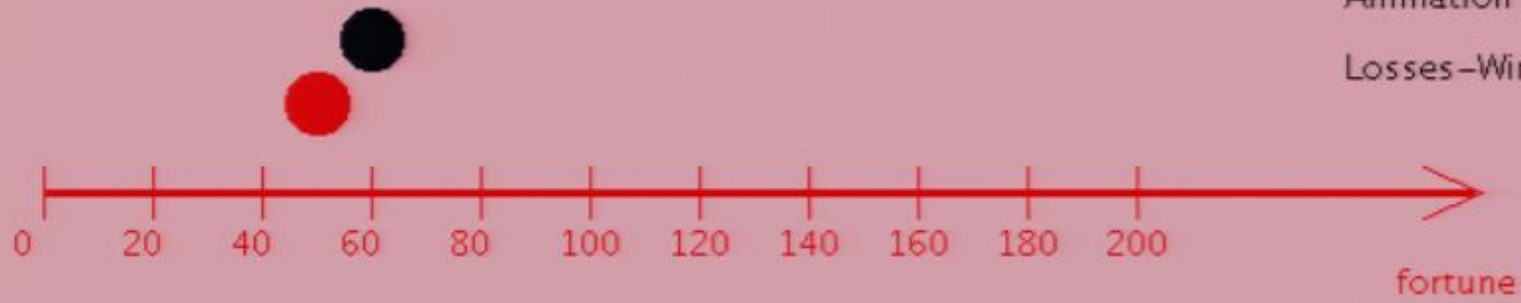
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 19  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



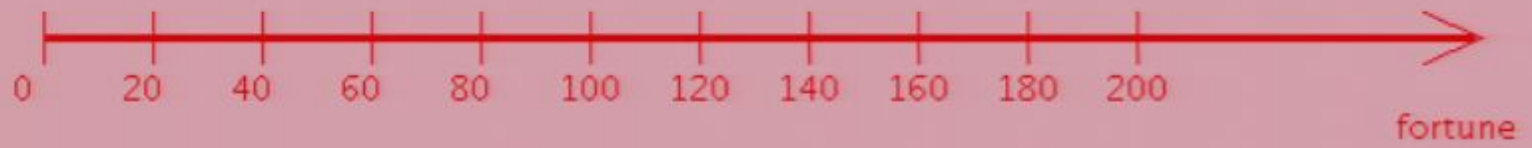
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 19  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



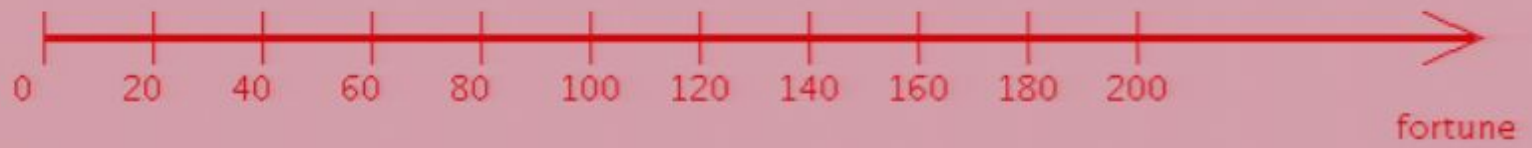
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 20  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 20  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



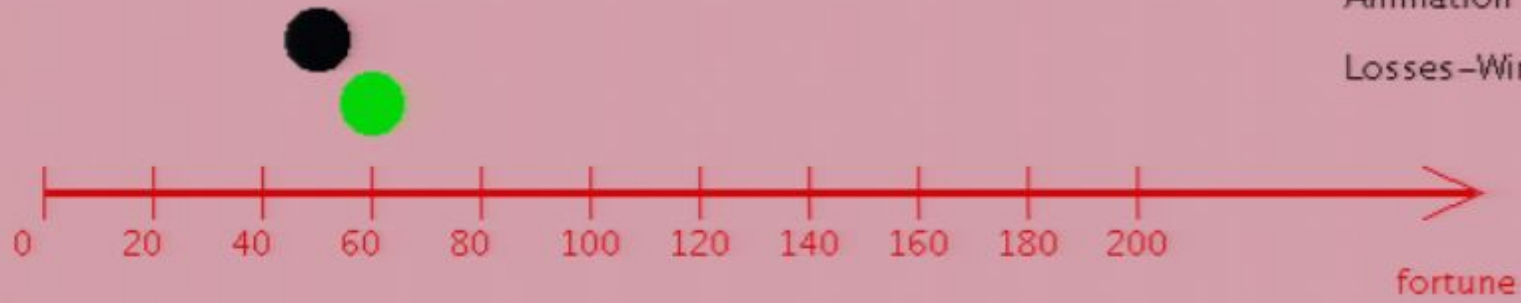
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 20  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 20  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 2  
Losses-Wins: 0-0



Applet started.



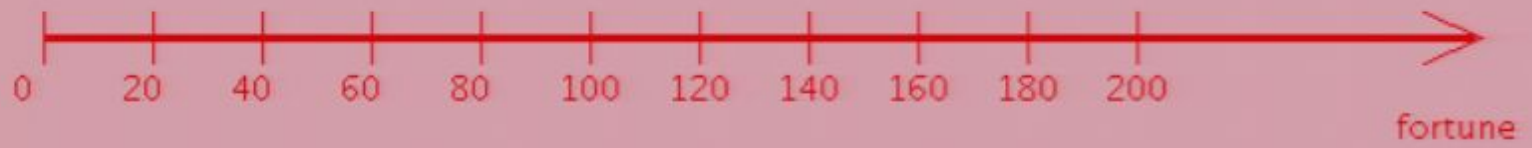
Fortune: \$60  
Win prob: 0.492929  
Number of bets: 21  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

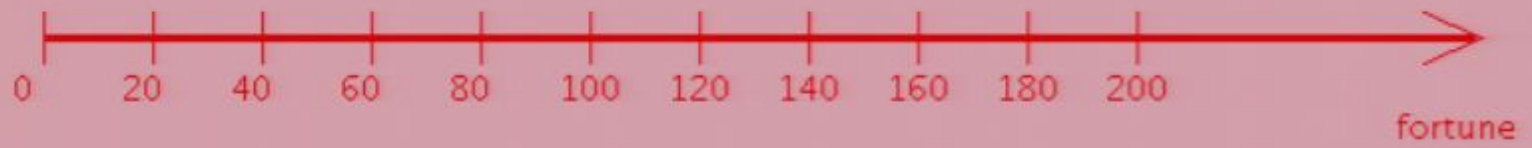


Fortune: \$70  
Win prob: 0.492929  
Number of bets: 22  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



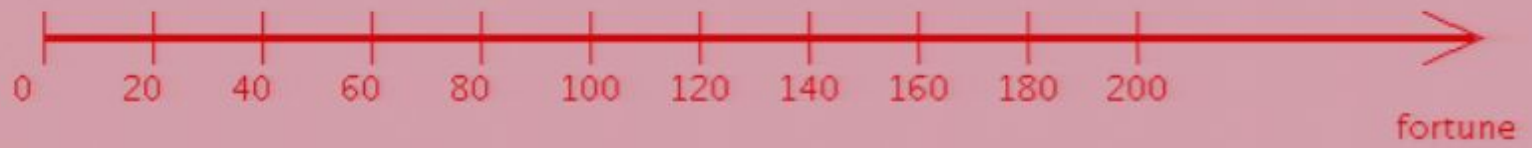
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 22  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



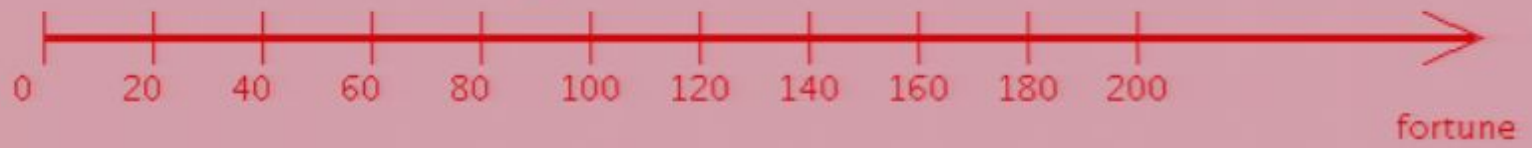
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 22  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



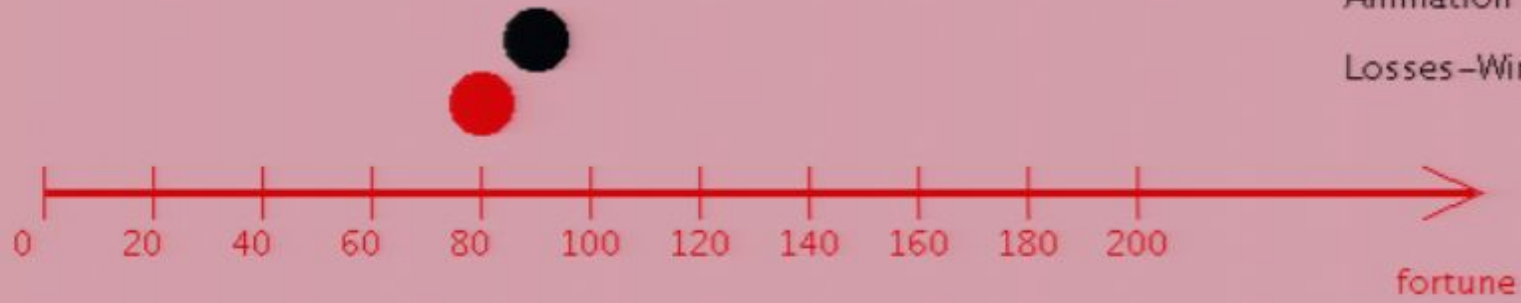
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 23  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



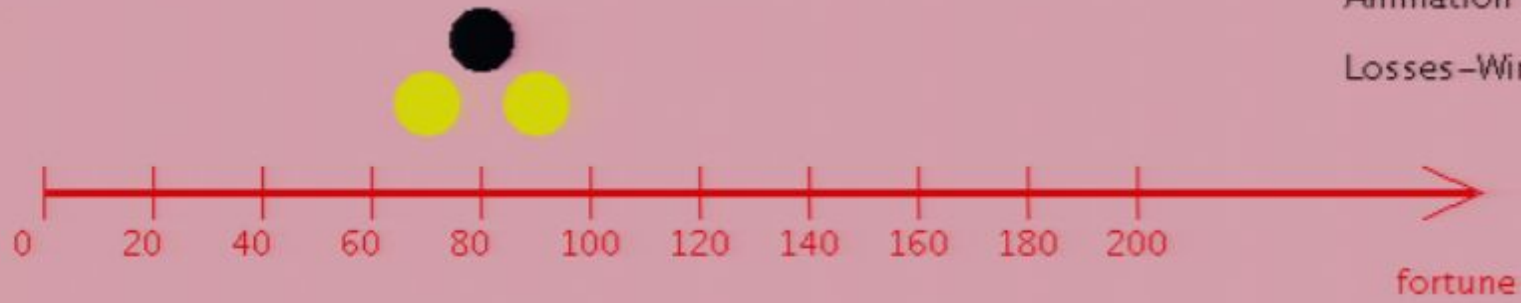
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 24  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



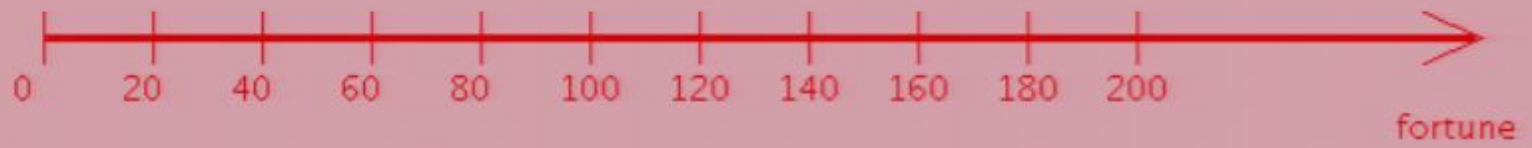
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 25  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

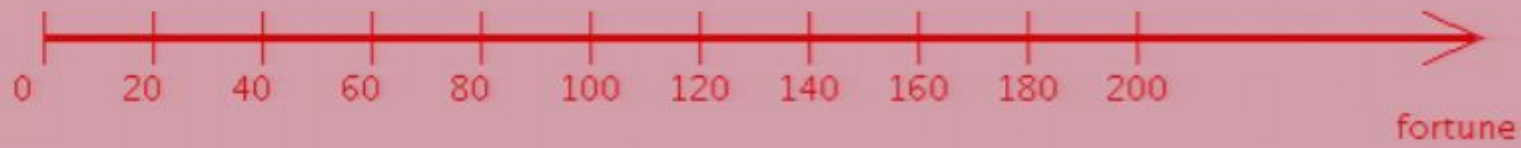
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 26  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.



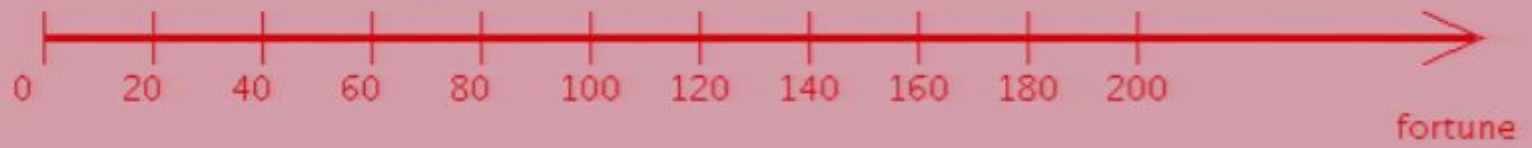
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 26  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

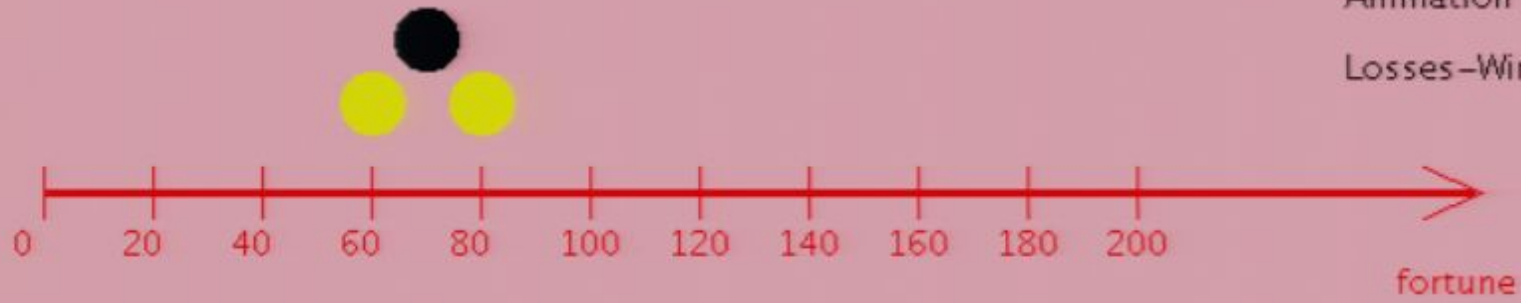


Fortune: \$80  
Win prob: 0.492929  
Number of bets: 27  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



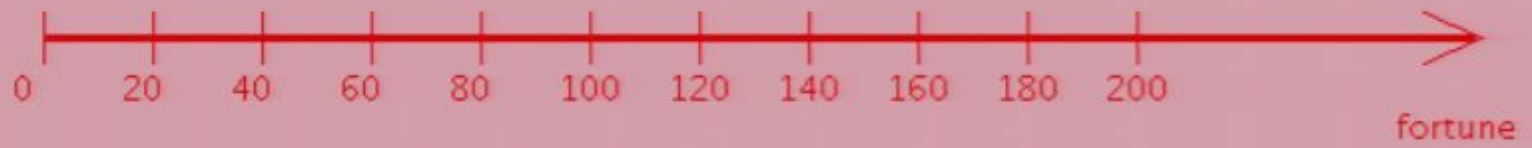
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 28  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 28  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 29  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 30  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



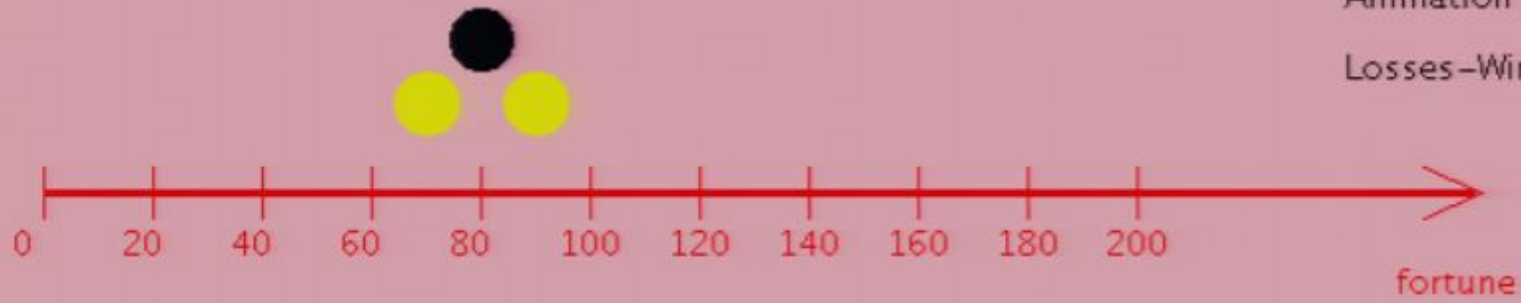
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 30  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

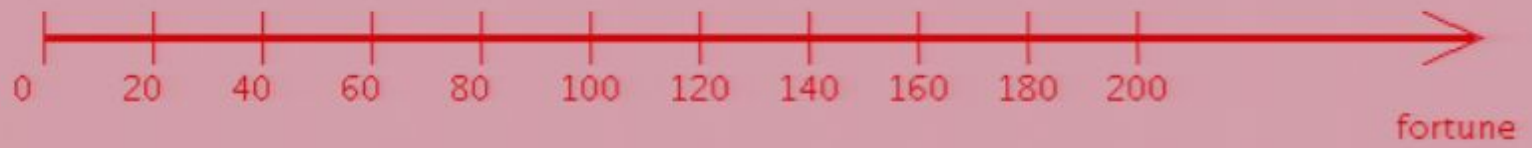
Fortune: \$80  
Win prob: 0.492929  
Number of bets: 31  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.



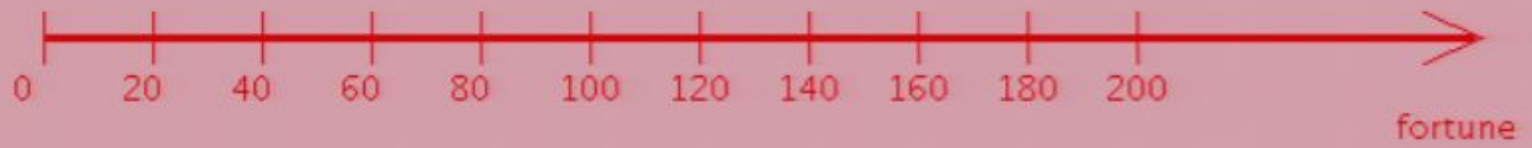
Fortune: \$90  
Win prob: 0.492929  
Number of bets: 32  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

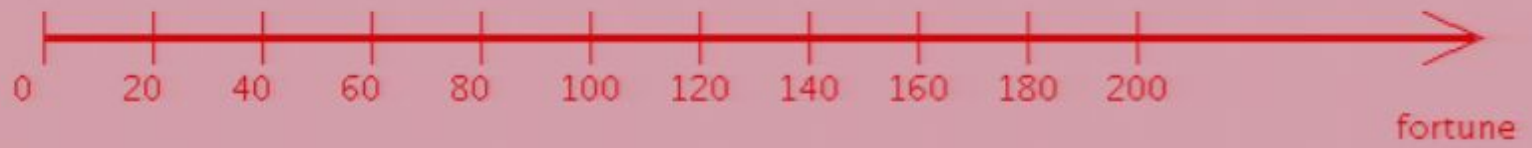


Fortune: \$90  
Win prob: 0.492929  
Number of bets: 32  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



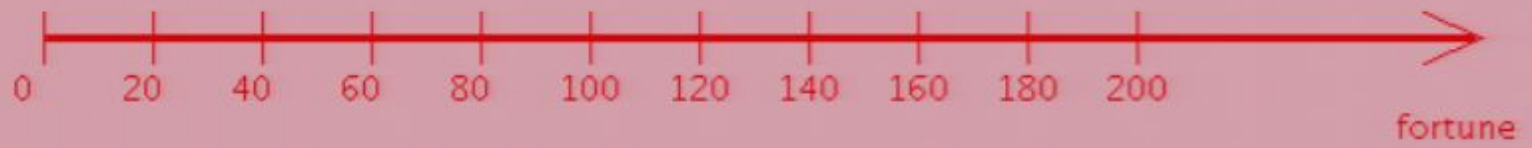
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 32  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



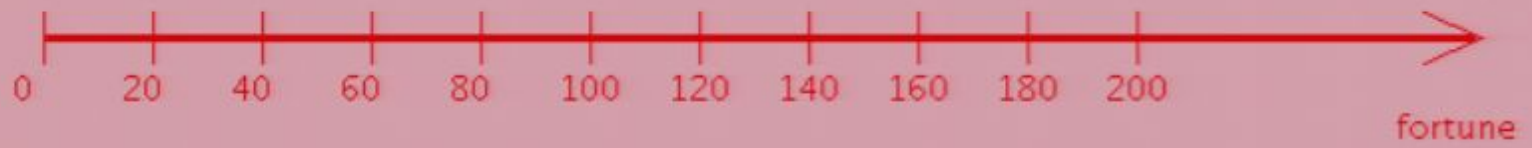
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 34  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 34  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 35  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



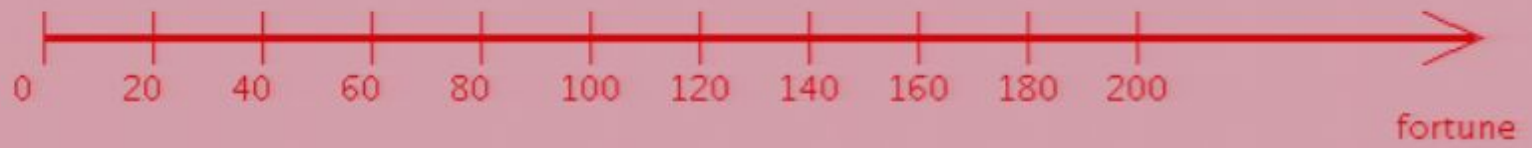
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 36  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

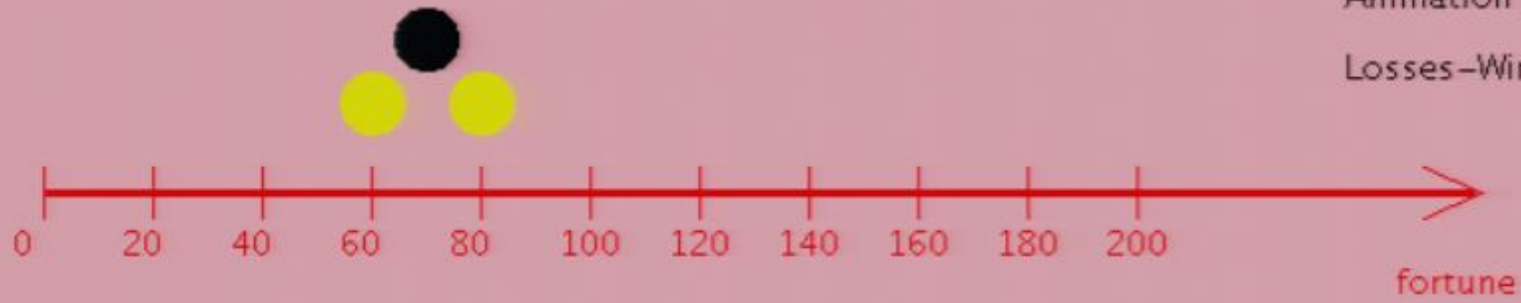
Fortune: \$60  
Win prob: 0.492929  
Number of bets: 37  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.



Fortune: \$70  
Win prob: 0.492929  
Number of bets: 38  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

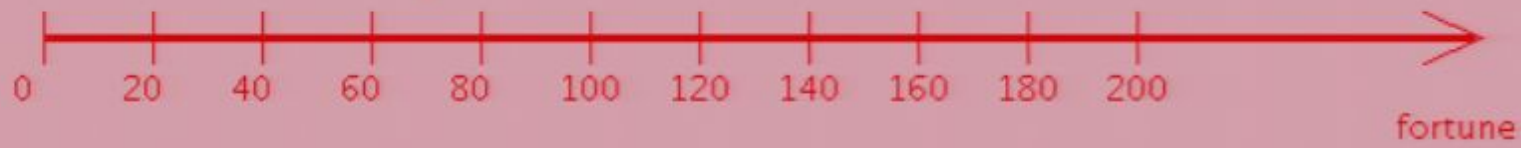


Fortune: \$70  
Win prob: 0.492929  
Number of bets: 38  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 39  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 40  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



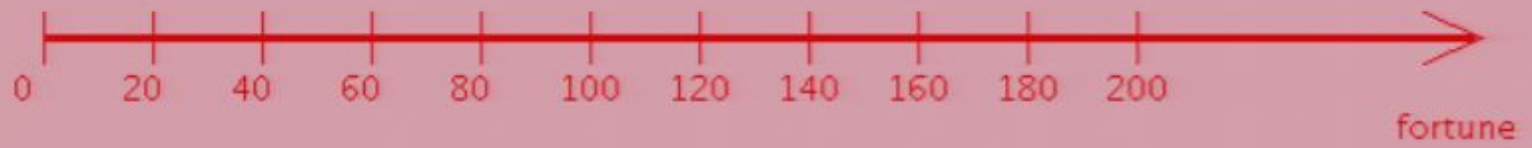
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 40  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



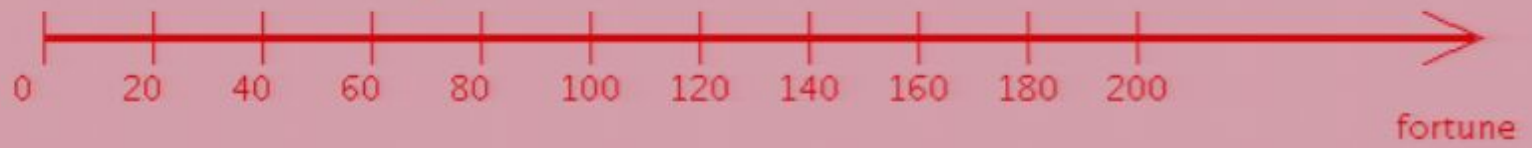
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 41  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



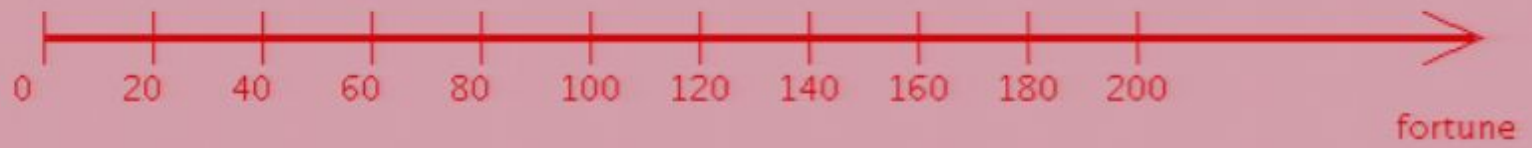
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 41  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

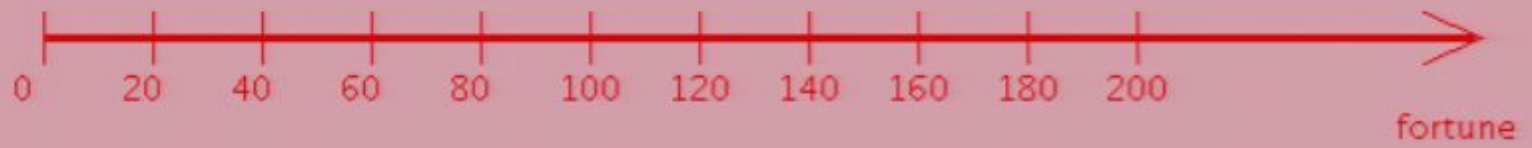
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 42  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.



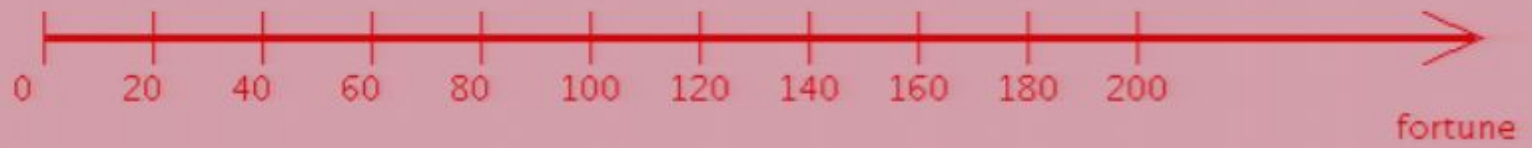
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 42  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

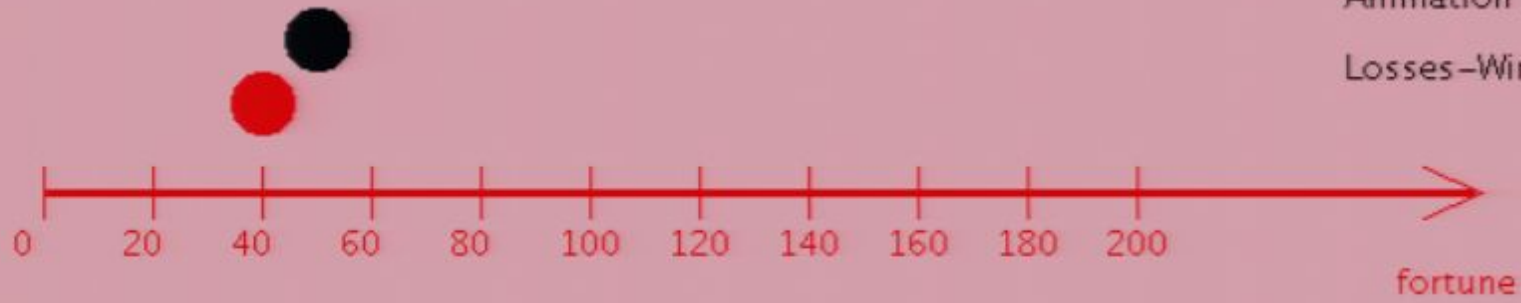


Fortune: \$50  
Win prob: 0.492929  
Number of bets: 44  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



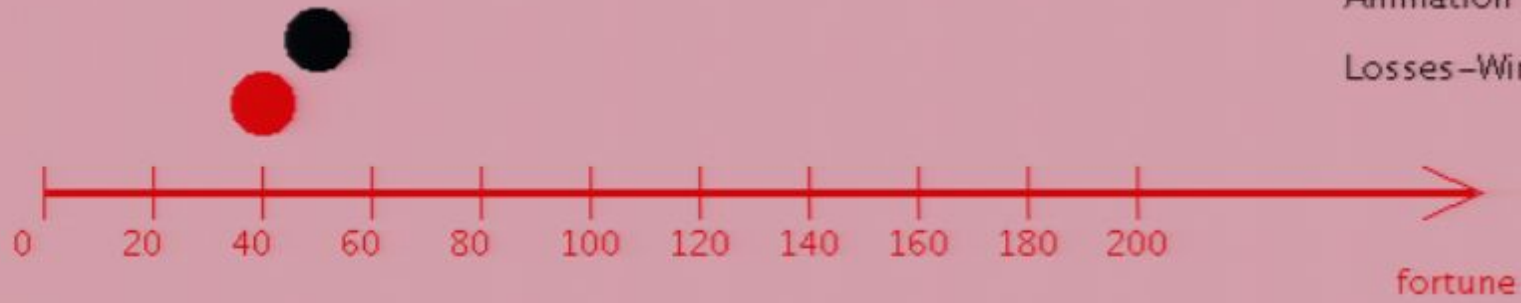
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 44  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



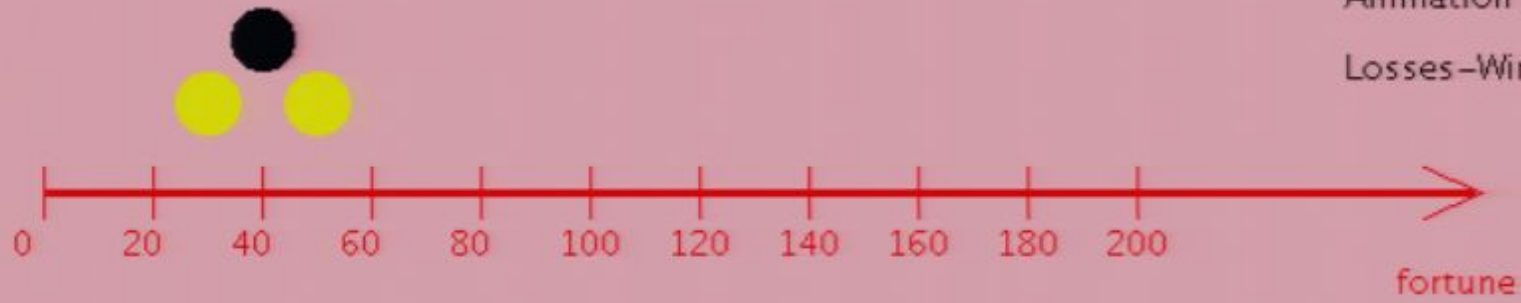
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 44  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



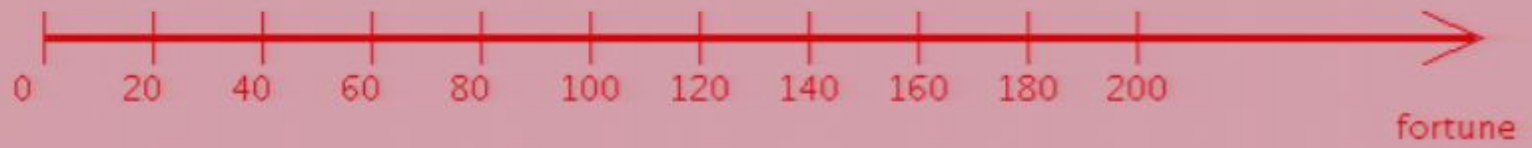
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 45  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



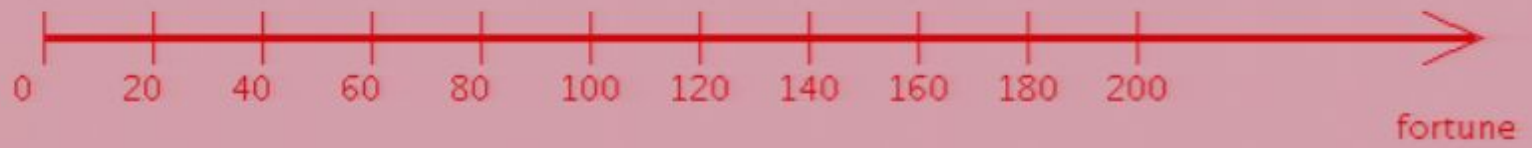
Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 46  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



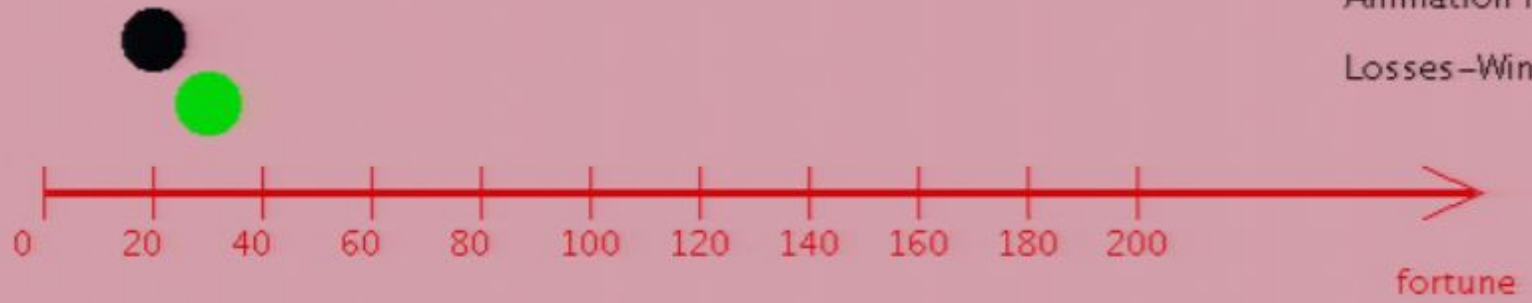
Applet started.

Fortune: \$20  
Win prob: 0.492929  
Number of bets: 47  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

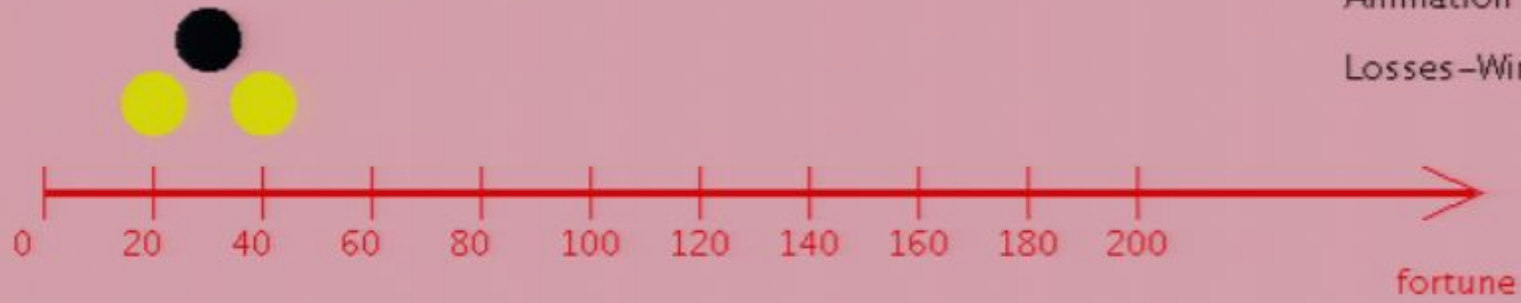
Fortune: \$20  
Win prob: 0.492929  
Number of bets: 47  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.



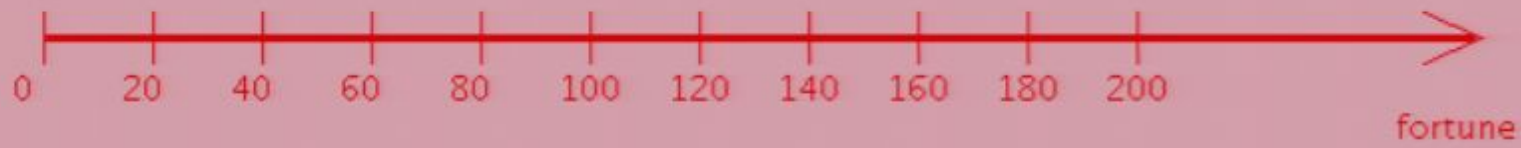
Fortune: \$30  
Win prob: 0.492929  
Number of bets: 48  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.



Fortune: \$40  
Win prob: 0.492929  
Number of bets: 49  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



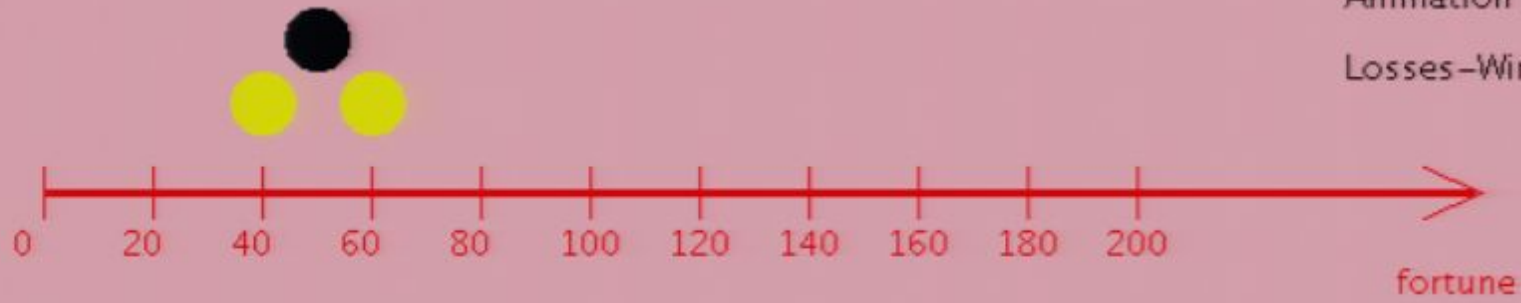
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 49  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 50  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



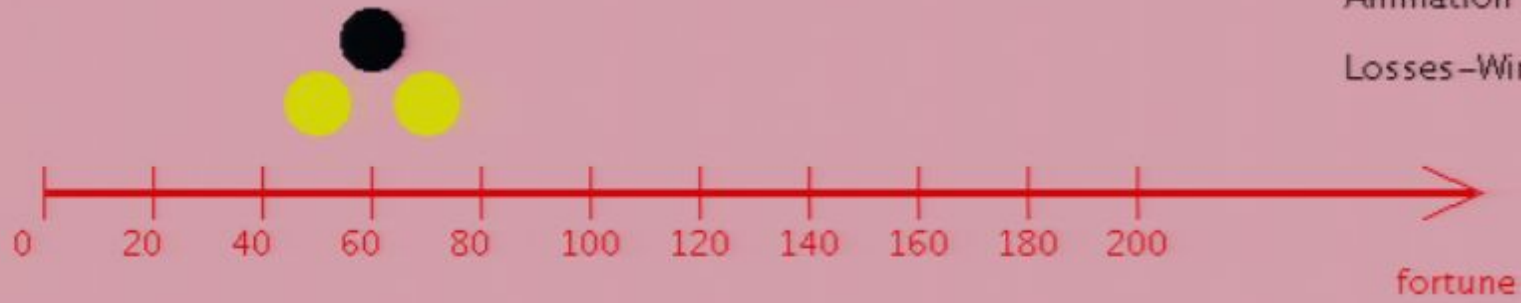
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 51  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



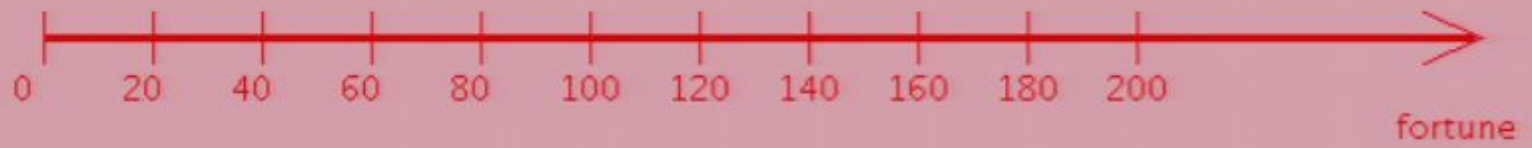
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 51  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



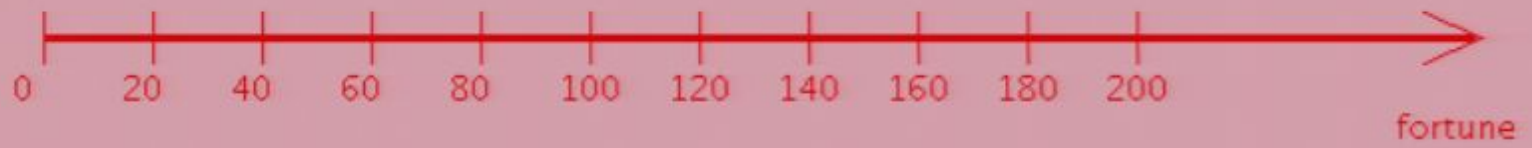
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 51  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.

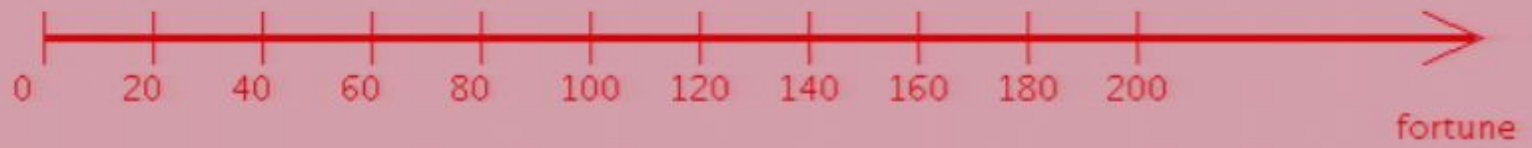
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 52  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 3  
Losses-Wins: 0-0



Applet started.



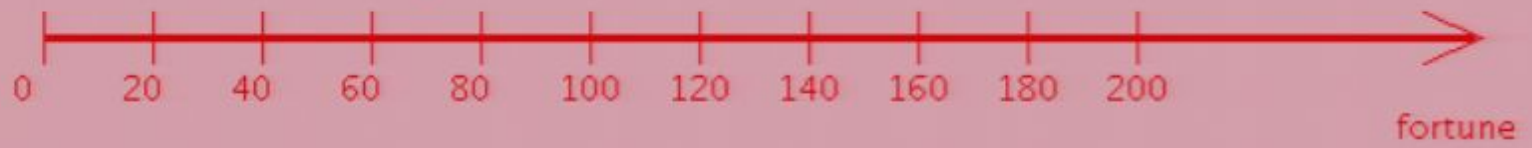
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 52  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

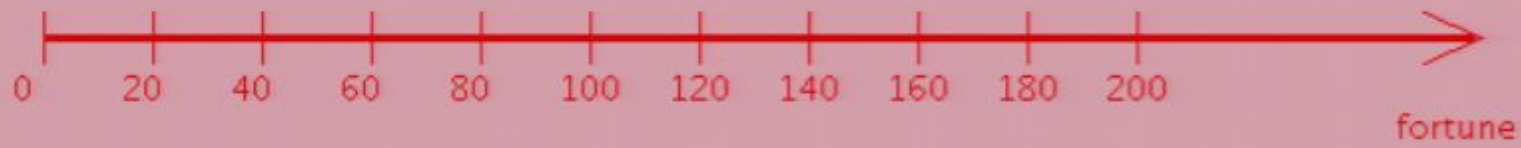


Fortune: \$80  
Win prob: 0.492929  
Number of bets: 53  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



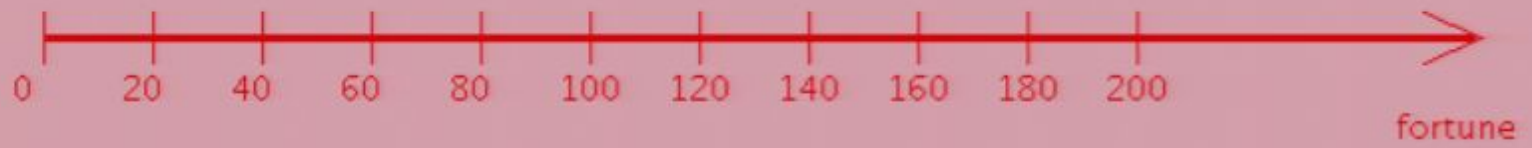
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 54  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



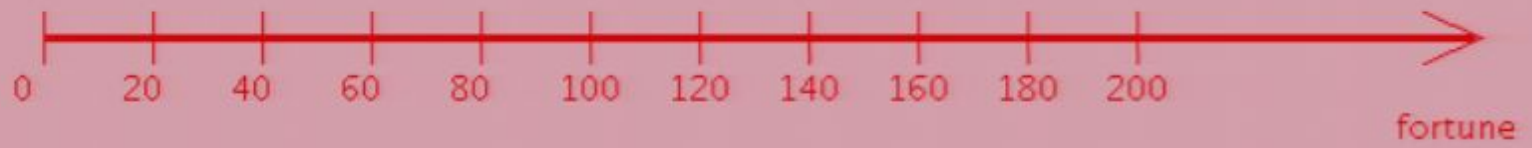
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 56  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



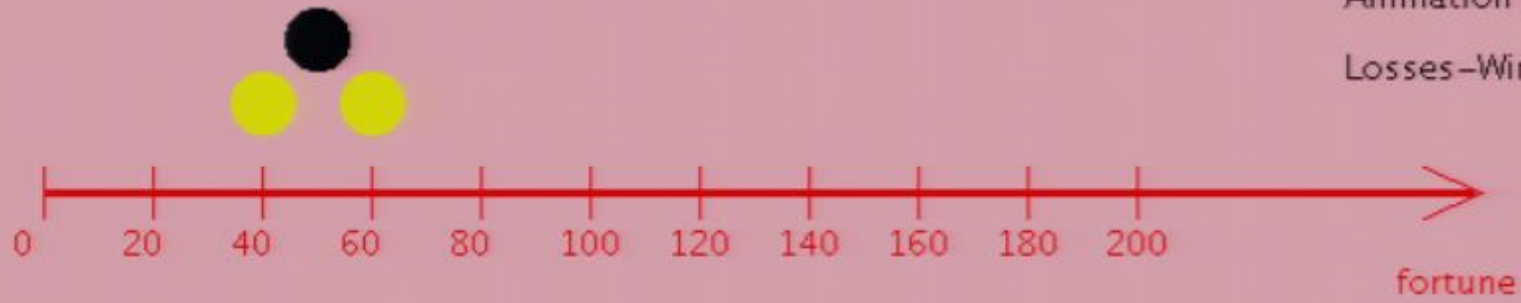
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 57  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



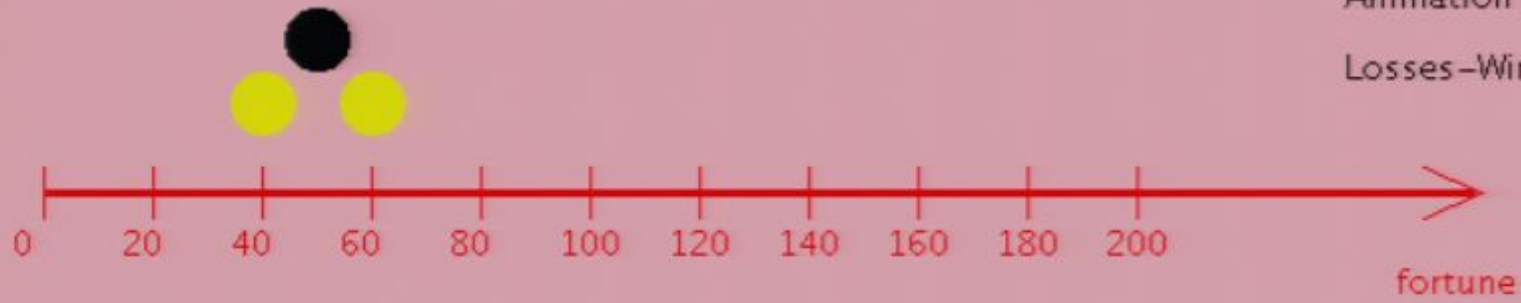
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 60  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 62  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

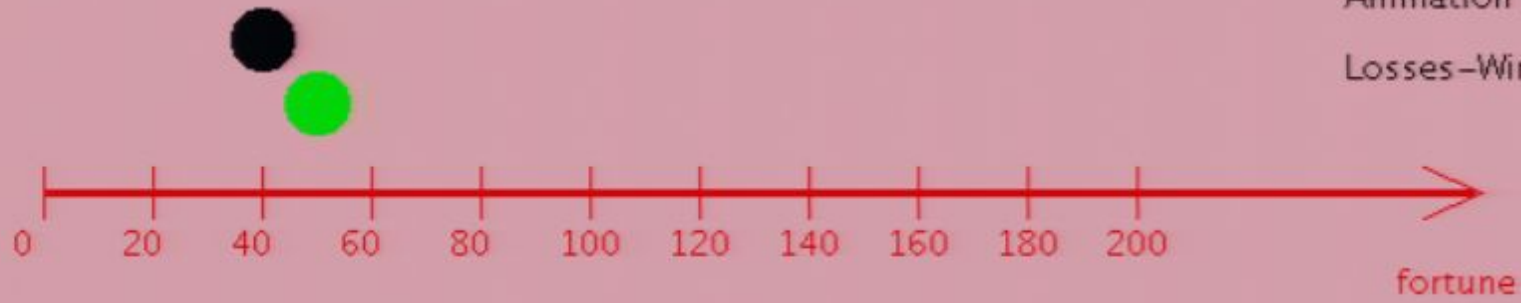
Fortune: \$30  
Win prob: 0.492929  
Number of bets: 64  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



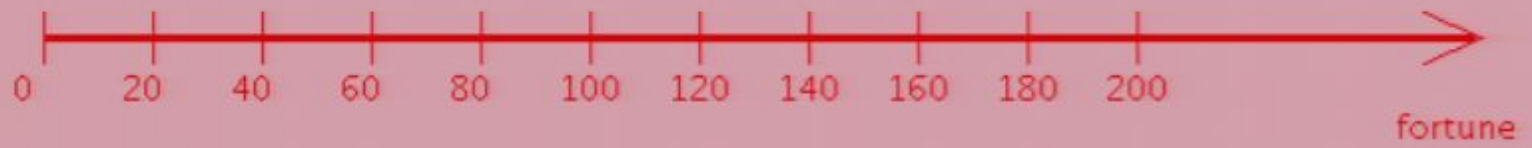
Fortune: \$40  
Win prob: 0.492929  
Number of bets: 65  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

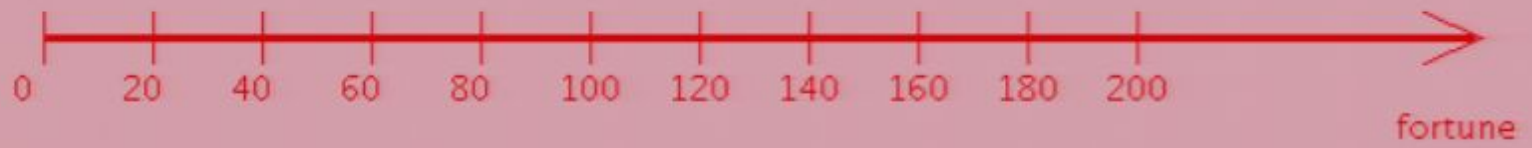


Fortune: \$70  
Win prob: 0.492929  
Number of bets: 68  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



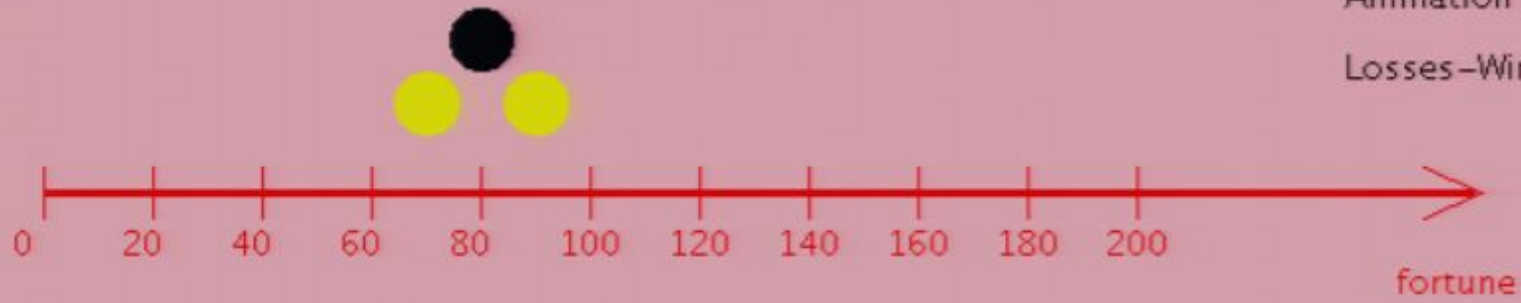
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 70  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



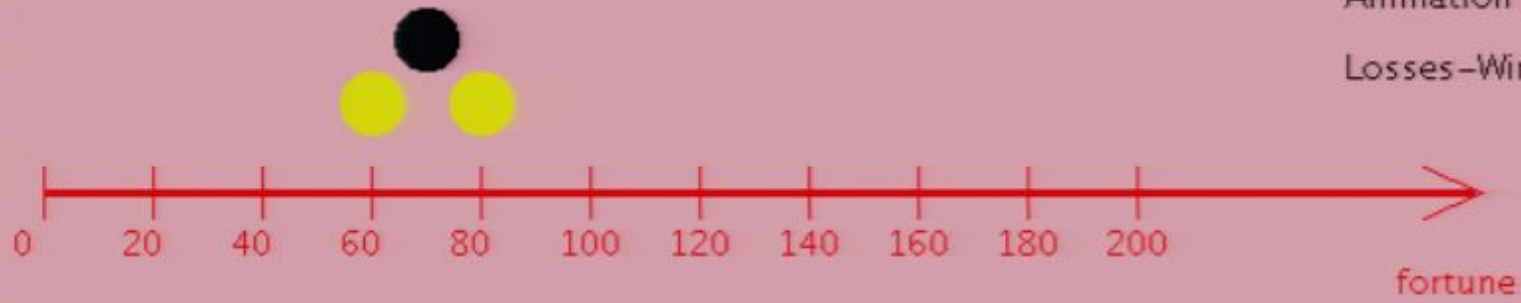
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 71  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



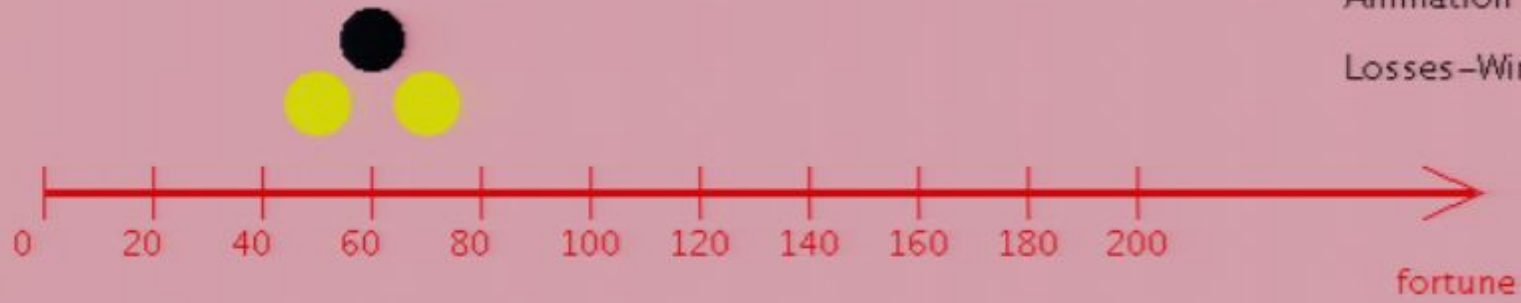
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 72  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



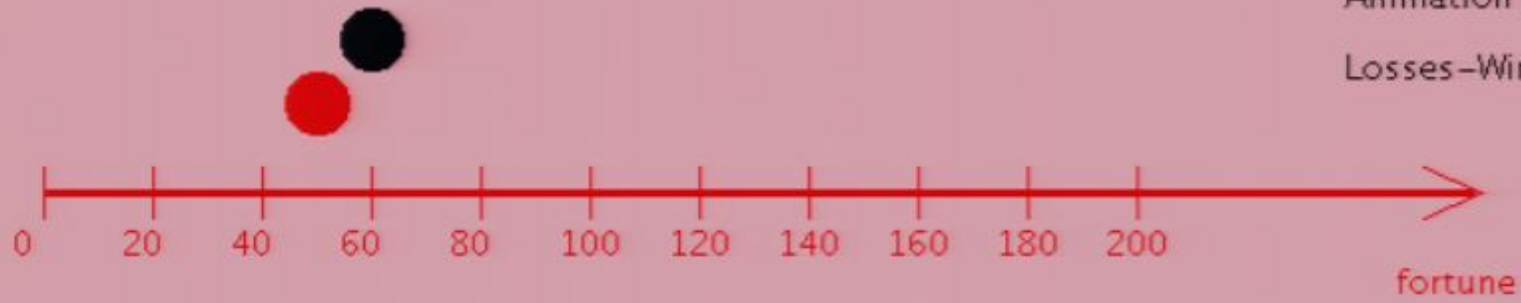
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 73  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



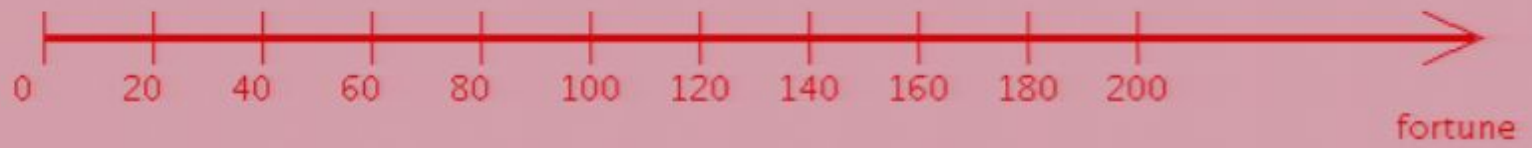
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 75  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

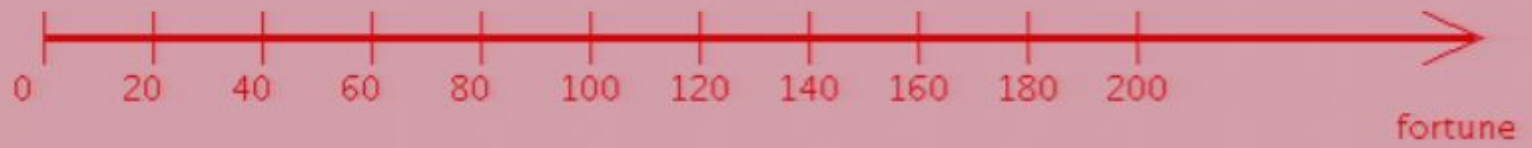
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 76  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



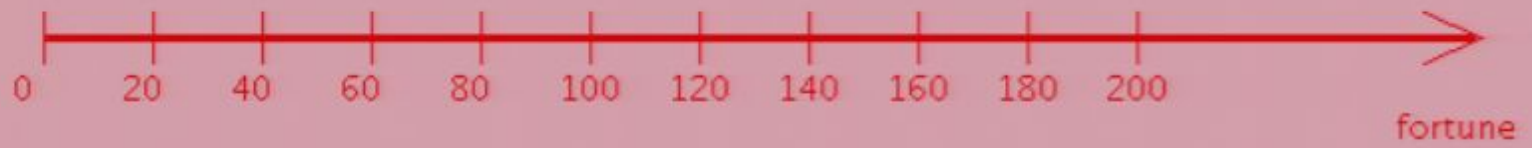
Fortune: \$40  
Win prob: 0.492929  
Number of bets: 79  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

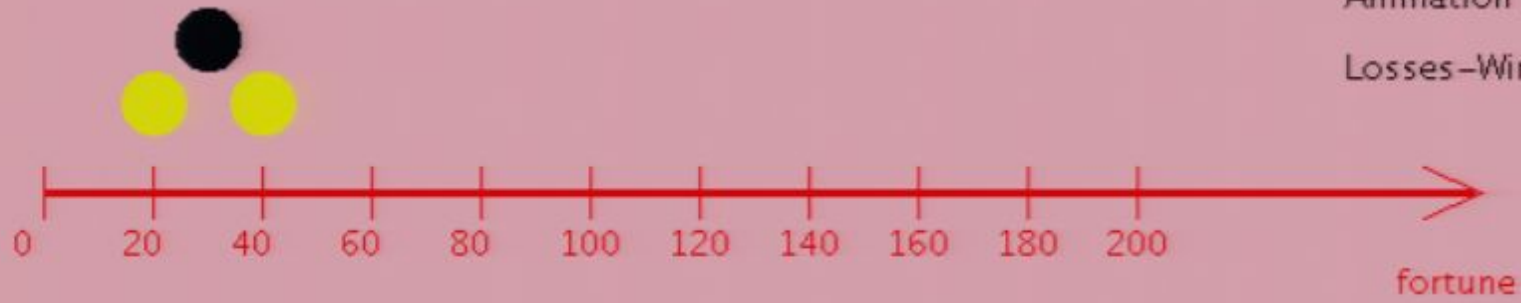


Fortune: \$30  
Win prob: 0.492929  
Number of bets: 80  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



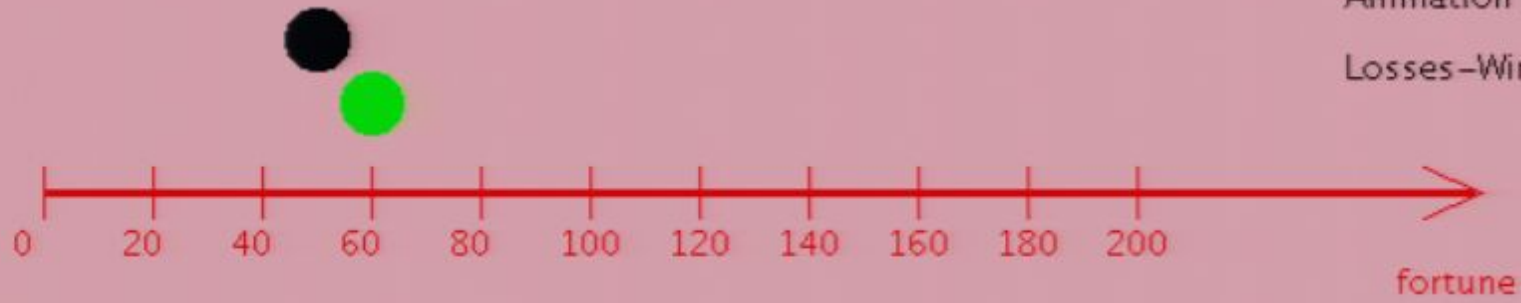
Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 82  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



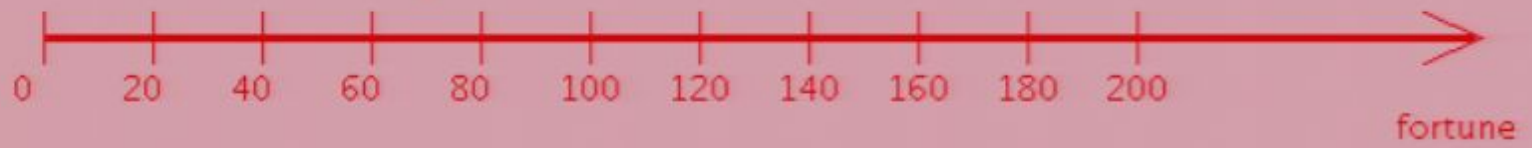
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 84  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



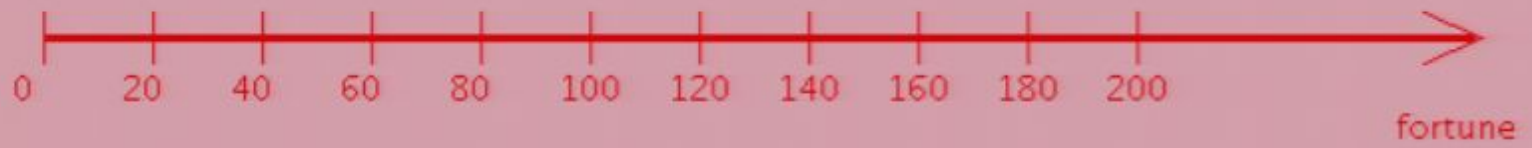
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 85  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



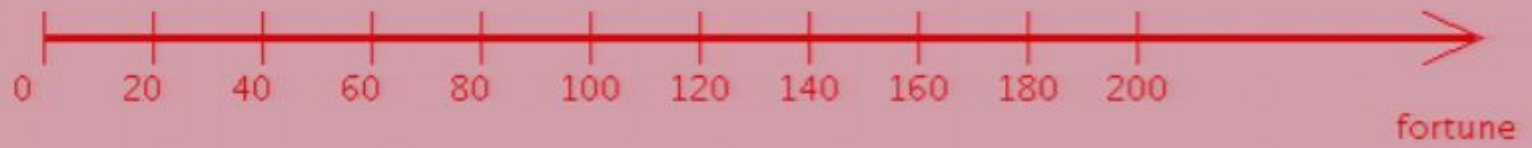
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 87  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



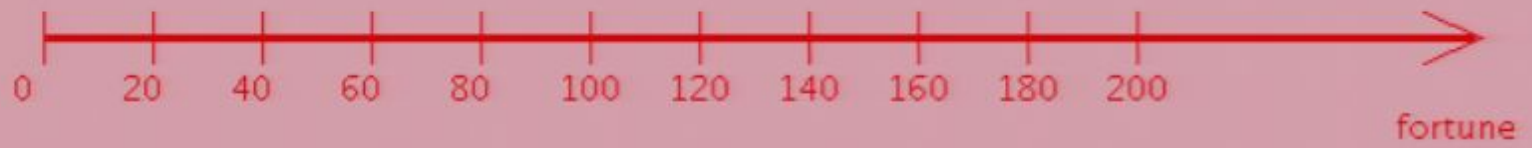
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 89  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

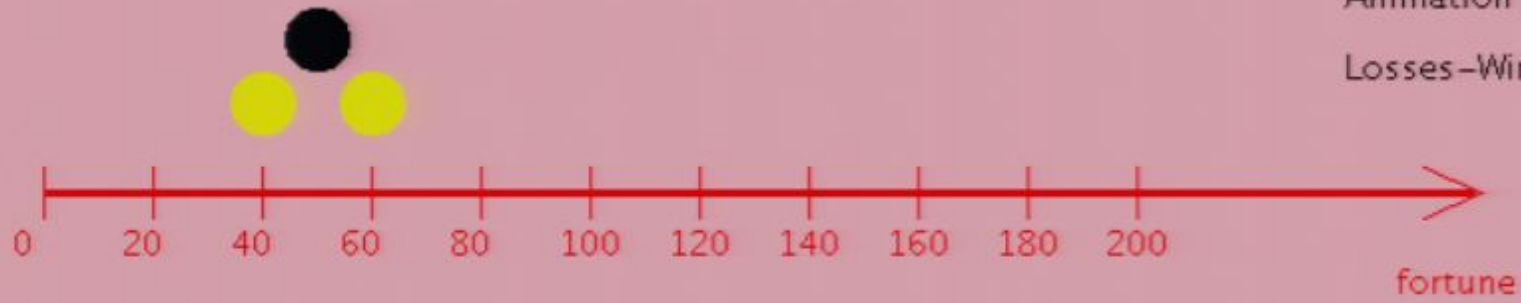
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 90  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



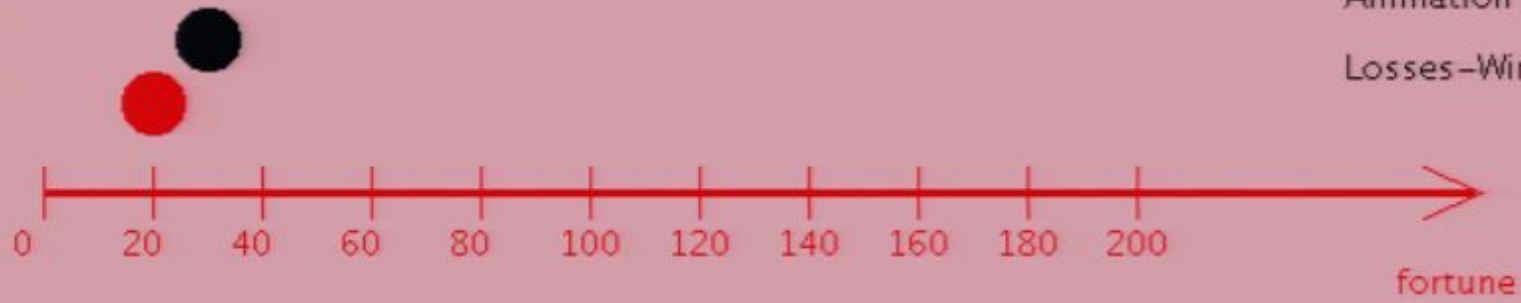
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 92  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

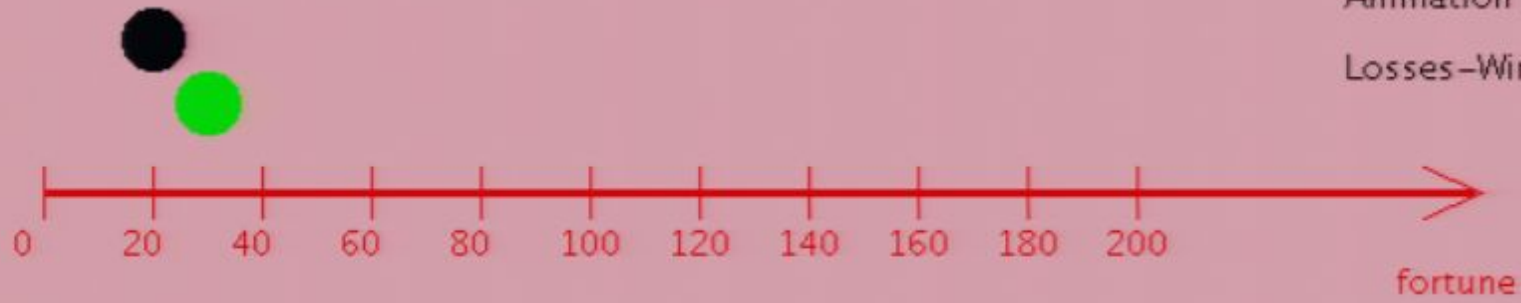


Fortune: \$30  
Win prob: 0.492929  
Number of bets: 94  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



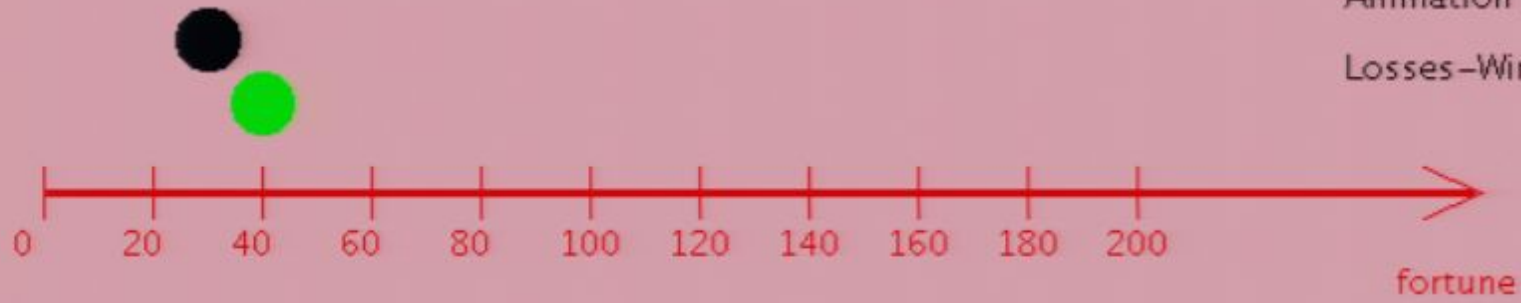
Applet started.

Fortune: \$20  
Win prob: 0.492929  
Number of bets: 95  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



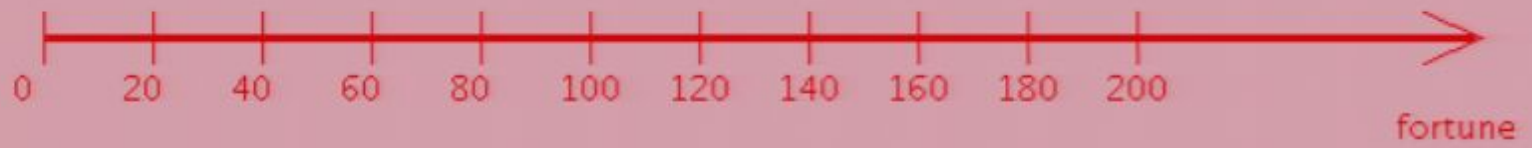
Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 96  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



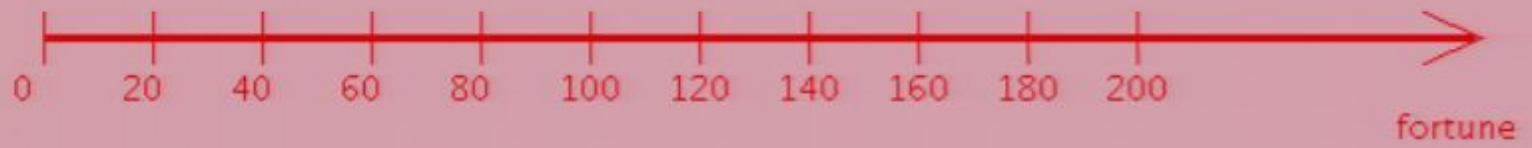
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 97  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



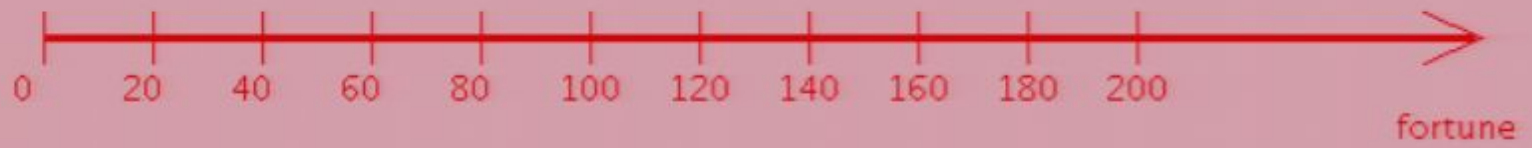
Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 100  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



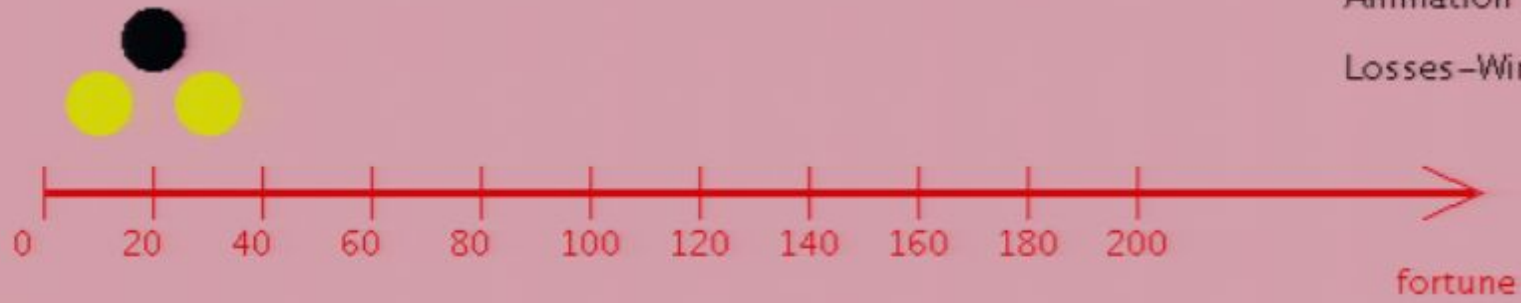
Applet started.

Fortune: \$20  
Win prob: 0.492929  
Number of bets: 101  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$20  
Win prob: 0.492929  
Number of bets: 103  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



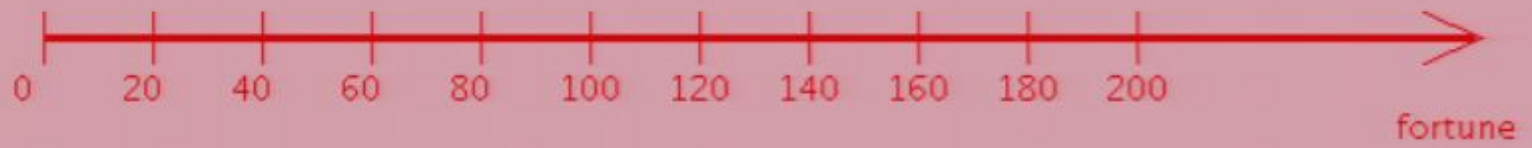
Fortune: \$20  
Win prob: 0.492929  
Number of bets: 105  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

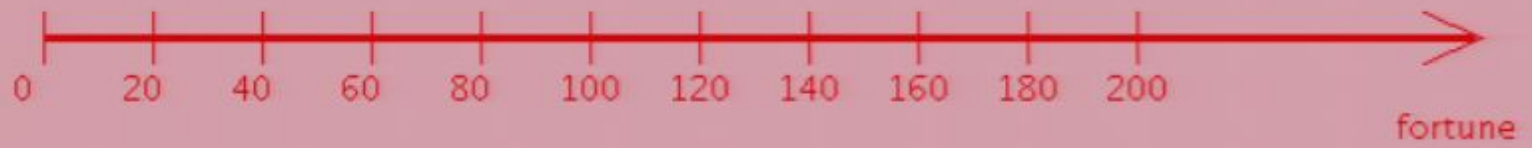


Fortune: \$60  
Win prob: 0.492929  
Number of bets: 109  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



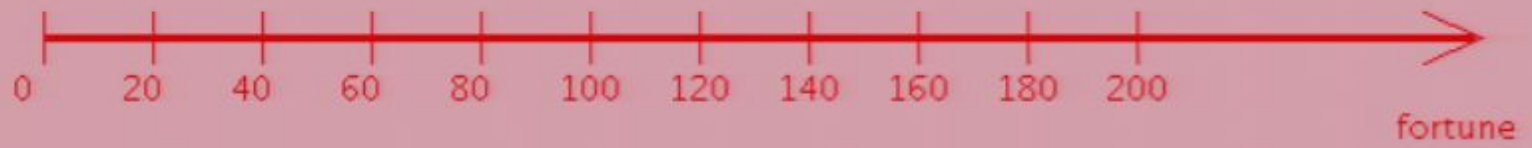
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 109  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 110  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 112  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



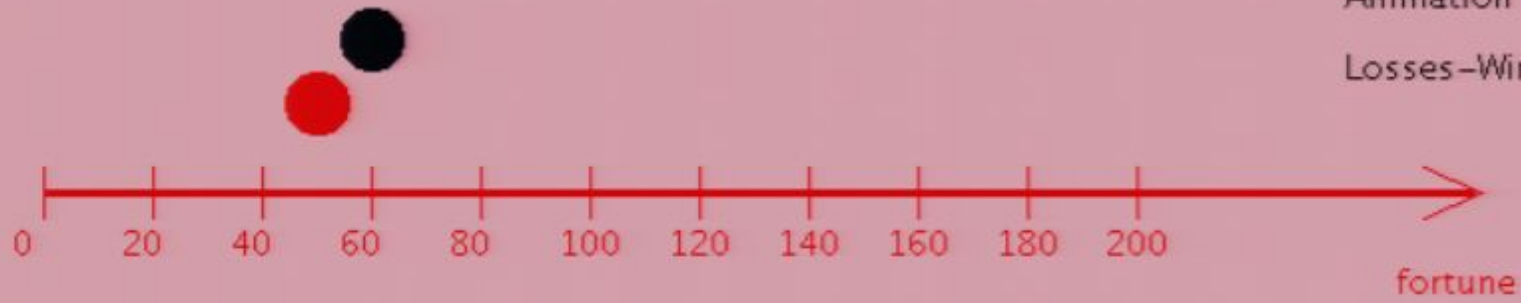
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 114  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



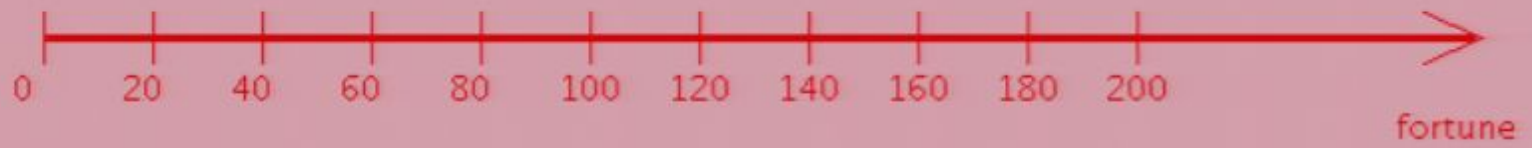
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 115  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

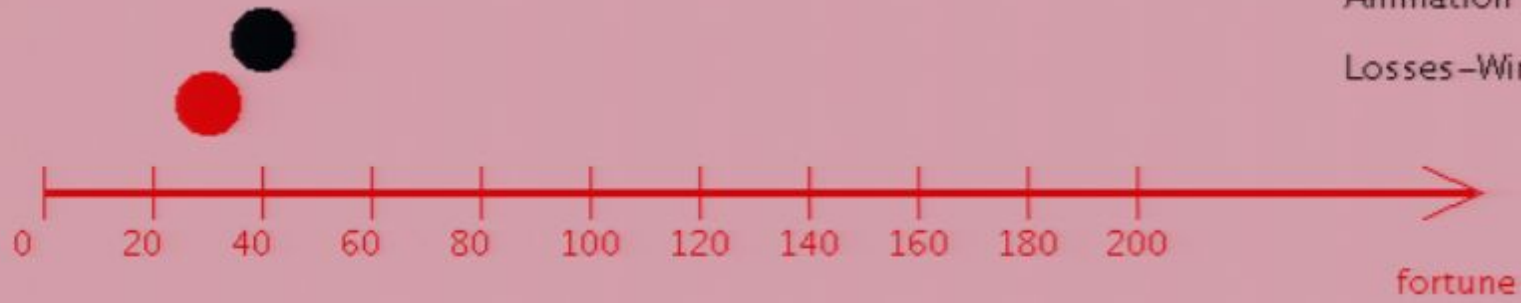
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 116  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



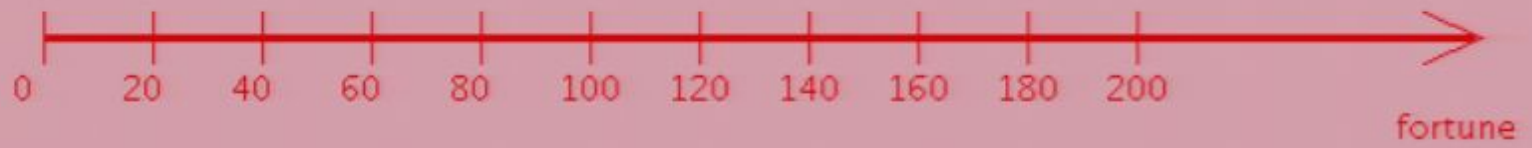
Fortune: \$40  
Win prob: 0.492929  
Number of bets: 117  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

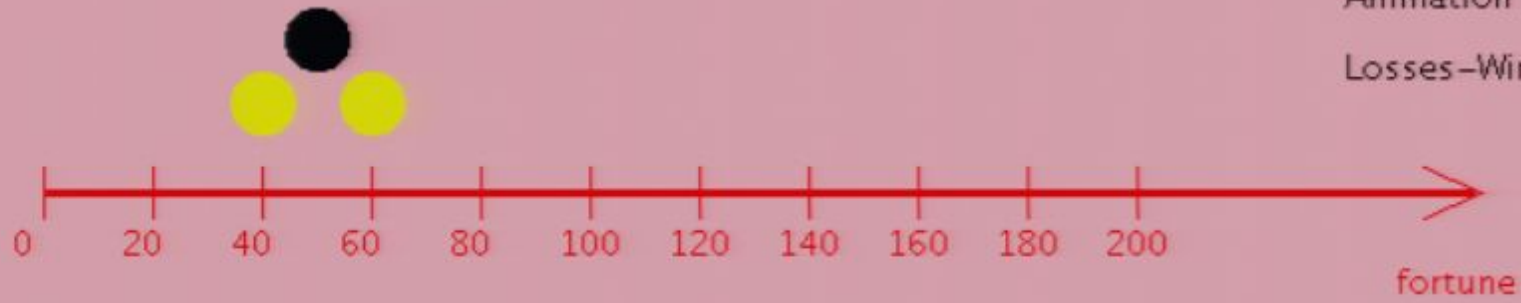


Fortune: \$30  
Win prob: 0.492929  
Number of bets: 120  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



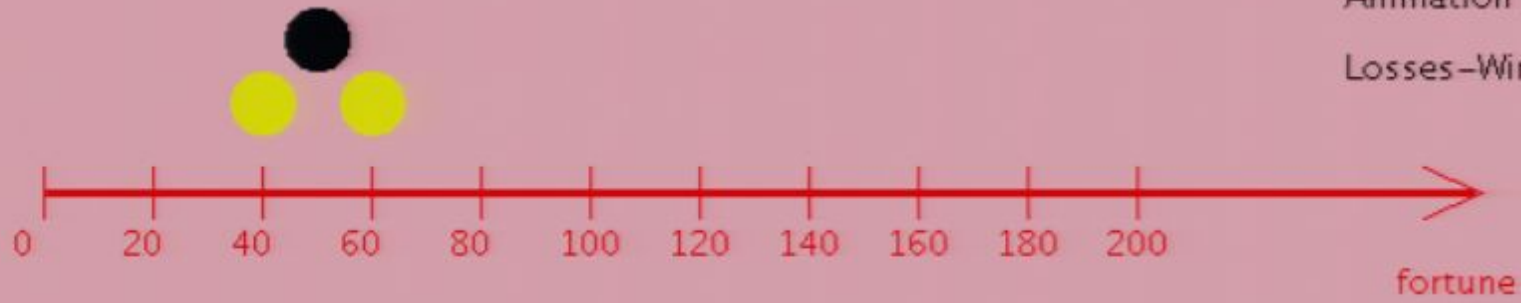
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 122  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 123  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



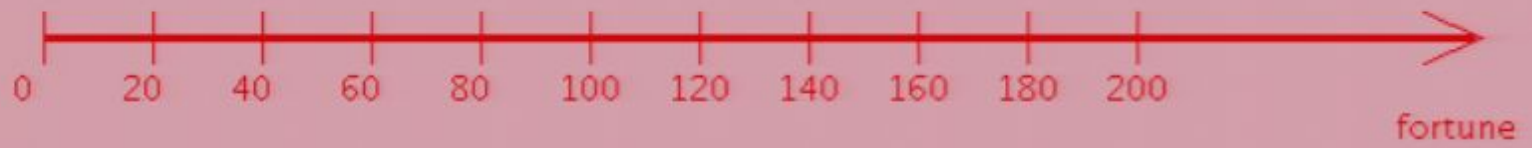
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 125  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



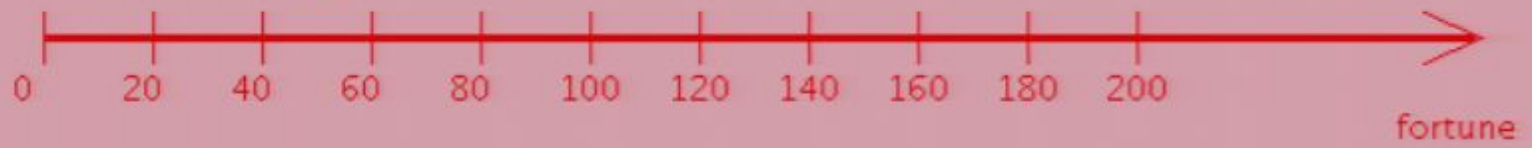
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 126  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



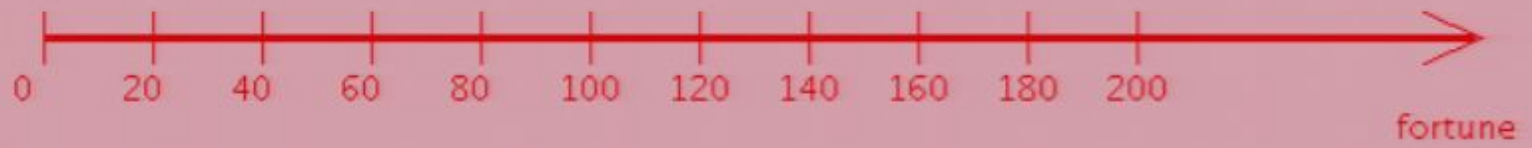
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 127  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

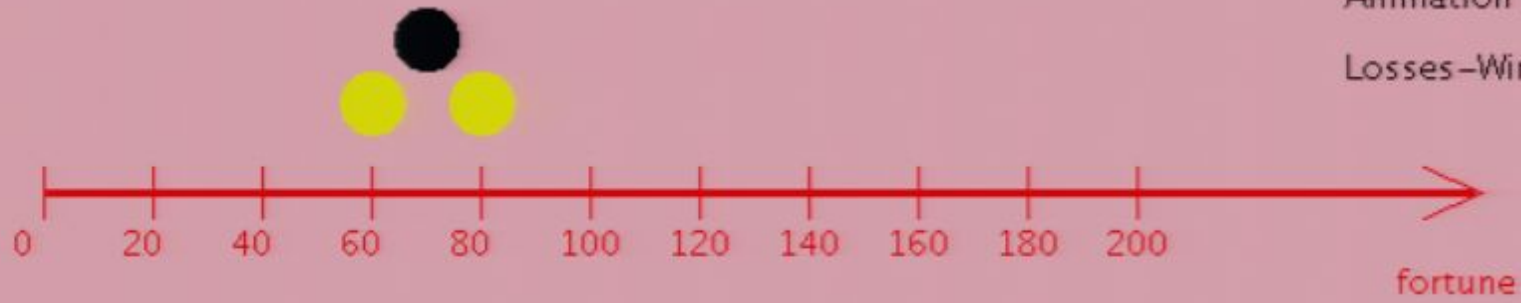
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 130  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



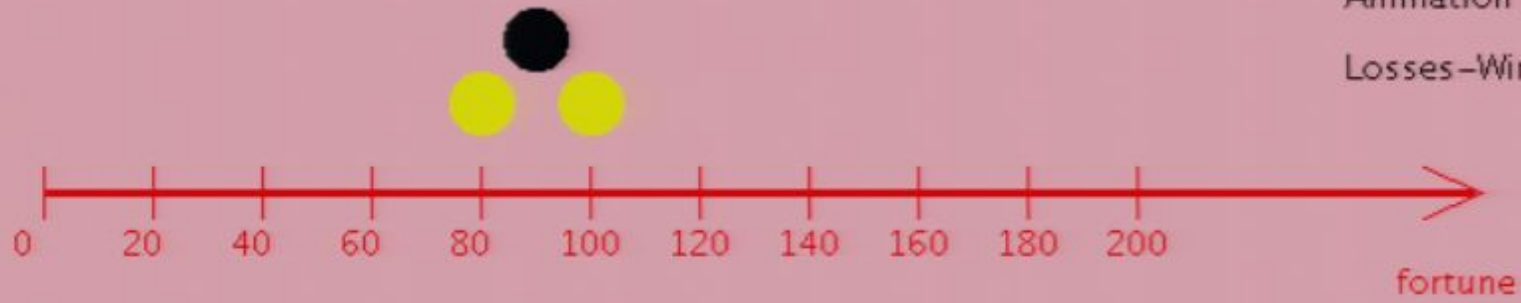
Fortune: \$70  
Win prob: 0.492929  
Number of bets: 132  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



Fortune: \$90  
Win prob: 0.492929  
Number of bets: 134  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



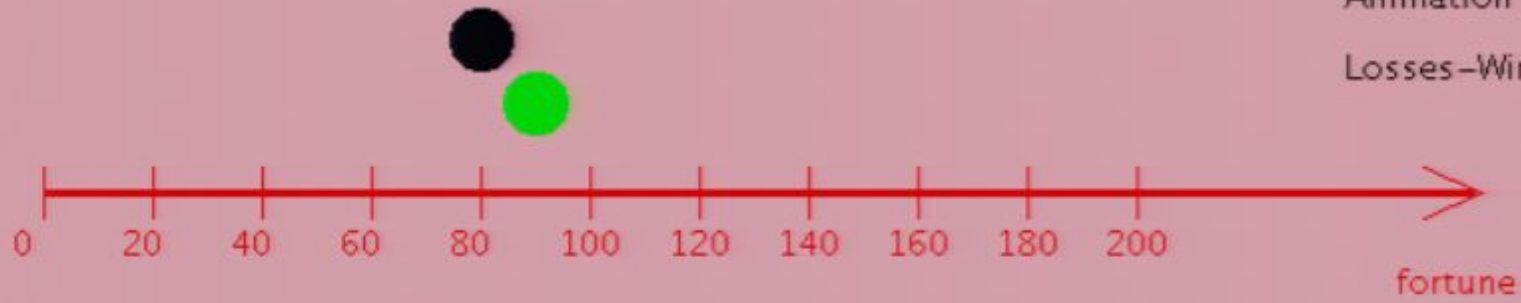
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 135  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



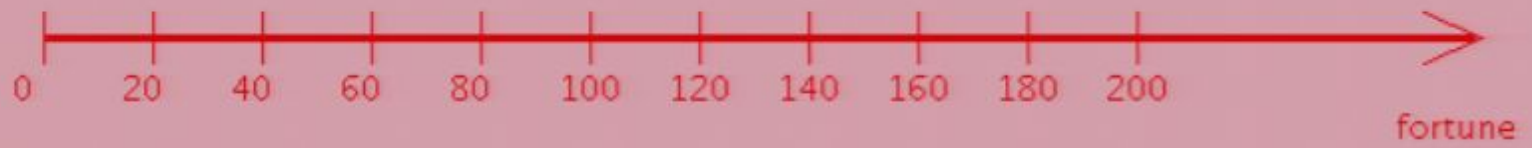
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 137  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



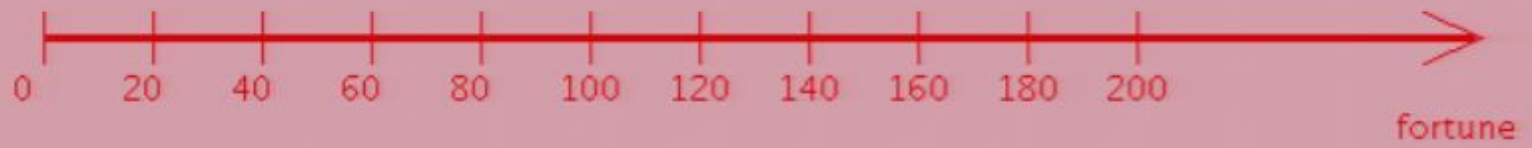
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 140  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



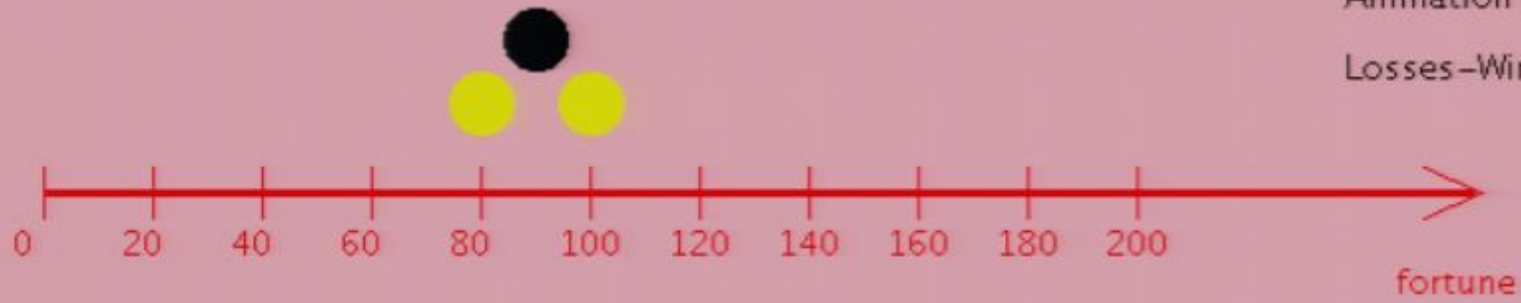
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 141  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 142  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

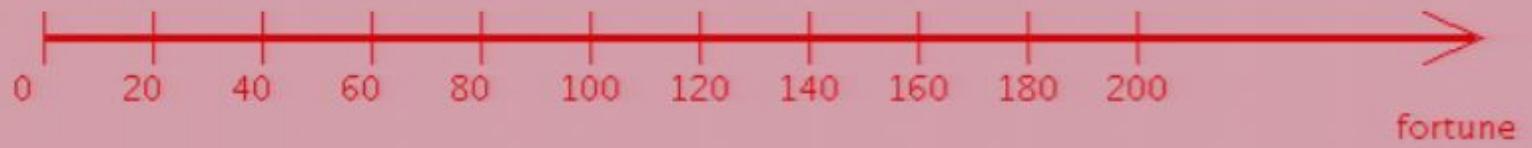
Fortune: \$110  
Win prob: 0.492929  
Number of bets: 144  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



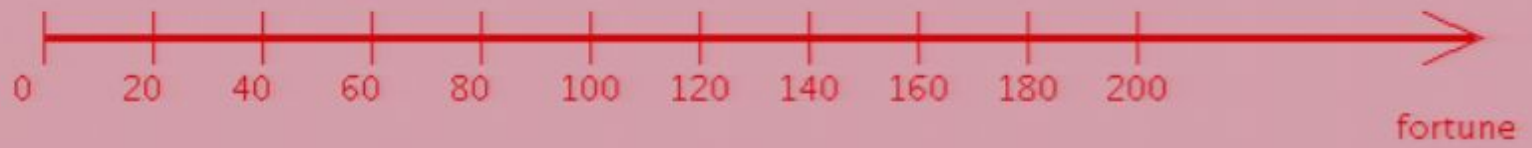
Fortune: \$90  
Win prob: 0.492929  
Number of bets: 146  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

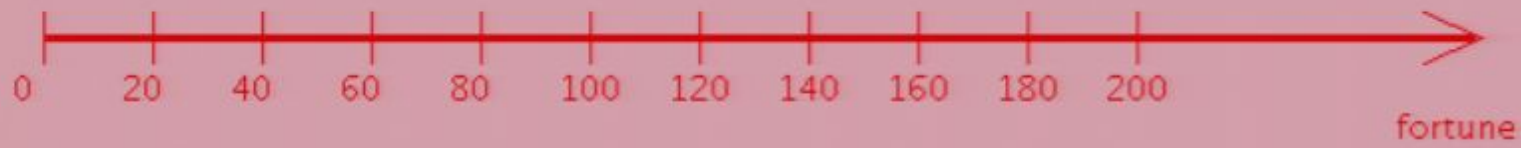


Fortune: \$70  
Win prob: 0.492929  
Number of bets: 148  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



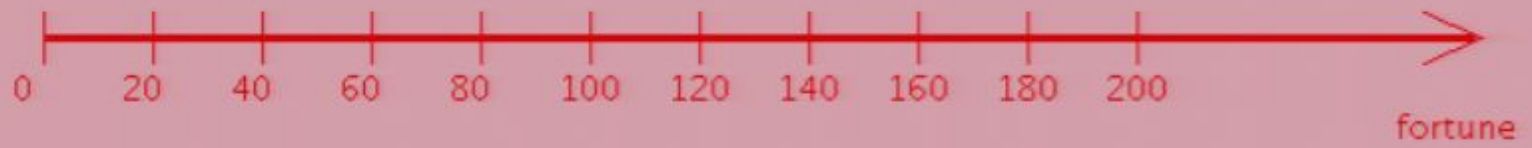
Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 151  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



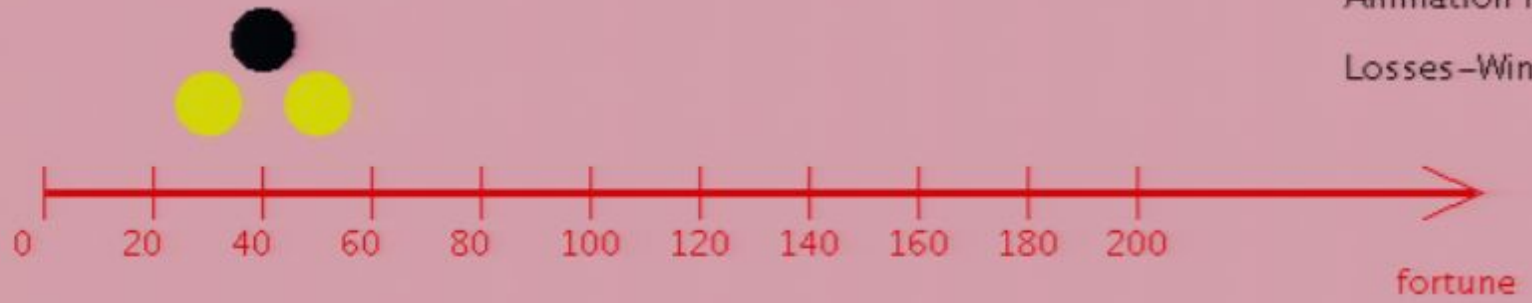
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 152  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$40  
Win prob: 0.492929  
Number of bets: 153  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



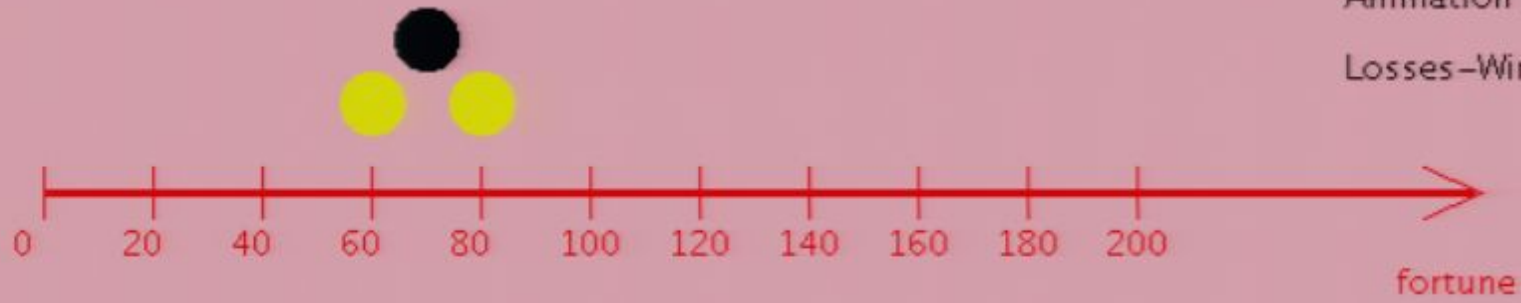
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 154  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



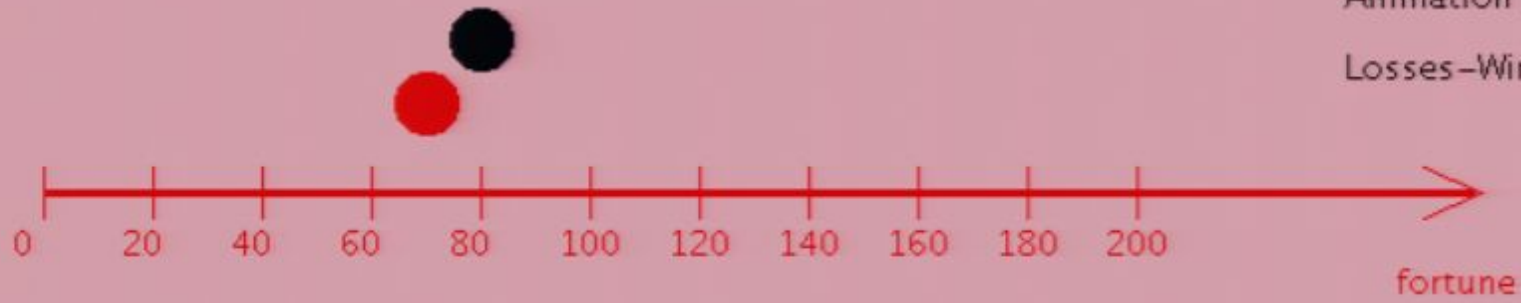
Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 156  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

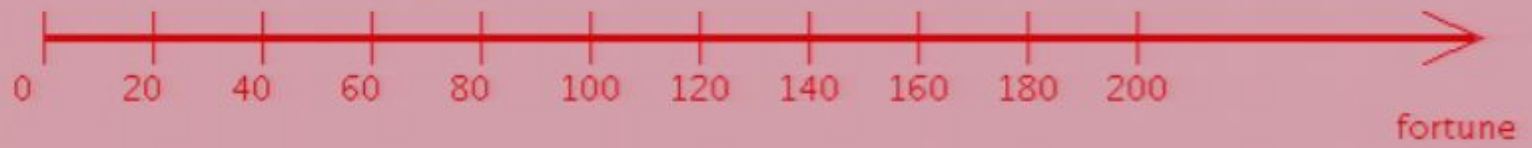
Fortune: \$80  
Win prob: 0.492929  
Number of bets: 157  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



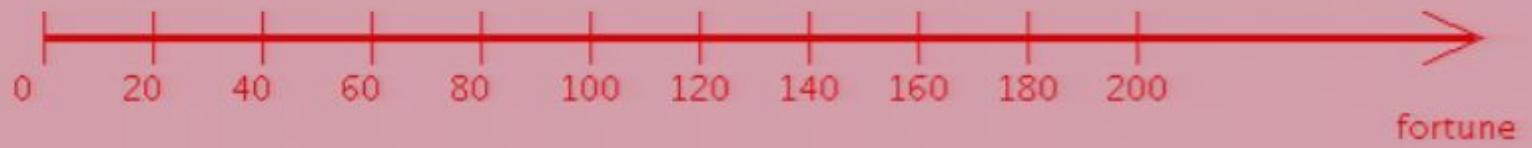
Fortune: \$60  
Win prob: 0.492929  
Number of bets: 159  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

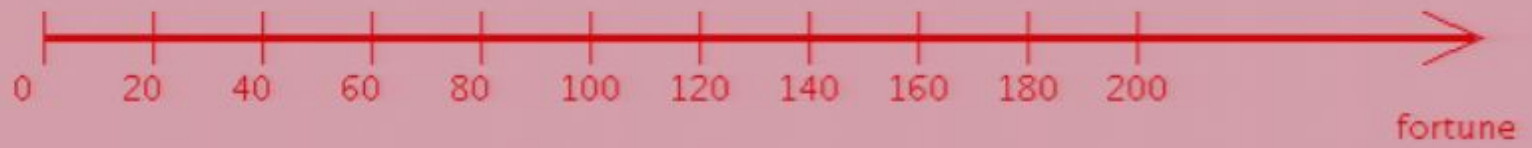


Fortune: \$90  
Win prob: 0.492929  
Number of bets: 162  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 163  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



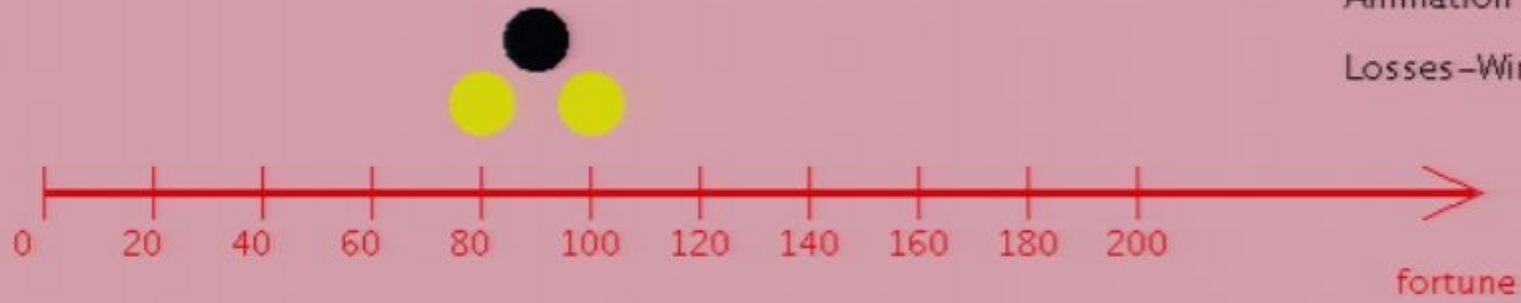
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 165  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



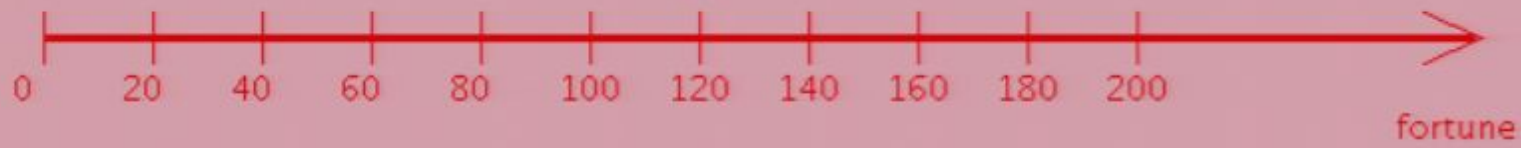
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 166  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



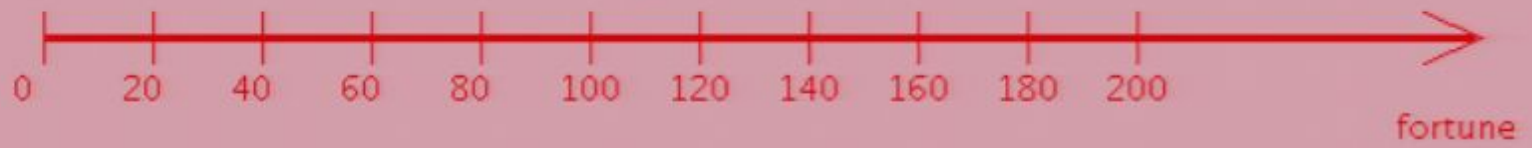
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 168  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



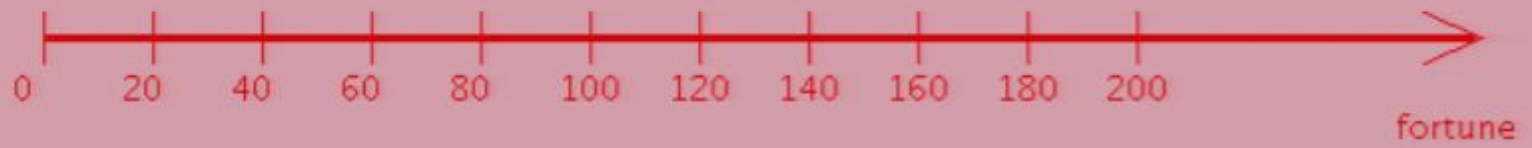
Applet started.

Fortune: \$120  
Win prob: 0.492929  
Number of bets: 171  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 174  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



Fortune: \$90  
Win prob: 0.492929  
Number of bets: 176  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

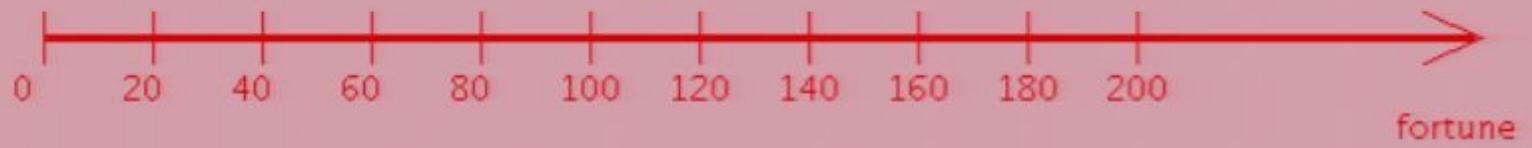


Fortune: \$100  
Win prob: 0.492929  
Number of bets: 177  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



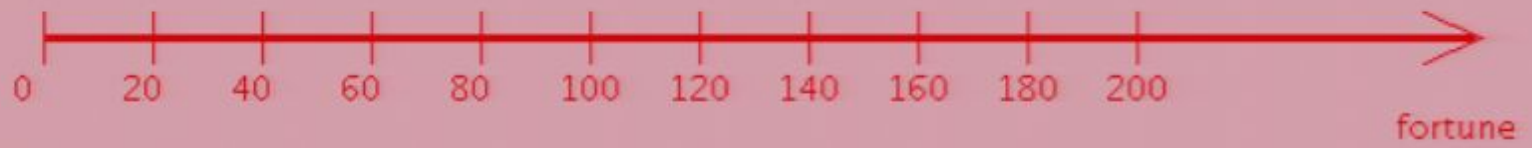
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 179  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



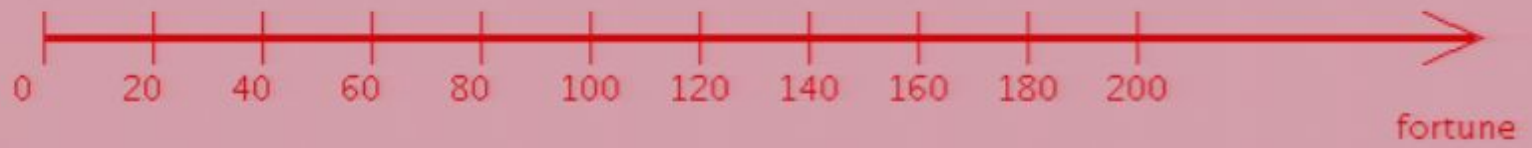
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 183  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



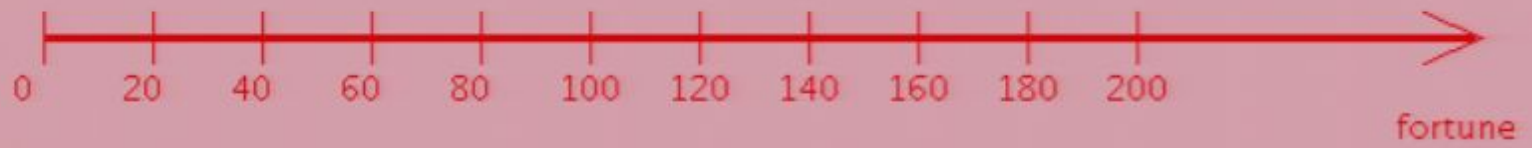
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 184  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



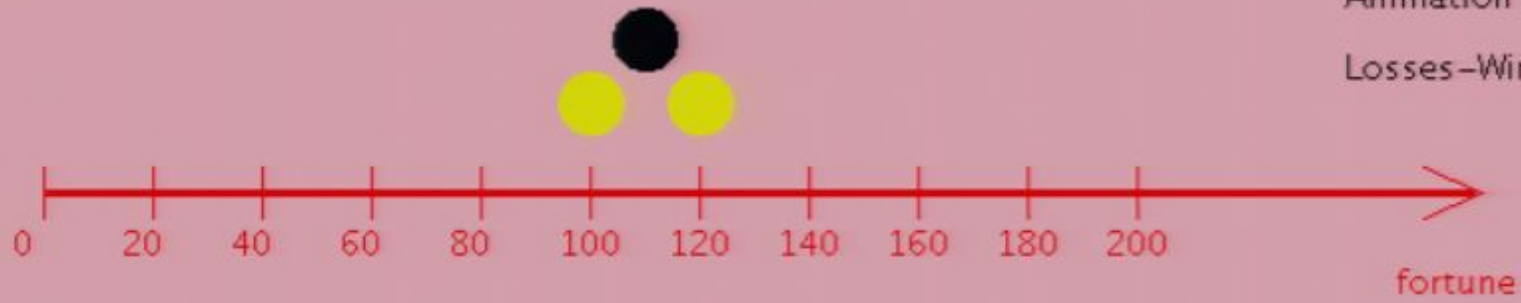
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 185  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



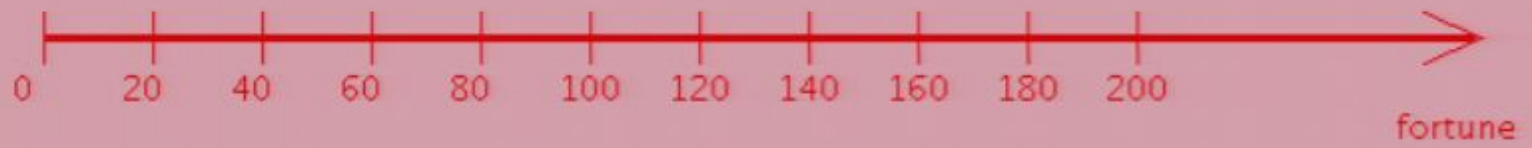
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 186  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

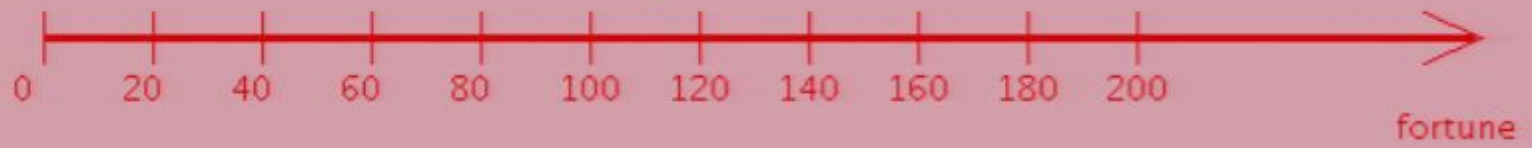
Fortune: \$120  
Win prob: 0.492929  
Number of bets: 189  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



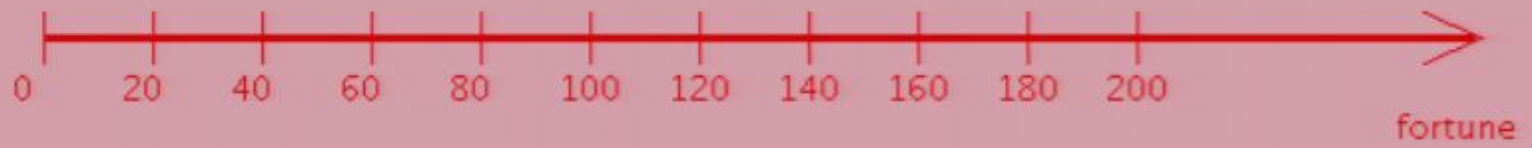
Fortune: \$100  
Win prob: 0.492929  
Number of bets: 191  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

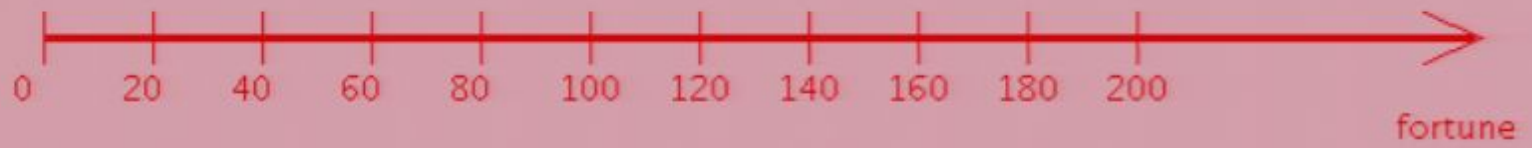


Fortune: \$130  
Win prob: 0.492929  
Number of bets: 194  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$130  
Win prob: 0.492929  
Number of bets: 196  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 198  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



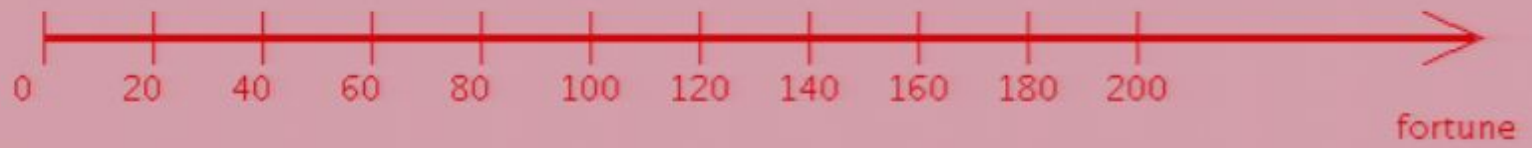
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 199  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



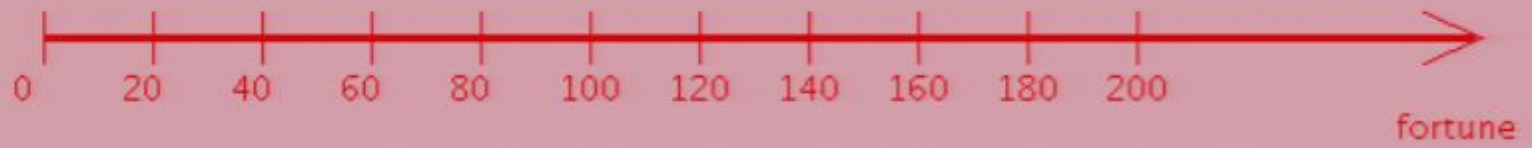
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 200  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



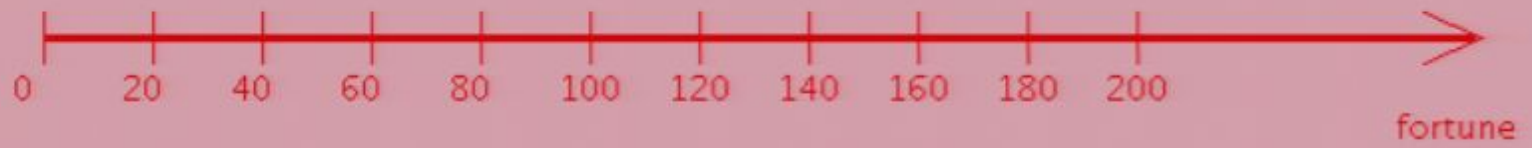
Applet started.

Fortune: \$90  
Win prob: 0.492929  
Number of bets: 202  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

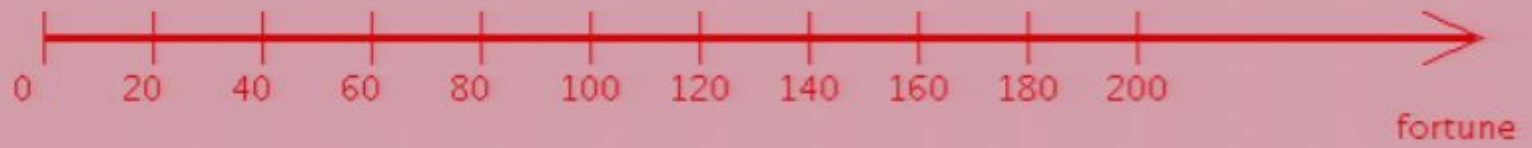
Fortune: \$80  
Win prob: 0.492929  
Number of bets: 205  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



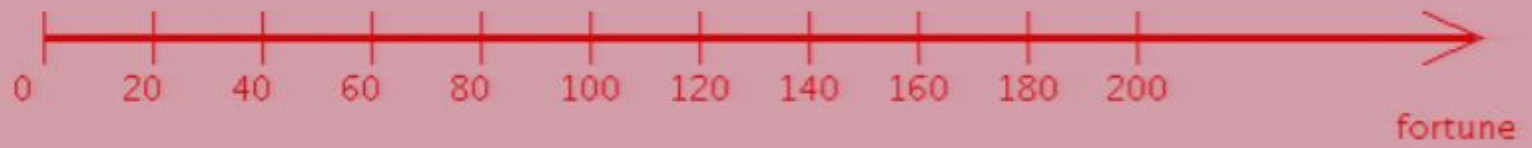
Fortune: \$90  
Win prob: 0.492929  
Number of bets: 206  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

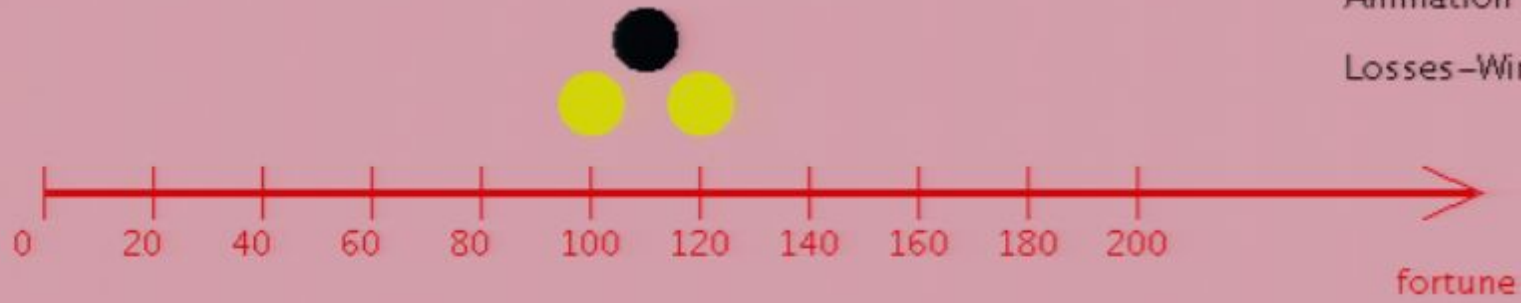


Fortune: \$100  
Win prob: 0.492929  
Number of bets: 207  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



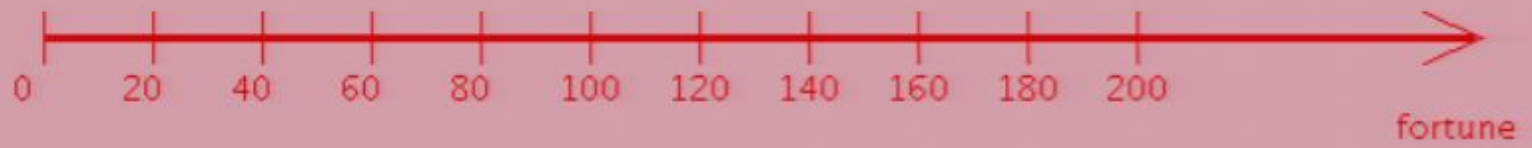
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 208  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



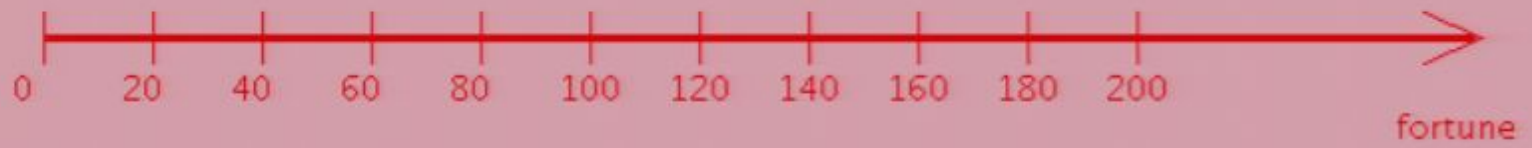
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 210  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



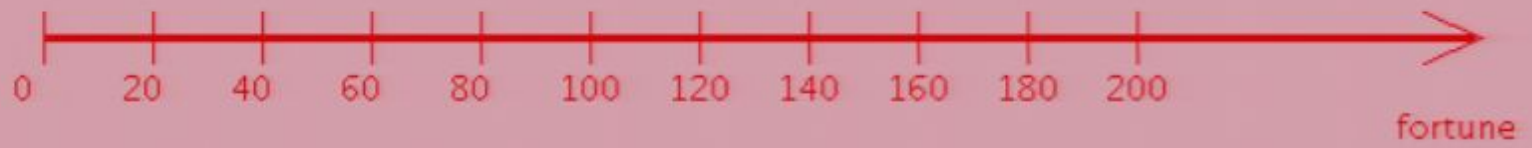
Applet started.

Fortune: \$130  
Win prob: 0.492929  
Number of bets: 212  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$140  
Win prob: 0.492929  
Number of bets: 215  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$160  
Win prob: 0.492929  
Number of bets: 217  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

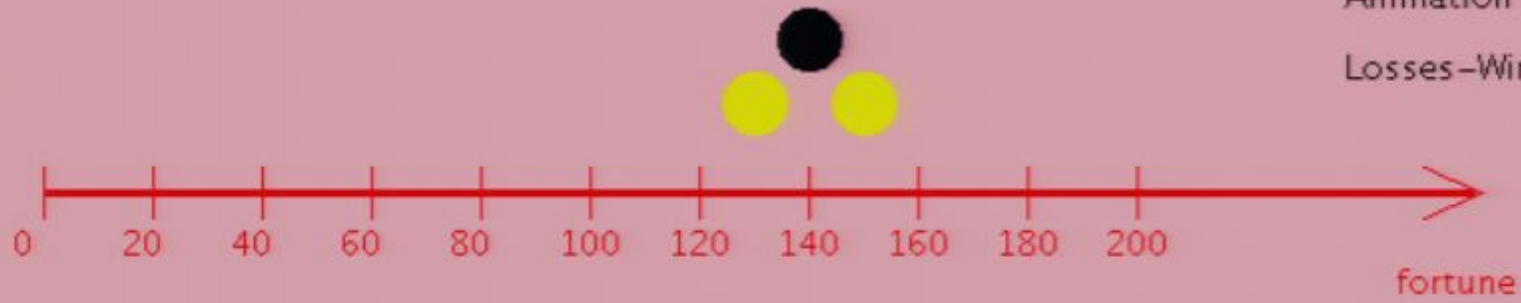
Fortune: \$150  
Win prob: 0.492929  
Number of bets: 218  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



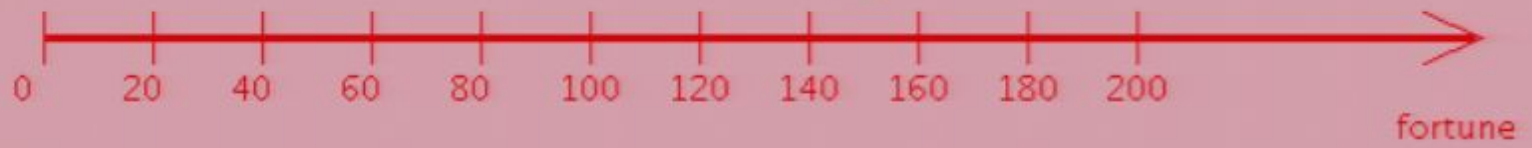
Fortune: \$140  
Win prob: 0.492929  
Number of bets: 219  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

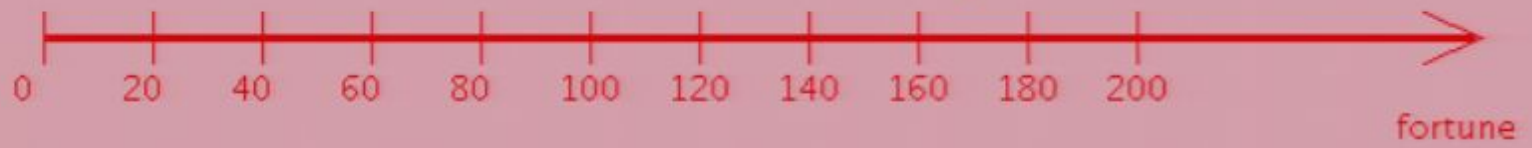


Fortune: \$140  
Win prob: 0.492929  
Number of bets: 221  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



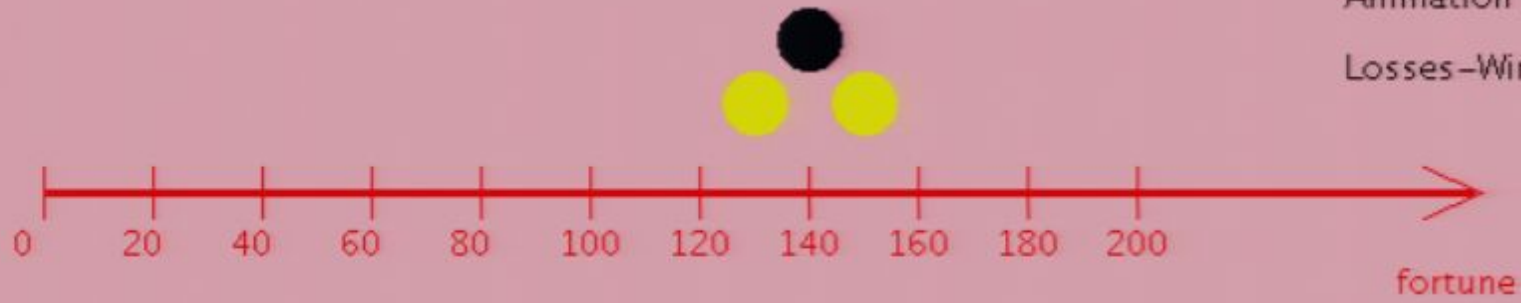
Applet started.

Fortune: \$160  
Win prob: 0.492929  
Number of bets: 223  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



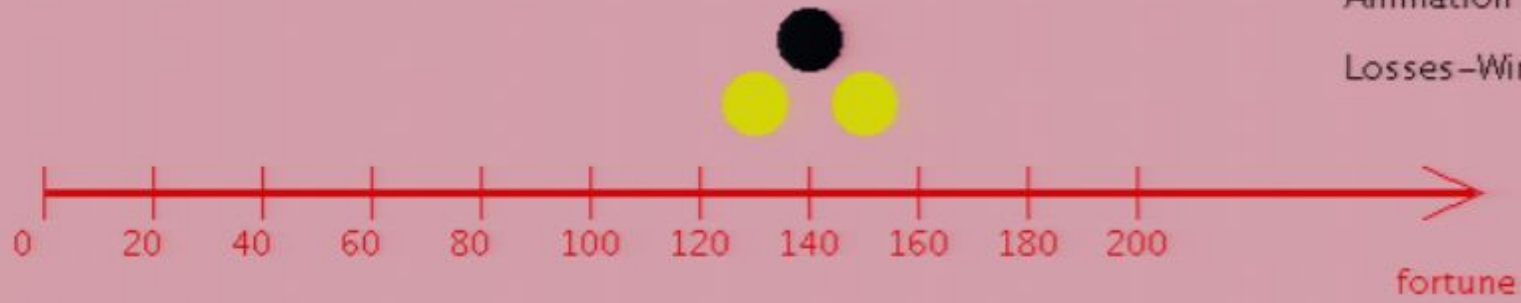
Applet started.

Fortune: \$140  
Win prob: 0.492929  
Number of bets: 227  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



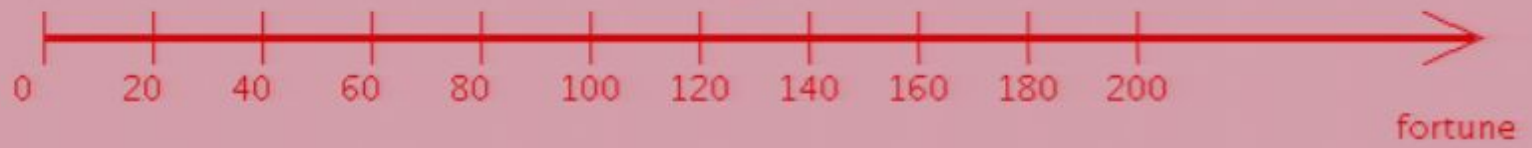
Applet started.

Fortune: \$140  
Win prob: 0.492929  
Number of bets: 229  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



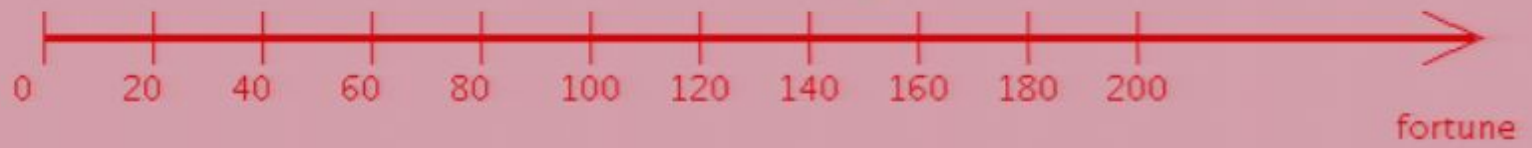
Applet started.

Fortune: \$140  
Win prob: 0.492929  
Number of bets: 231  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



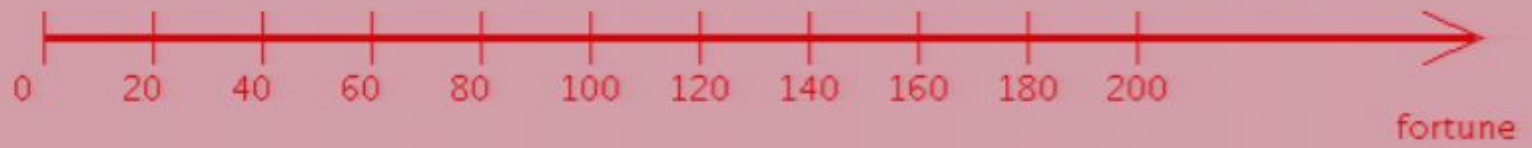
Applet started.

Fortune: \$140  
Win prob: 0.492929  
Number of bets: 233  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$130  
Win prob: 0.492929  
Number of bets: 236  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



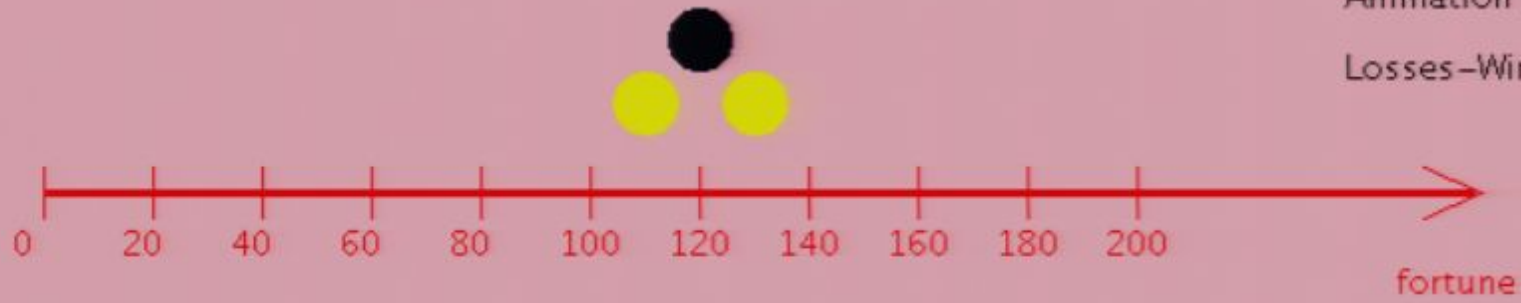
Fortune: \$110  
Win prob: 0.492929  
Number of bets: 238  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

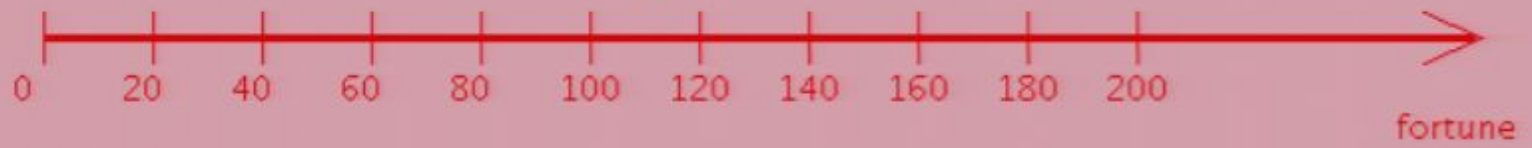


Fortune: \$120  
Win prob: 0.492929  
Number of bets: 239  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



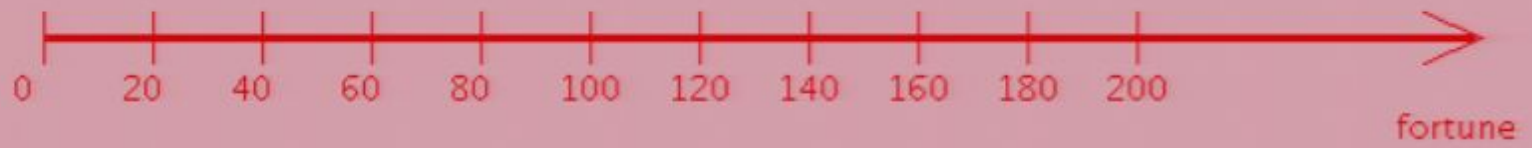
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 241  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



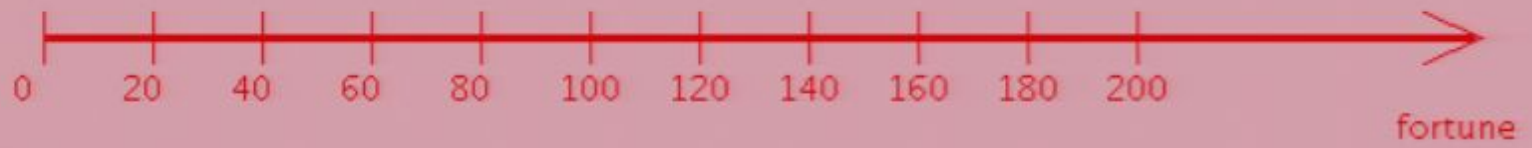
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 243  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$70  
Win prob: 0.492929  
Number of bets: 246  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 248  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 250  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

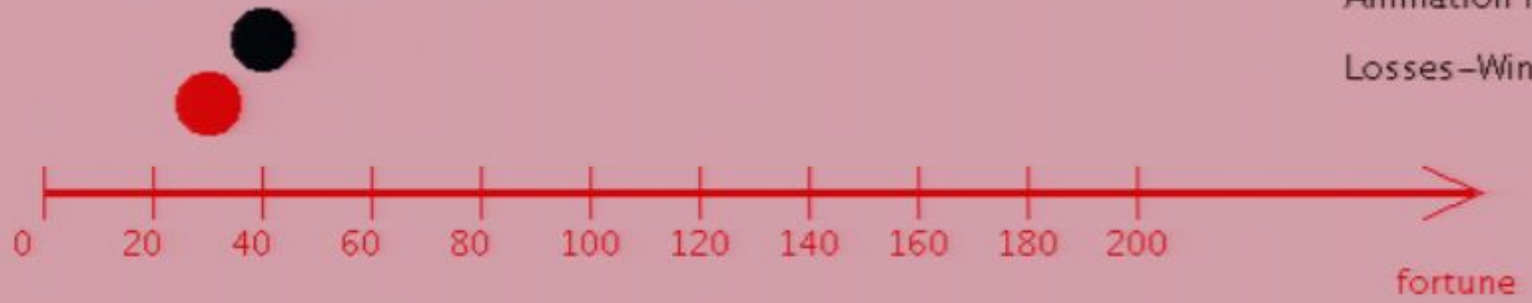
Fortune: \$50  
Win prob: 0.492929  
Number of bets: 252  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



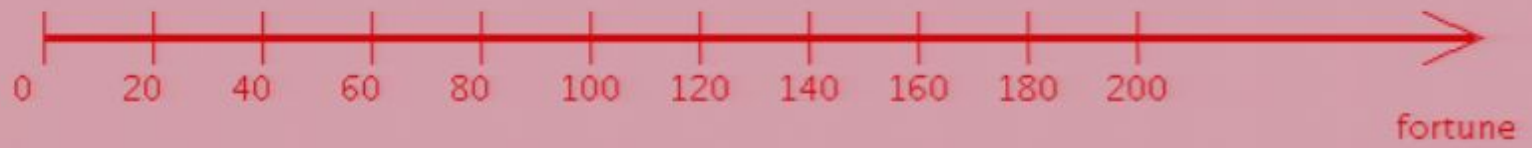
Fortune: \$40  
Win prob: 0.492929  
Number of bets: 253  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

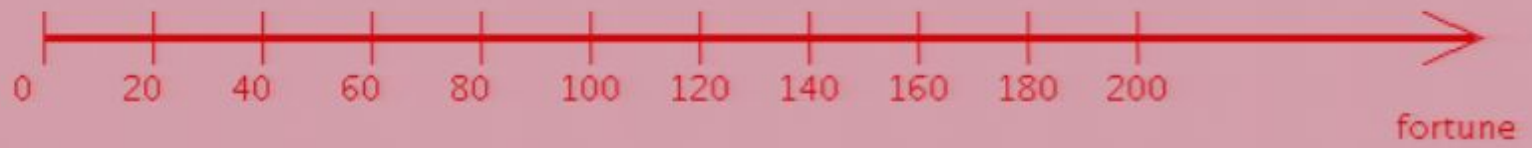


Fortune: \$20  
Win prob: 0.492929  
Number of bets: 255  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 256  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 258  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



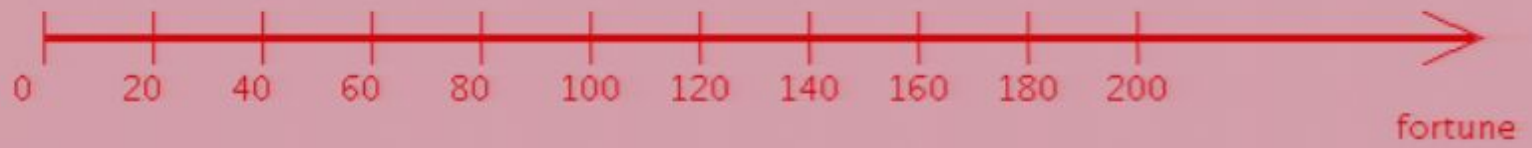
Applet started.

Fortune: \$30  
Win prob: 0.492929  
Number of bets: 260  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



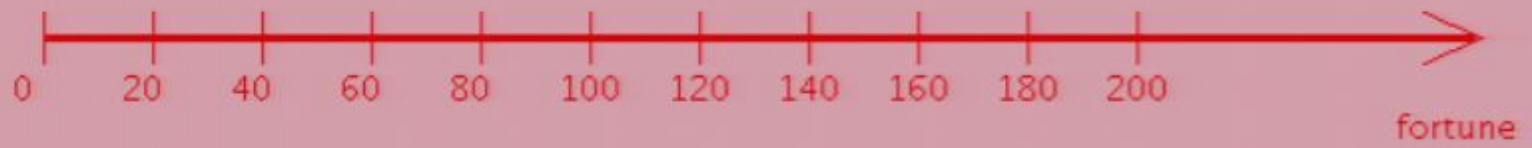
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 262  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



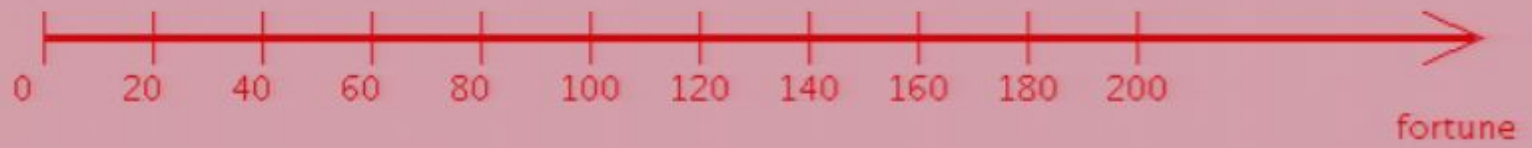
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 264  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

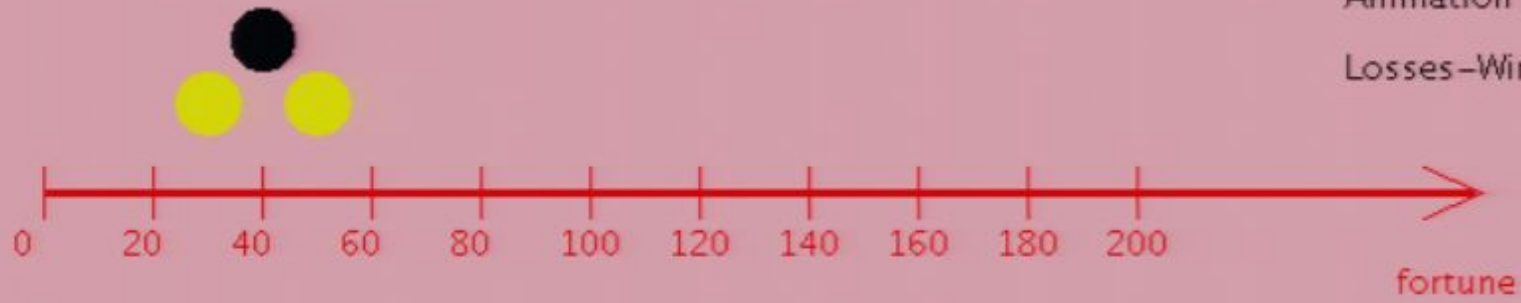
Fortune: \$40  
Win prob: 0.492929  
Number of bets: 267  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



Fortune: \$40  
Win prob: 0.492929  
Number of bets: 269  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

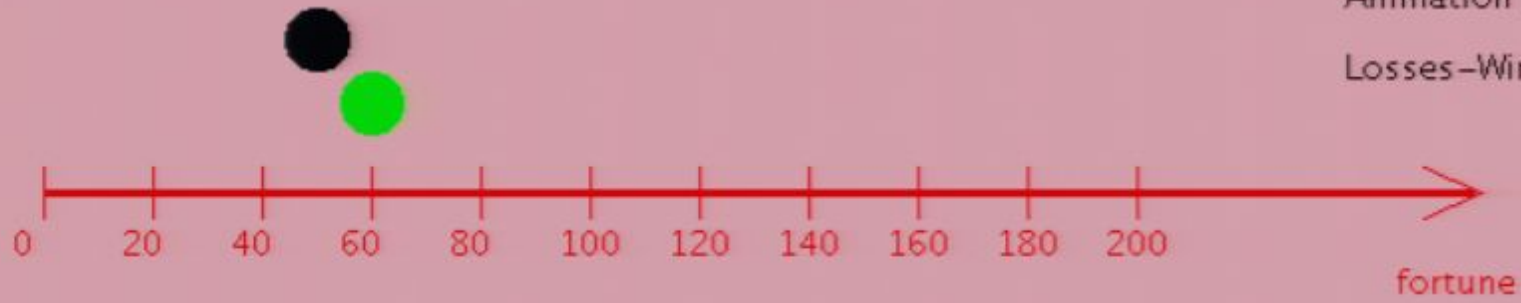


Fortune: \$50  
Win prob: 0.492929  
Number of bets: 270  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 272  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



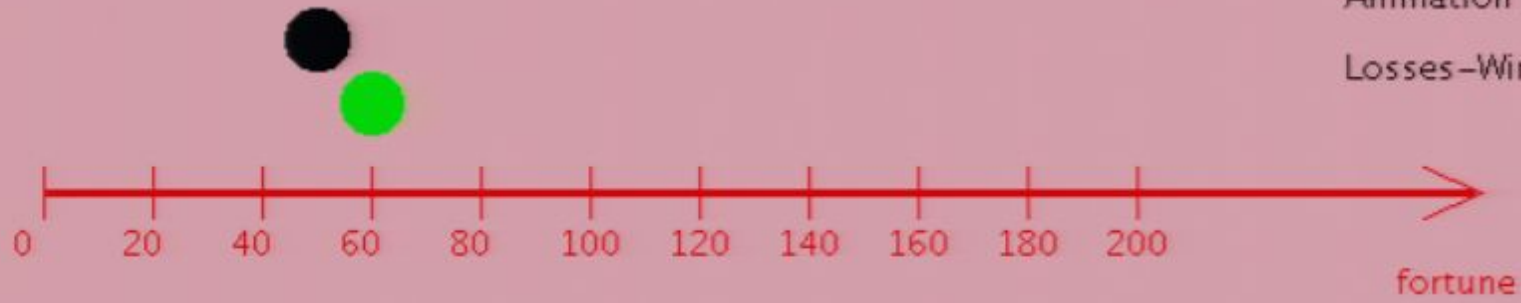
Applet started.

Fortune: \$60  
Win prob: 0.492929  
Number of bets: 273  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



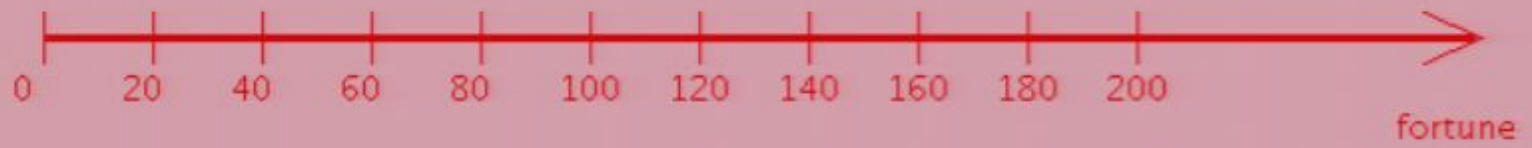
Applet started.

Fortune: \$50  
Win prob: 0.492929  
Number of bets: 274  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 277  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



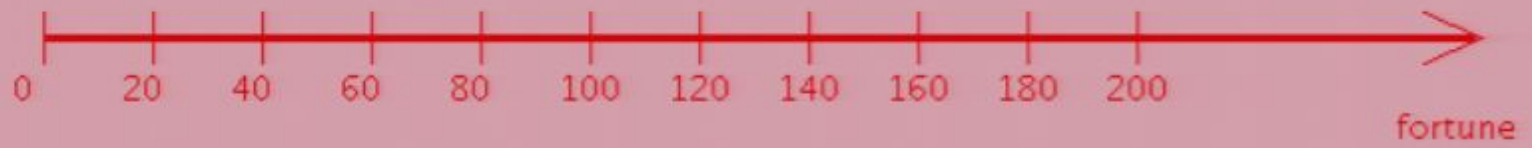
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 279  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

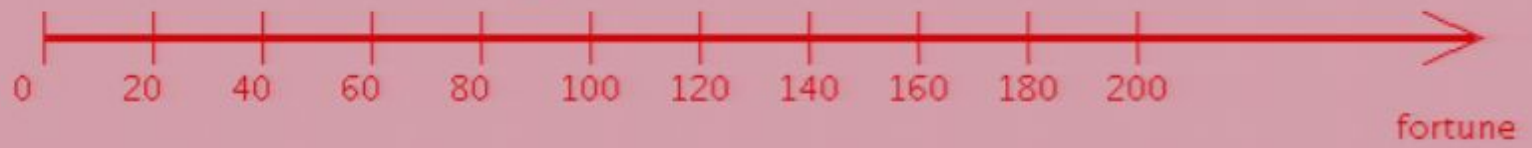
Fortune: \$80  
Win prob: 0.492929  
Number of bets: 281  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



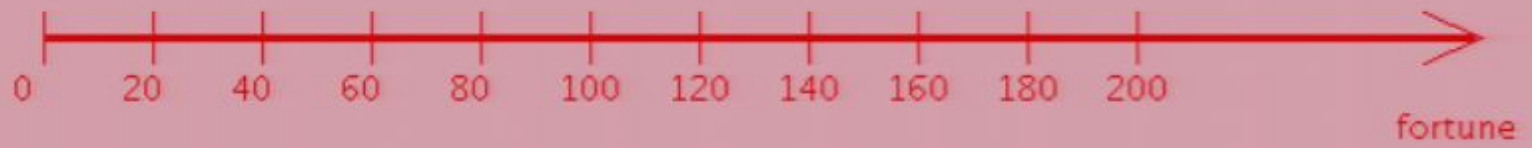
Fortune: \$80  
Win prob: 0.492929  
Number of bets: 283  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



Fortune: \$90  
Win prob: 0.492929  
Number of bets: 284  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



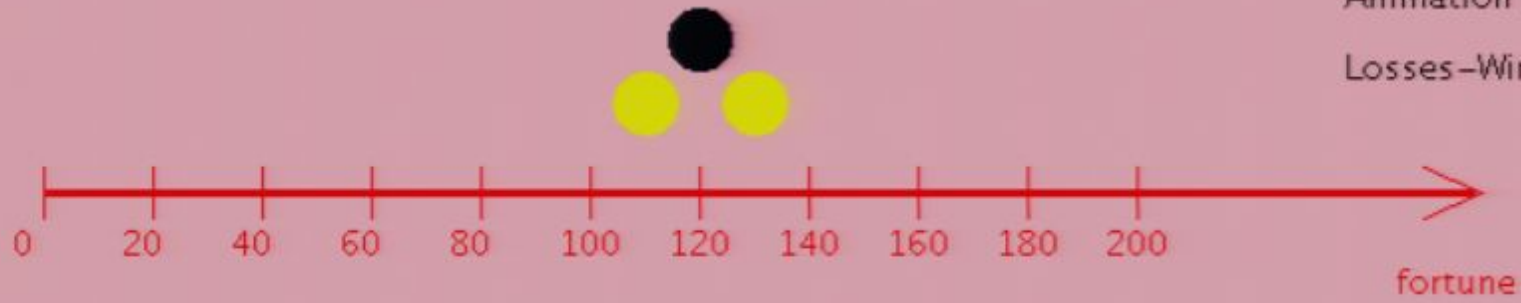
Applet started.

Fortune: \$110  
Win prob: 0.492929  
Number of bets: 288  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



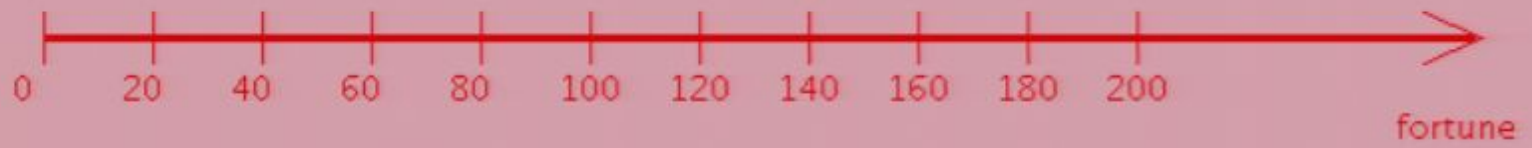
Applet started.

Fortune: \$120  
Win prob: 0.492929  
Number of bets: 291  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



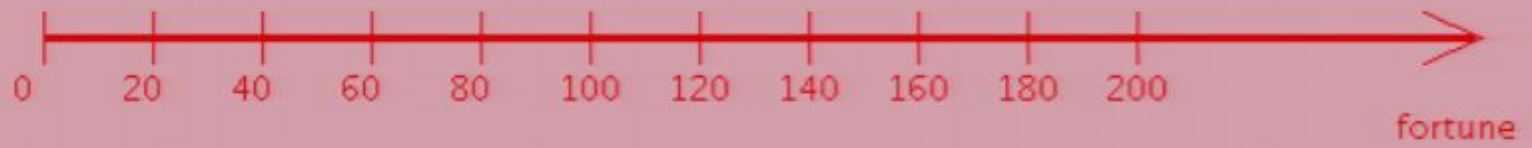
Applet started.

Fortune: \$130  
Win prob: 0.492929  
Number of bets: 294  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



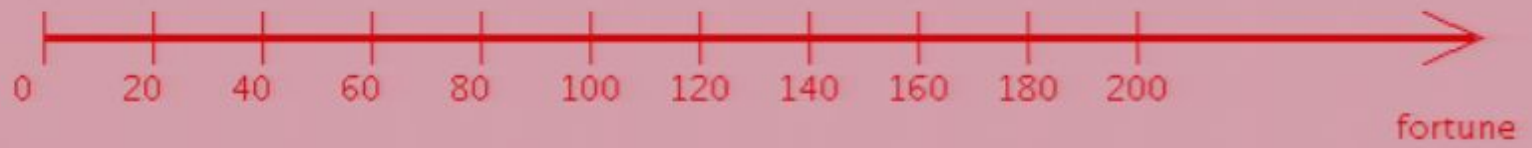
Applet started.

Fortune: \$140  
Win prob: 0.492929  
Number of bets: 296  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

Fortune: \$170  
Win prob: 0.492929  
Number of bets: 300  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

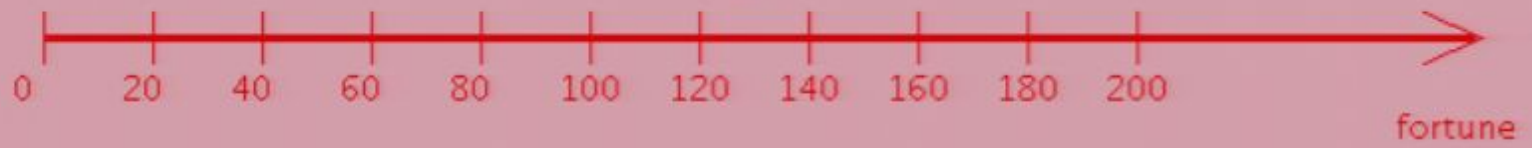
Fortune: \$150  
Win prob: 0.492929  
Number of bets: 302  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



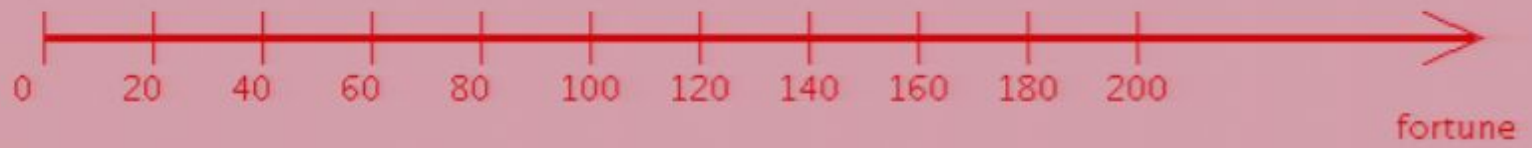
Fortune: \$140  
Win prob: 0.492929  
Number of bets: 305  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.

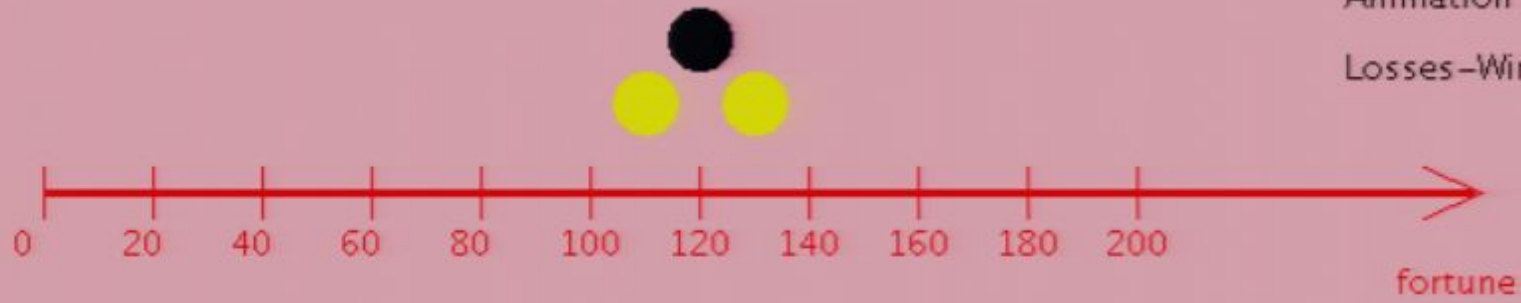


Fortune: \$120  
Win prob: 0.492929  
Number of bets: 309  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



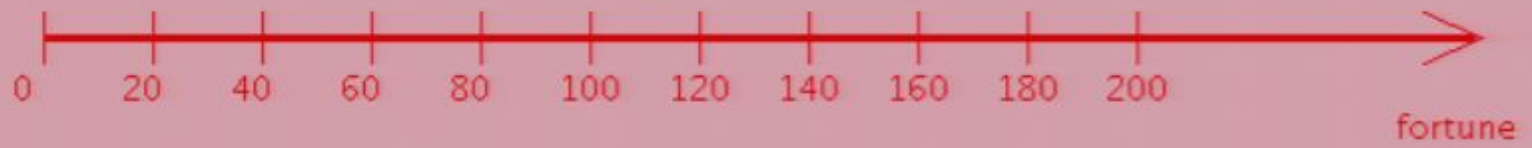
Applet started.

Fortune: \$120  
Win prob: 0.492929  
Number of bets: 311  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



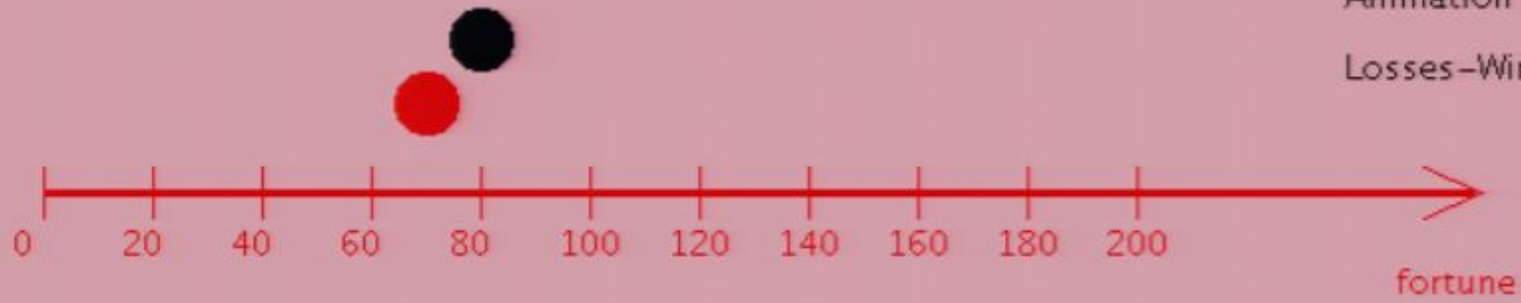
Applet started.

Fortune: \$100  
Win prob: 0.492929  
Number of bets: 315  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



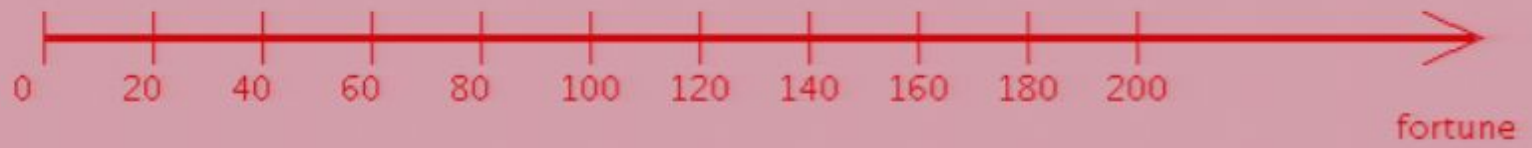
Applet started.

Fortune: \$80  
Win prob: 0.492929  
Number of bets: 327  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0

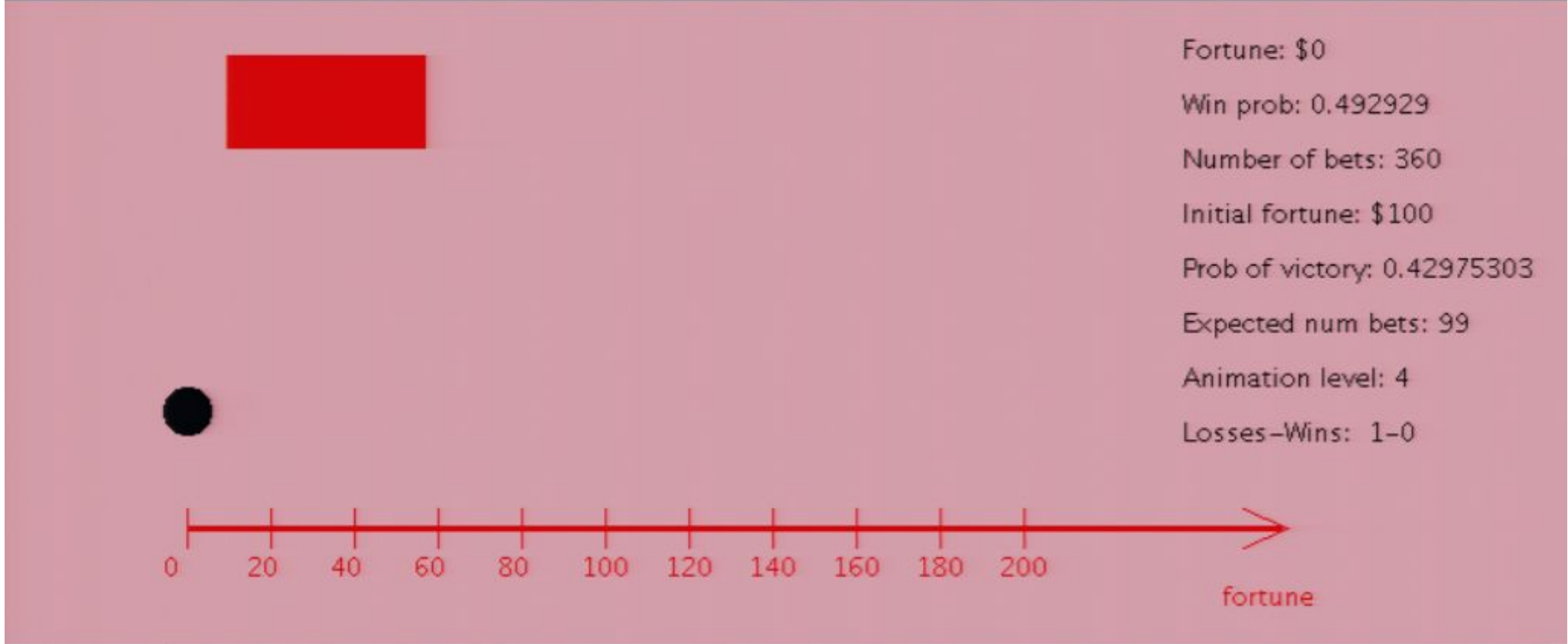


Applet started.

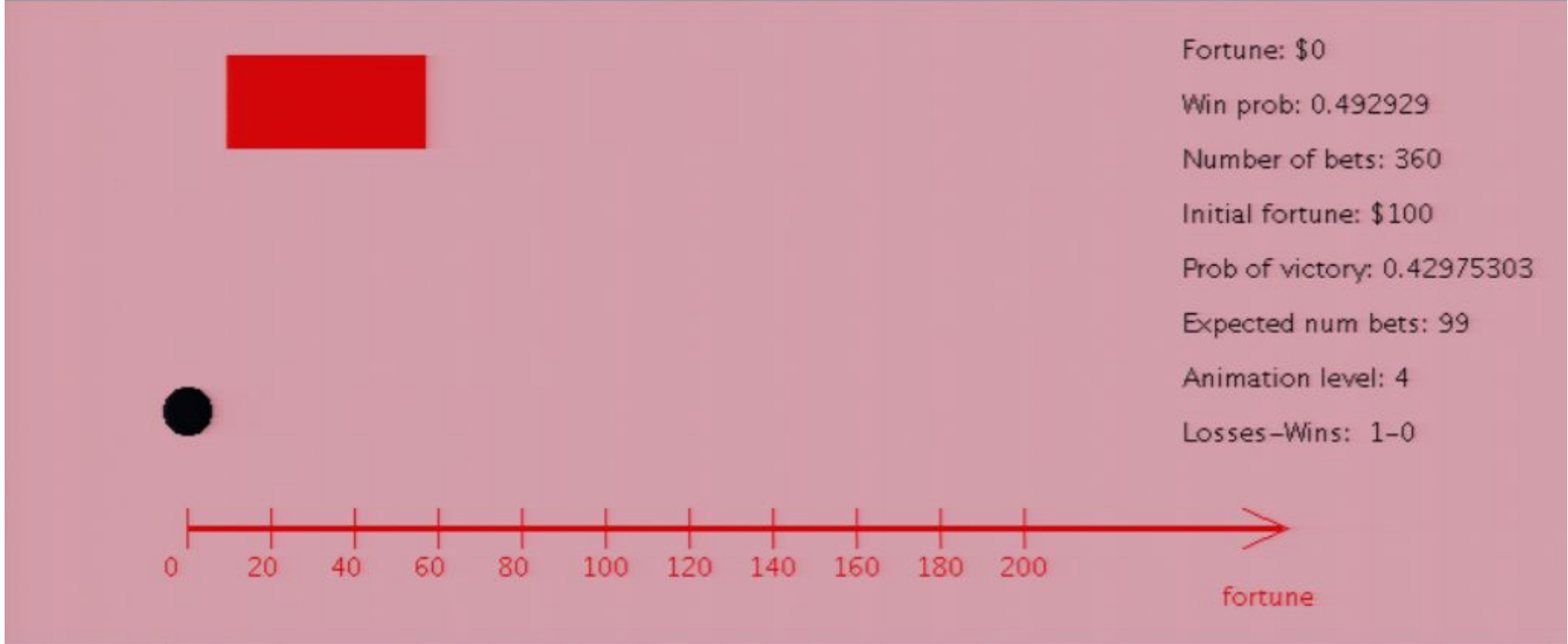
Fortune: \$60  
Win prob: 0.492929  
Number of bets: 341  
Initial fortune: \$100  
Prob of victory: 0.42975303  
Expected num bets: 99  
Animation level: 4  
Losses-Wins: 0-0



Applet started.



Applet started.



Applet started.



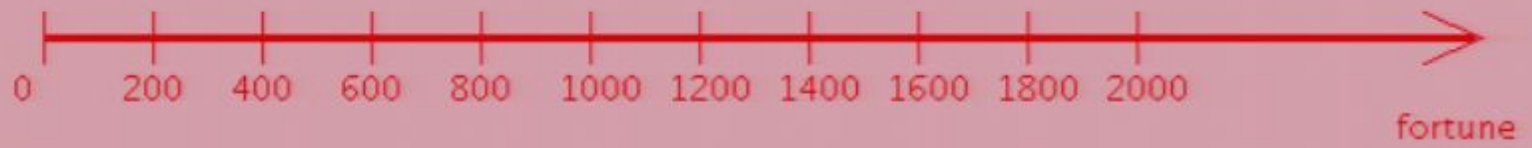
Fortune: \$1000  
Win prob: 0.492929  
Number of bets: 5  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 4  
Losses-Wins: 1-0



Applet started.

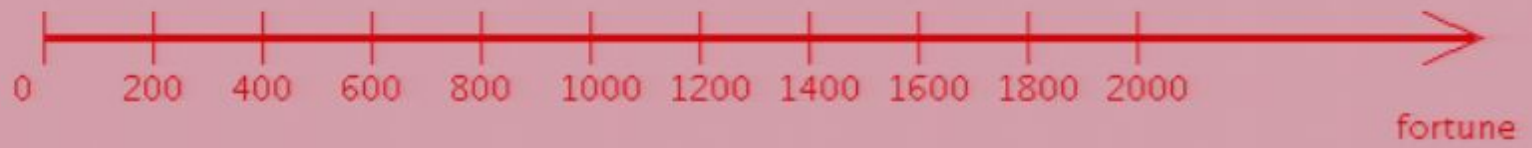


Fortune: \$820  
Win prob: 0.492929  
Number of bets: 175  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



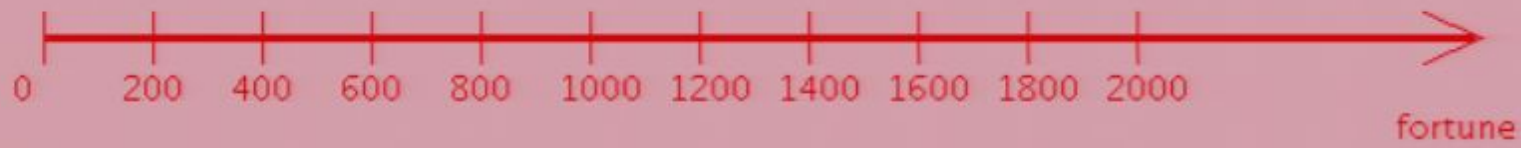
Applet started.

Fortune: \$810  
Win prob: 0.492929  
Number of bets: 206  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



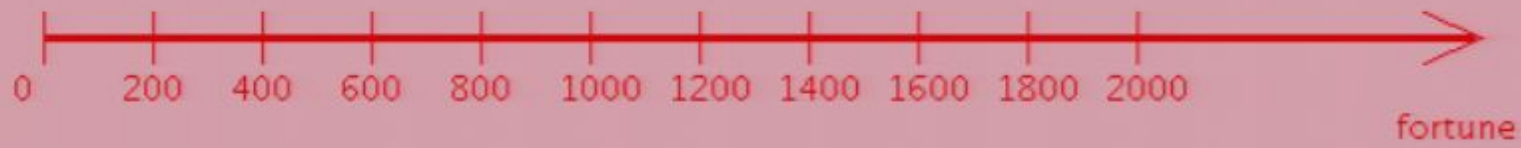
Applet started.

Fortune: \$860  
Win prob: 0.492929  
Number of bets: 221  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



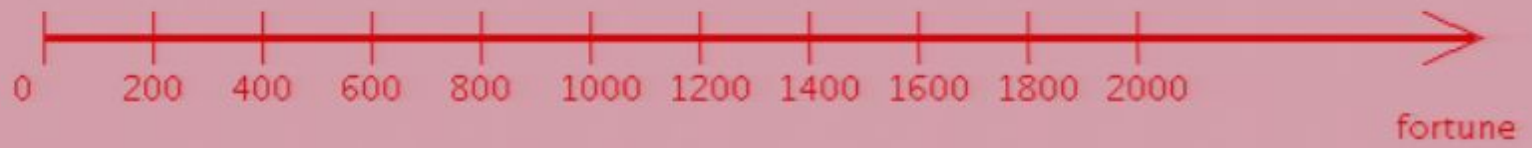
Applet started.

Fortune: \$890  
Win prob: 0.492929  
Number of bets: 236  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



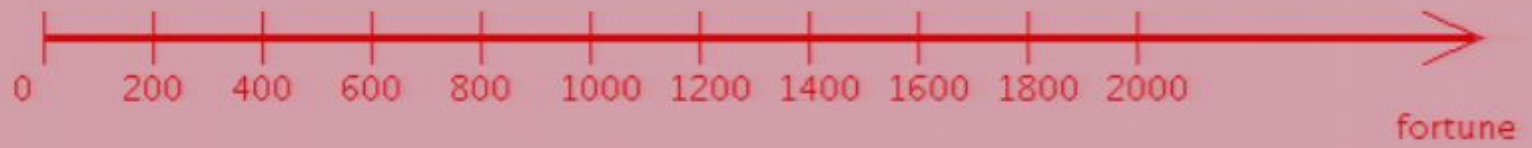
Applet started.

Fortune: \$880  
Win prob: 0.492929  
Number of bets: 251  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



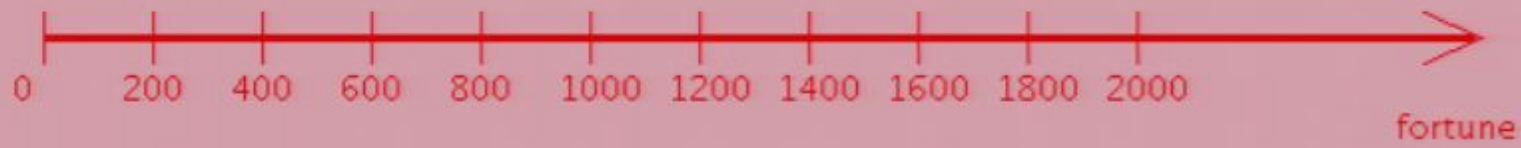
Applet started.

Fortune: \$900  
Win prob: 0.492929  
Number of bets: 275  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



Applet started.

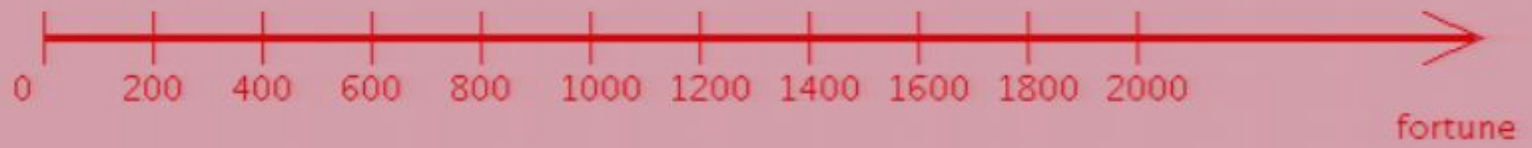
Fortune: \$910  
Win prob: 0.492929  
Number of bets: 300  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



Applet started.



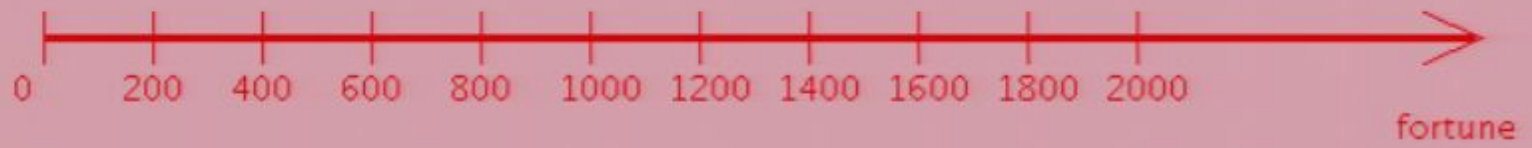
Fortune: \$850  
Win prob: 0.492929  
Number of bets: 330  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 5  
Losses-Wins: 1-0



Applet started.

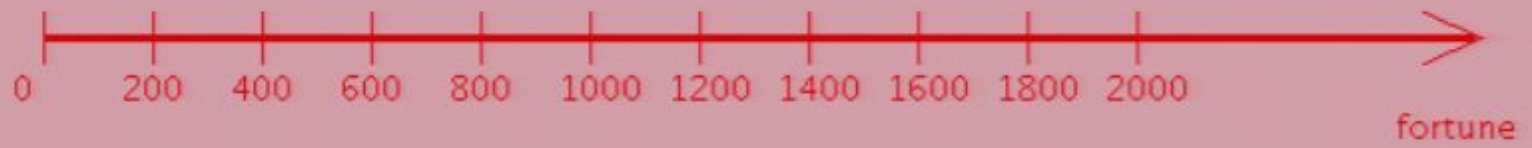


Fortune: \$650  
Win prob: 0.492929  
Number of bets: 1320  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



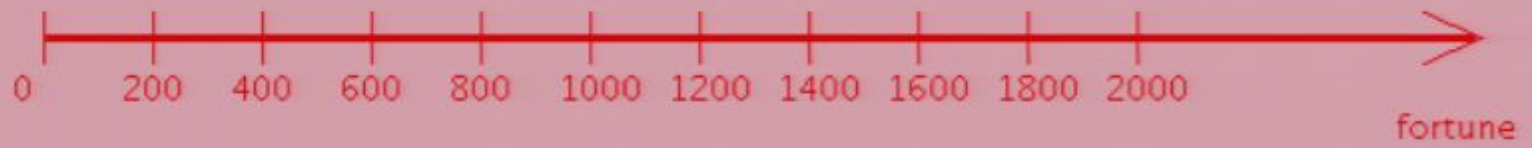
Applet started.

Fortune: \$750  
Win prob: 0.492929  
Number of bets: 2120  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



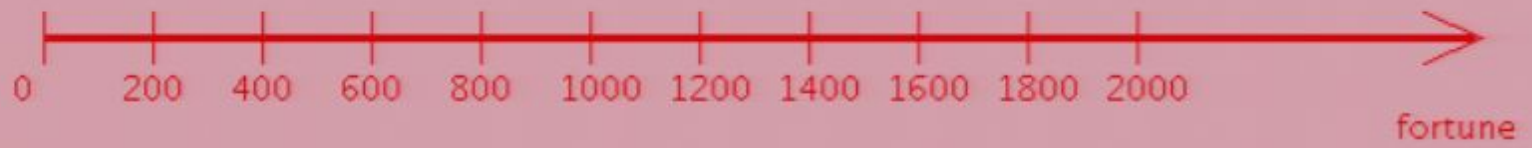
Applet started.

Fortune: \$1070  
Win prob: 0.492929  
Number of bets: 3080  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



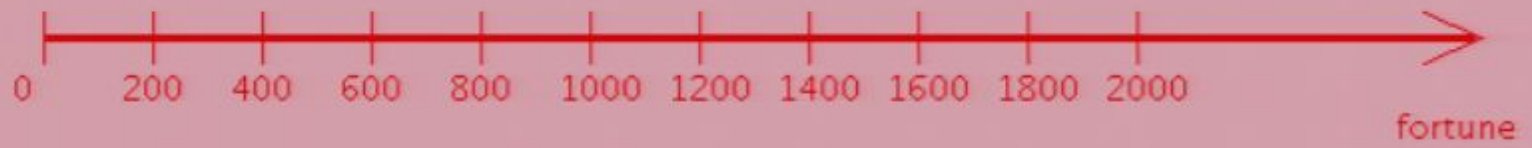
Applet started.

Fortune: \$550  
Win prob: 0.492929  
Number of bets: 4240  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



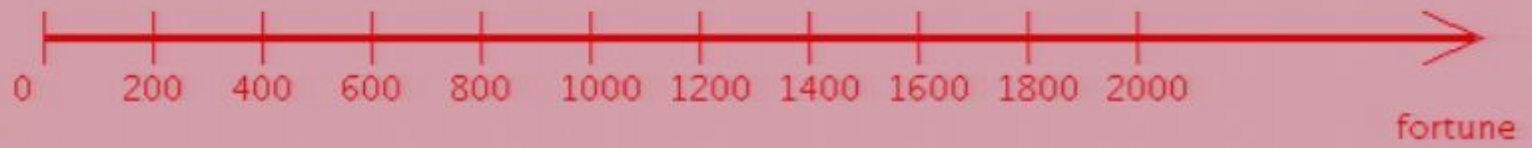
Applet started.

Fortune: \$930  
Win prob: 0.492929  
Number of bets: 5020  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



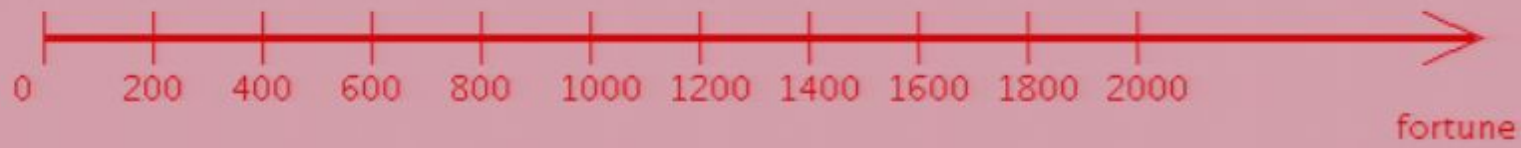
Applet started.

Fortune: \$450  
Win prob: 0.492929  
Number of bets: 6020  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



Applet started.

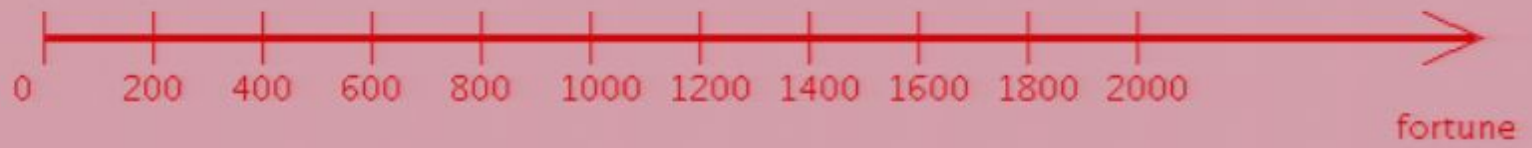
Fortune: \$810  
Win prob: 0.492929  
Number of bets: 7000  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



Applet started.



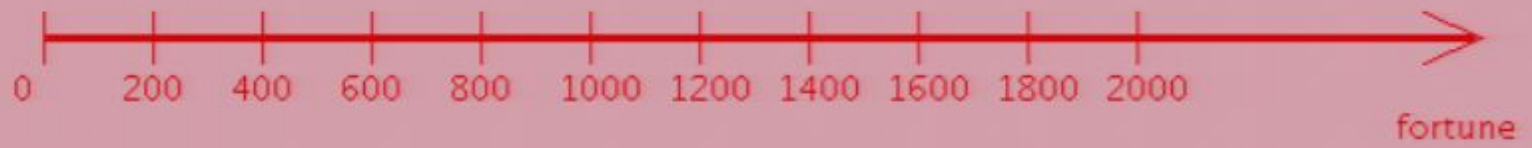
Fortune: \$1030  
Win prob: 0.492929  
Number of bets: 7980  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



Applet started.

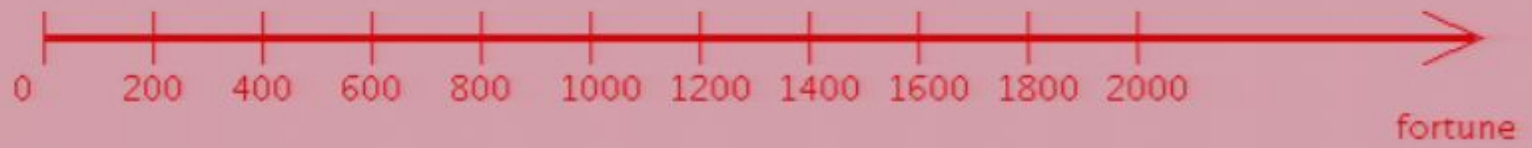


Fortune: \$890  
Win prob: 0.492929  
Number of bets: 8760  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0

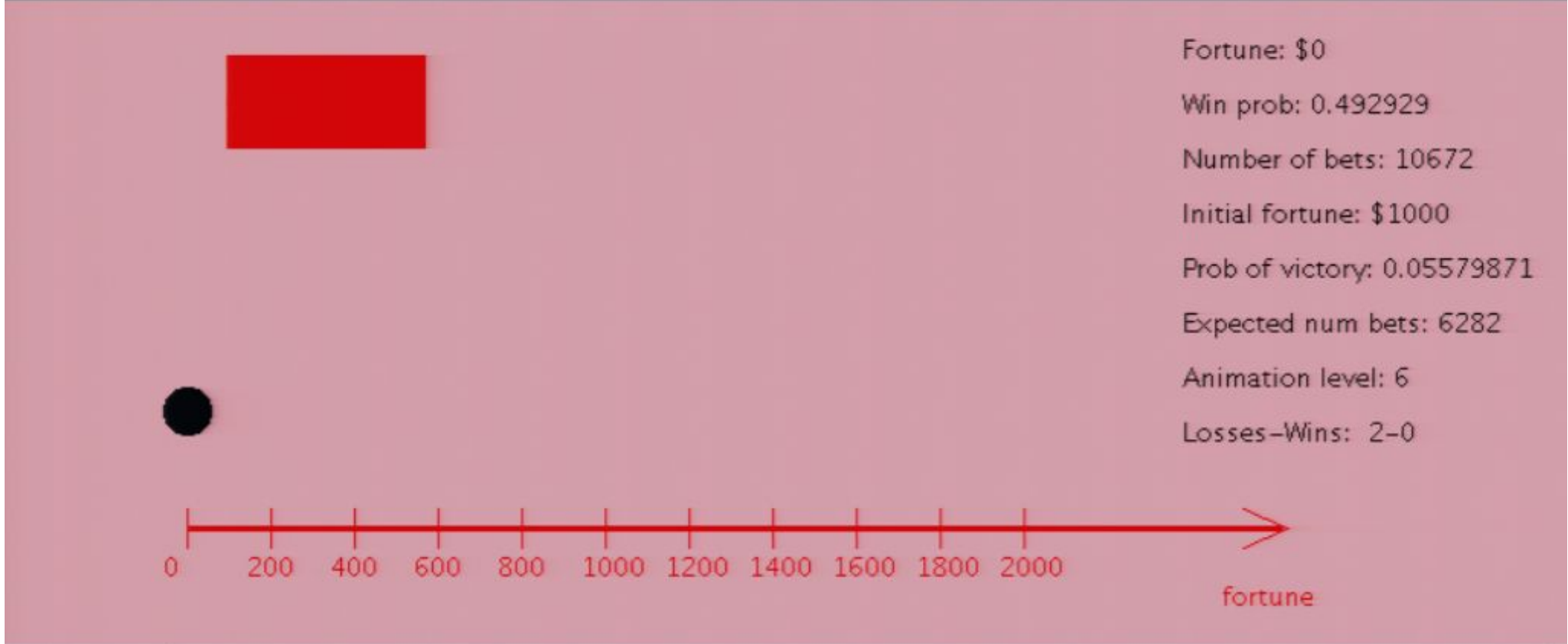


Applet started.

Fortune: \$530  
Win prob: 0.492929  
Number of bets: 9720  
Initial fortune: \$1000  
Prob of victory: 0.05579871  
Expected num bets: 6282  
Animation level: 6  
Losses-Wins: 1-0



Applet started.



Applet started.

Fortune: \$4690  
Win prob: 0.492929  
Number of bets: 1970  
Initial fortune: \$5000  
Prob of victory: 7.2E-7  
Expected num bets: 35356  
Animation level: 6  
Losses-Wins: 2-0



Applet started.

Fortune: \$3790  
Win prob: 0.492929  
Number of bets: 4330  
Initial fortune: \$5000  
Prob of victory: 7.2E-7  
Expected num bets: 35356  
Animation level: 6  
Losses-Wins: 2-0



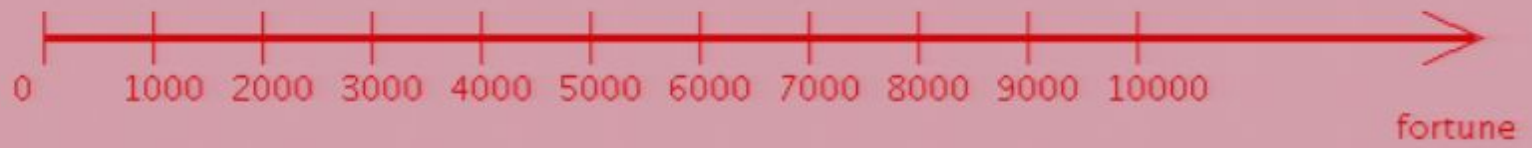
Applet started.

Fortune: \$3210  
Win prob: 0.492929  
Number of bets: 6270  
Initial fortune: \$5000  
Prob of victory: 7.2E-7  
Expected num bets: 35356  
Animation level: 6  
Losses-Wins: 2-0



Applet started.

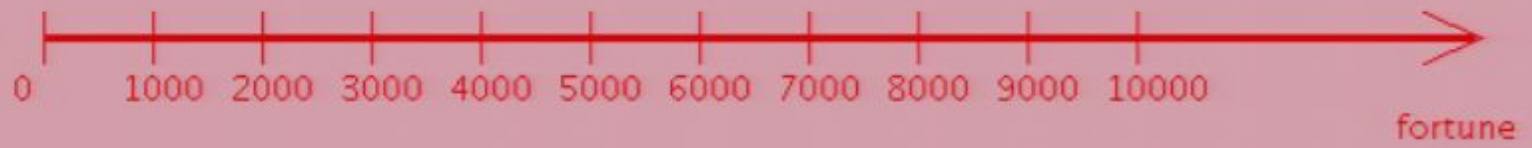
Fortune: \$2870  
Win prob: 0.492929  
Number of bets: 9420  
Initial fortune: \$5000  
Prob of victory: 7.2E-7  
Expected num bets: 35356  
Animation level: 6  
Losses-Wins: 2-0



Applet started.



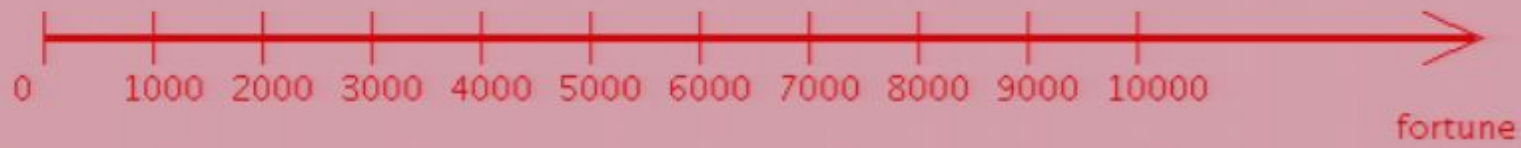
Fortune: \$2210  
Win prob: 0.492929  
Number of bets: 12340  
Initial fortune: \$5000  
Prob of victory: 7.2E-7  
Expected num bets: 35356  
Animation level: 6  
Losses-Wins: 2-0



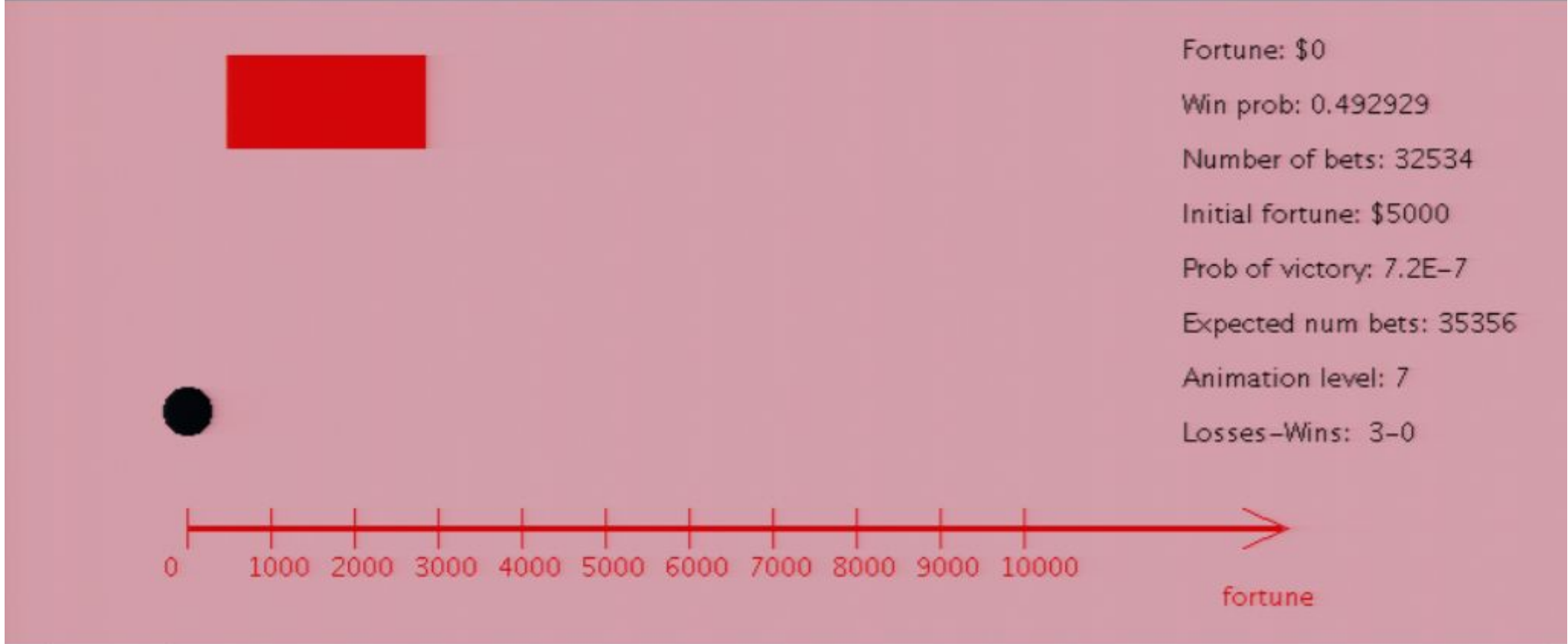
Applet started.



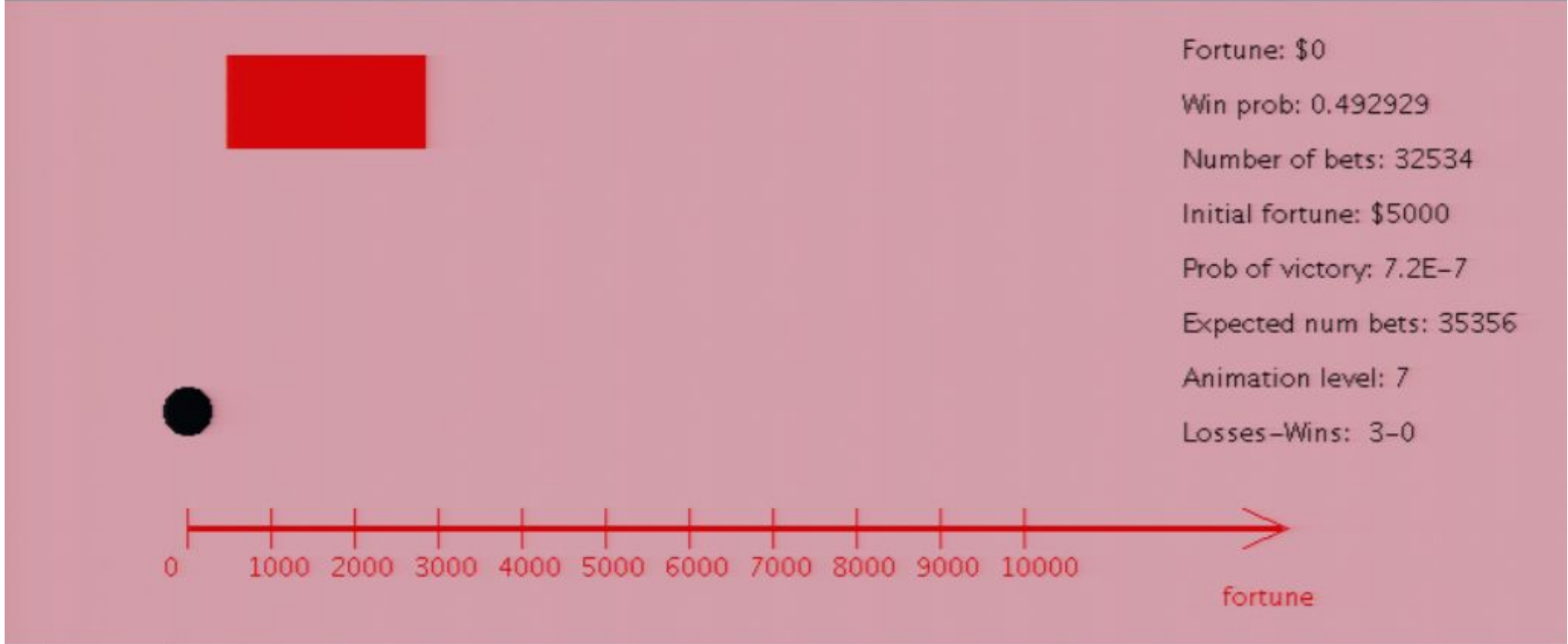
Fortune: \$1190  
Win prob: 0.492929  
Number of bets: 24320  
Initial fortune: \$5000  
Prob of victory: 7.2E-7  
Expected num bets: 35356  
Animation level: 7  
Losses-Wins: 2-0



Applet started.



Applet started.



Applet started.

## Casinos

Example: “craps”.

Probability of winning = 49.29%.

What happens in the long run? [APPLET]

## Casinos

Example: “craps”.

Probability of winning = 49.29%.

What happens in the long run? [APPLET]

“Law of Large Numbers”

## Casinos

Example: “craps”.

Probability of winning = 49.29%.

What happens in the long run? [APPLET]

“Law of Large Numbers”

# Usefulness of Randomness

(8/11)

## Usefulness of Randomness

- Interpreting new evidence: lupus test.



## Usefulness of Randomness

- Interpreting new evidence: lupus test.
- Surveys, polls: random sample.

## Usefulness of Randomness

- Interpreting new evidence: lupus test.
- Surveys, polls: random sample.
- Medical studies: assign treatments randomly.

## Usefulness of Randomness

- Interpreting new evidence: lupus test.
- Surveys, polls: random sample.
- Medical studies: assign treatments randomly.
- Computer games: random bad guys.

## Usefulness of Randomness

- Interpreting new evidence: lupus test.
- Surveys, polls: random sample.
- Medical studies: assign treatments randomly.
- Computer games: random bad guys.
- Exams: assign seats randomly, to separate cheaters.

## Usefulness of Randomness

- Interpreting new evidence: lupus test.
- Surveys, polls: random sample.
- Medical studies: assign treatments randomly.
- Computer games: random bad guys.
- Exams: assign seats randomly, to separate cheaters.
- Random strategies: Rock/Paper/Scissors.

# Monte Carlo computer algorithms

(9/11)

# Monte Carlo computer algorithms

Applied to complicated models / computations.

## Monte Carlo computer algorithms

Applied to complicated models / computations.

Analogy: Average altitude of a mountain range.



## Monte Carlo computer algorithms

Applied to complicated models / computations.

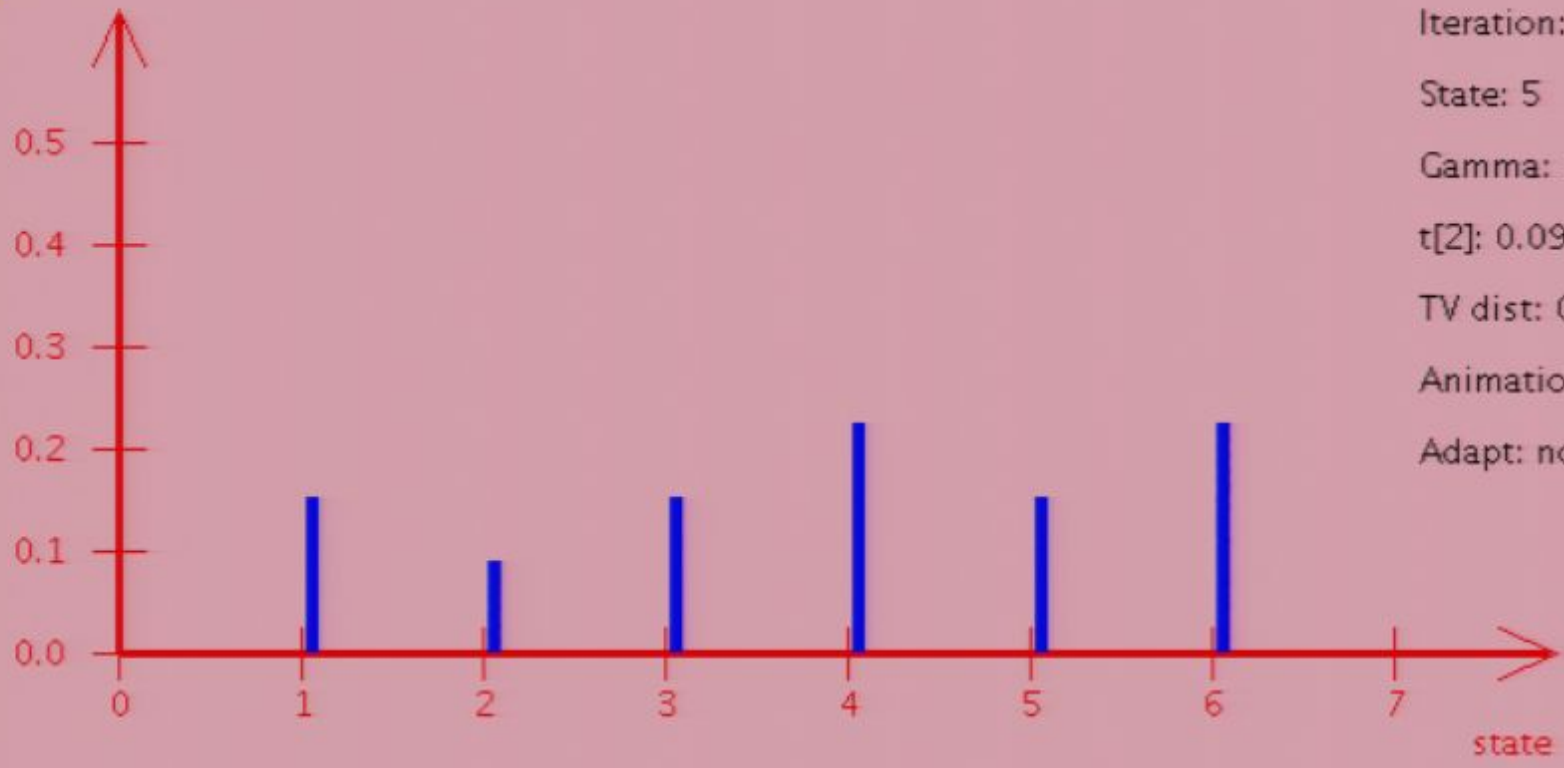
Analogy: Average altitude of a mountain range.

Explore randomly to conduct a “mini-poll” of altitudes.  
Then take average.

“Markov chain Monte Carlo”

[APPLET]

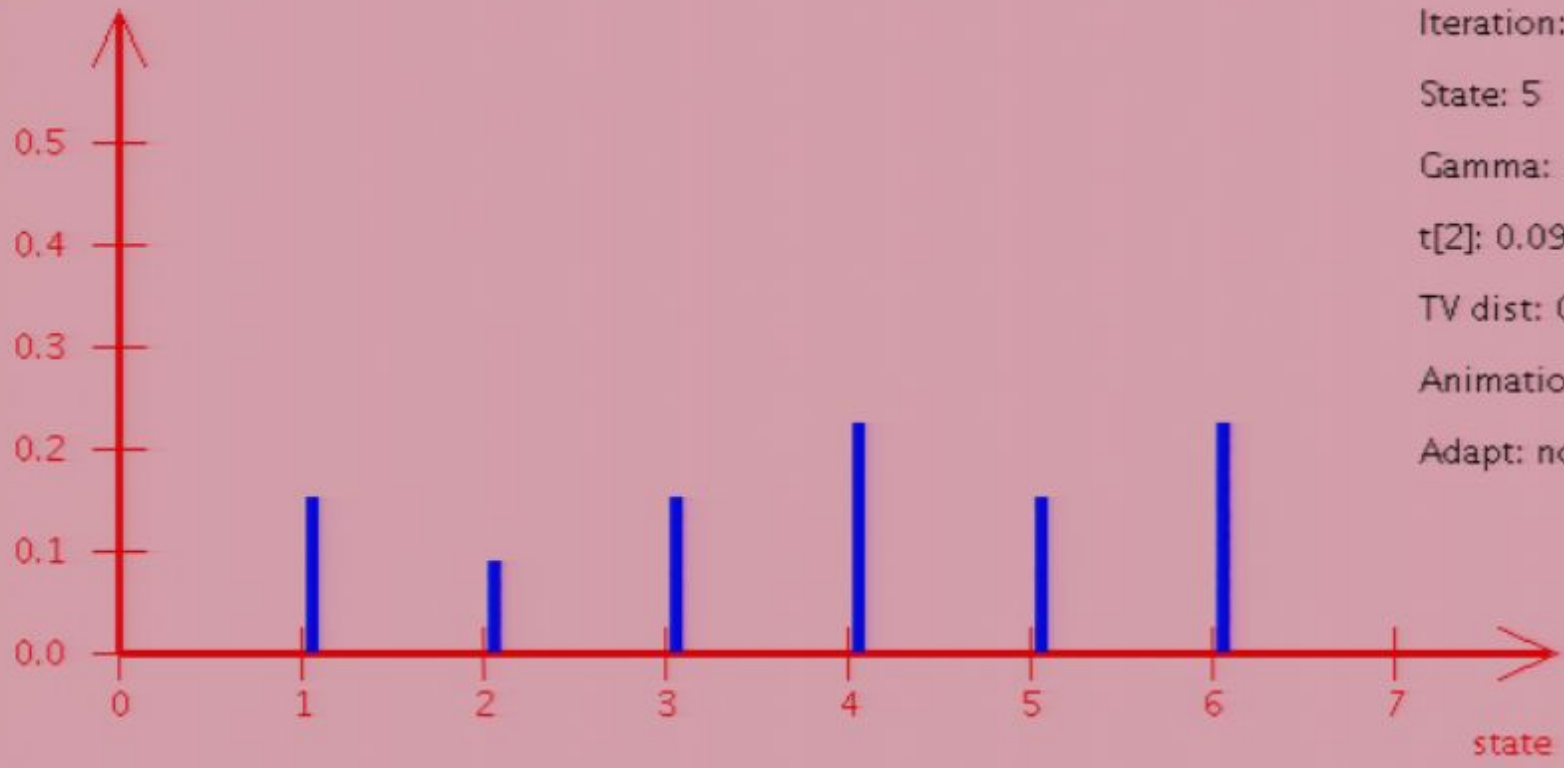
target



Mean state: 5.0  
Iteration: 1  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.846846  
Animation: 1  
Adapt: no

Applet started.

target

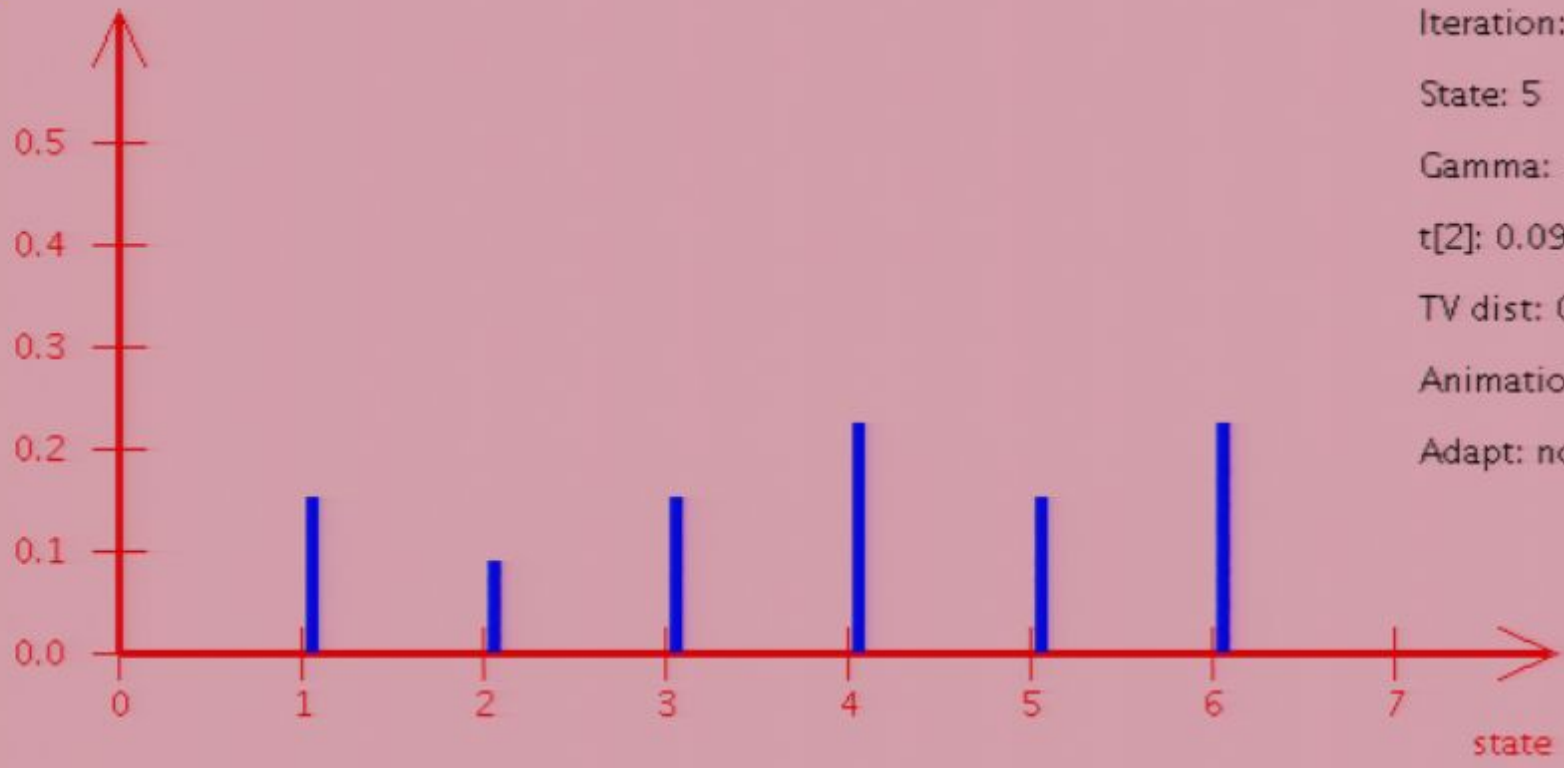


Mean state: 5.0  
Iteration: 1  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.846846  
Animation: 1  
Adapt: no



Applet started.

target

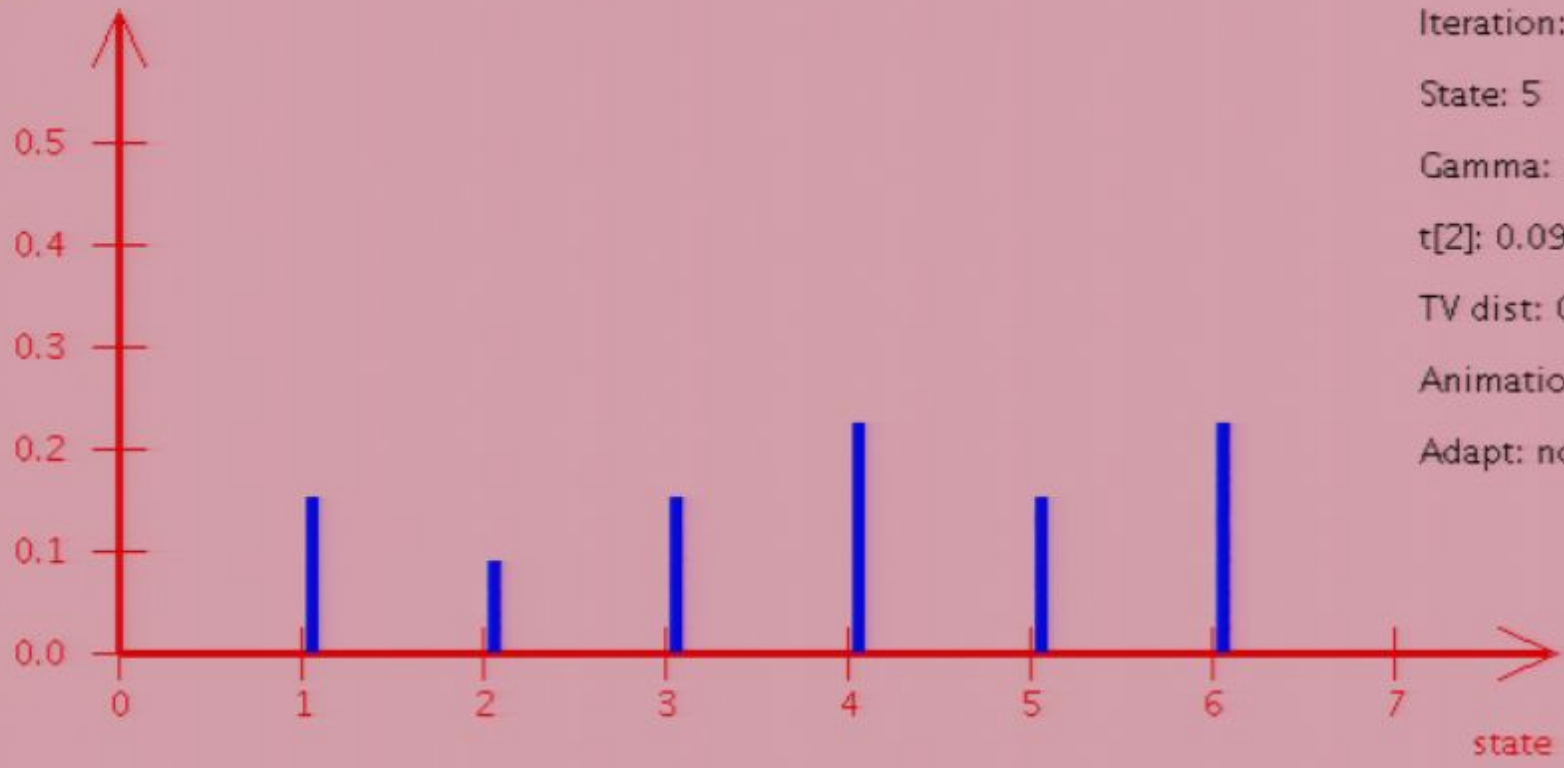


Mean state: 5.0  
Iteration: 1  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.846846  
Animation: 1  
Adapt: no



Applet started.

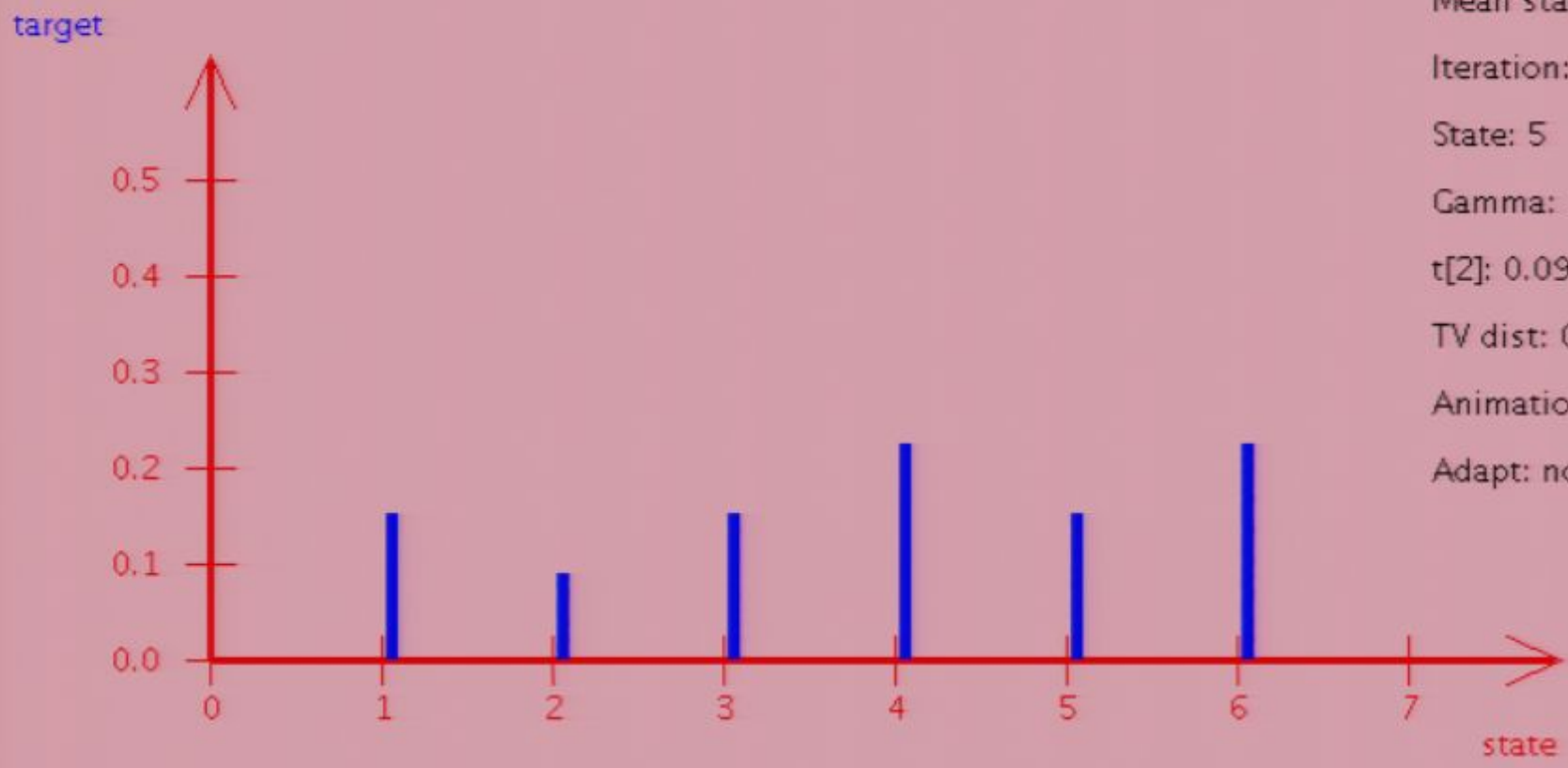
target



Mean state: 5.0  
Iteration: 1  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.846846  
Animation: 1  
Adapt: no



Applet started.

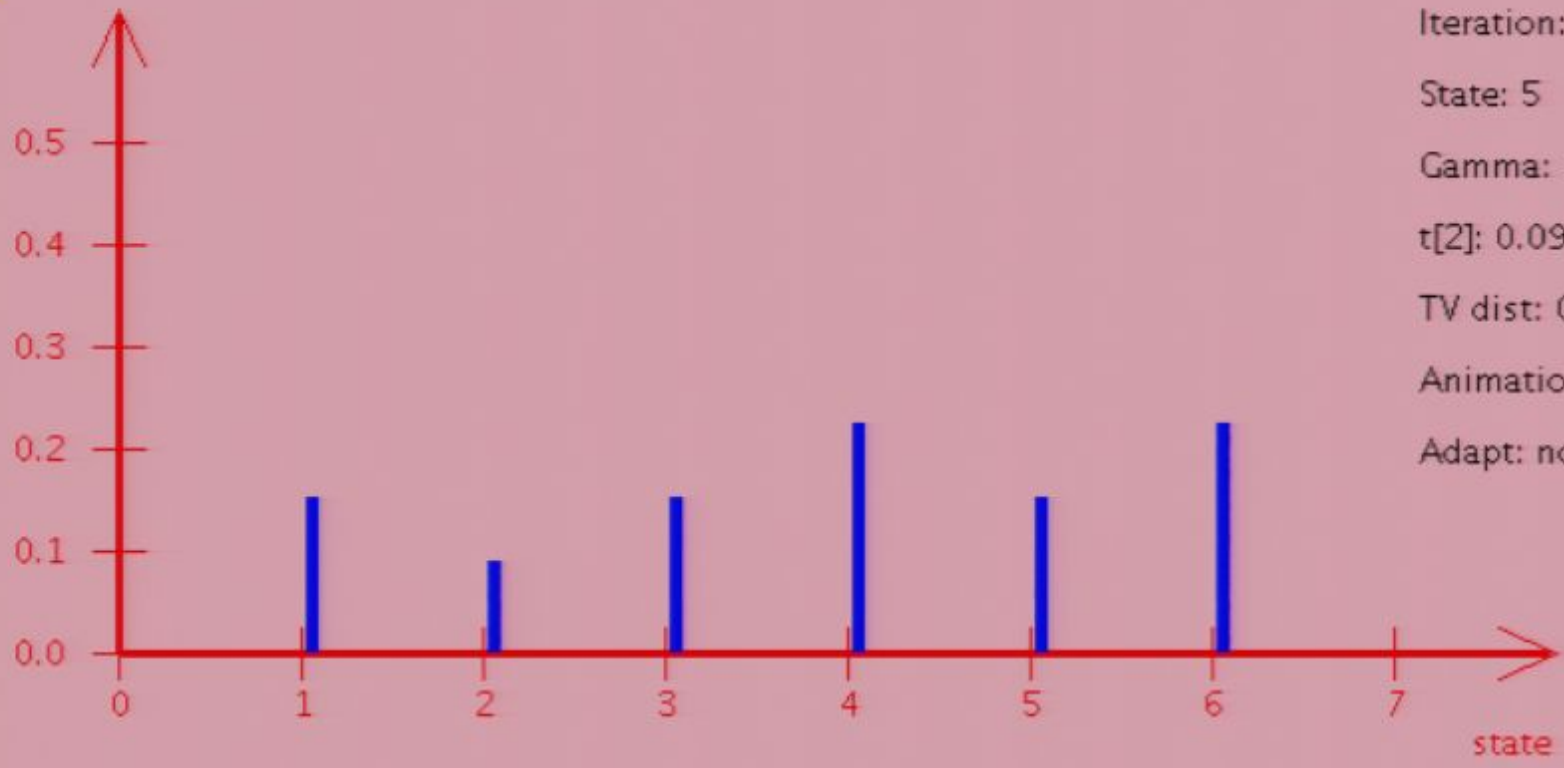


Mean state: 5.0  
Iteration: 1  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.846846  
Animation: 1  
Adapt: no



Applet started.

target



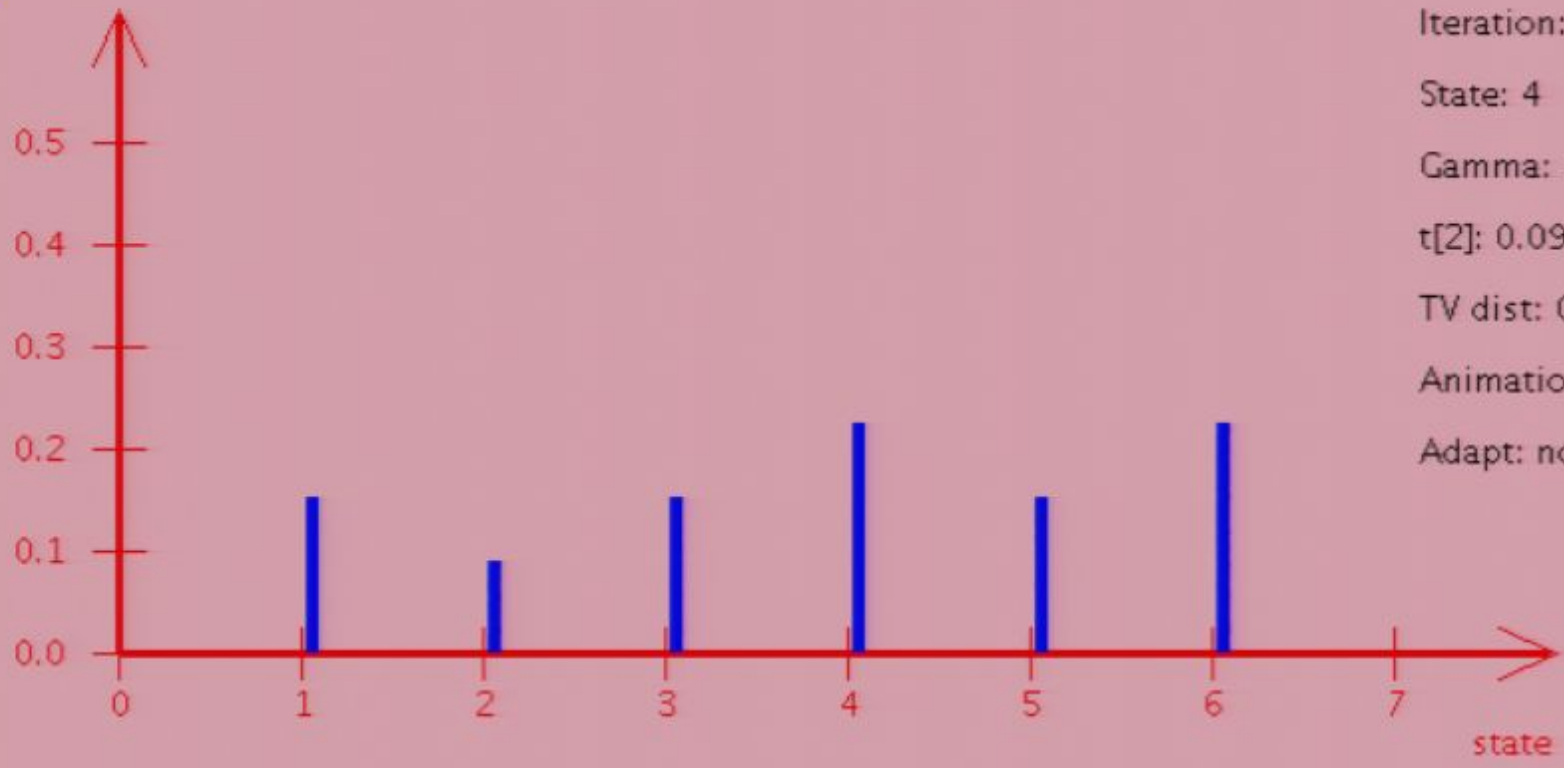
Mean state: 5.0  
Iteration: 1  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.846846  
Animation: 1  
Adapt: no



Applet started.



target



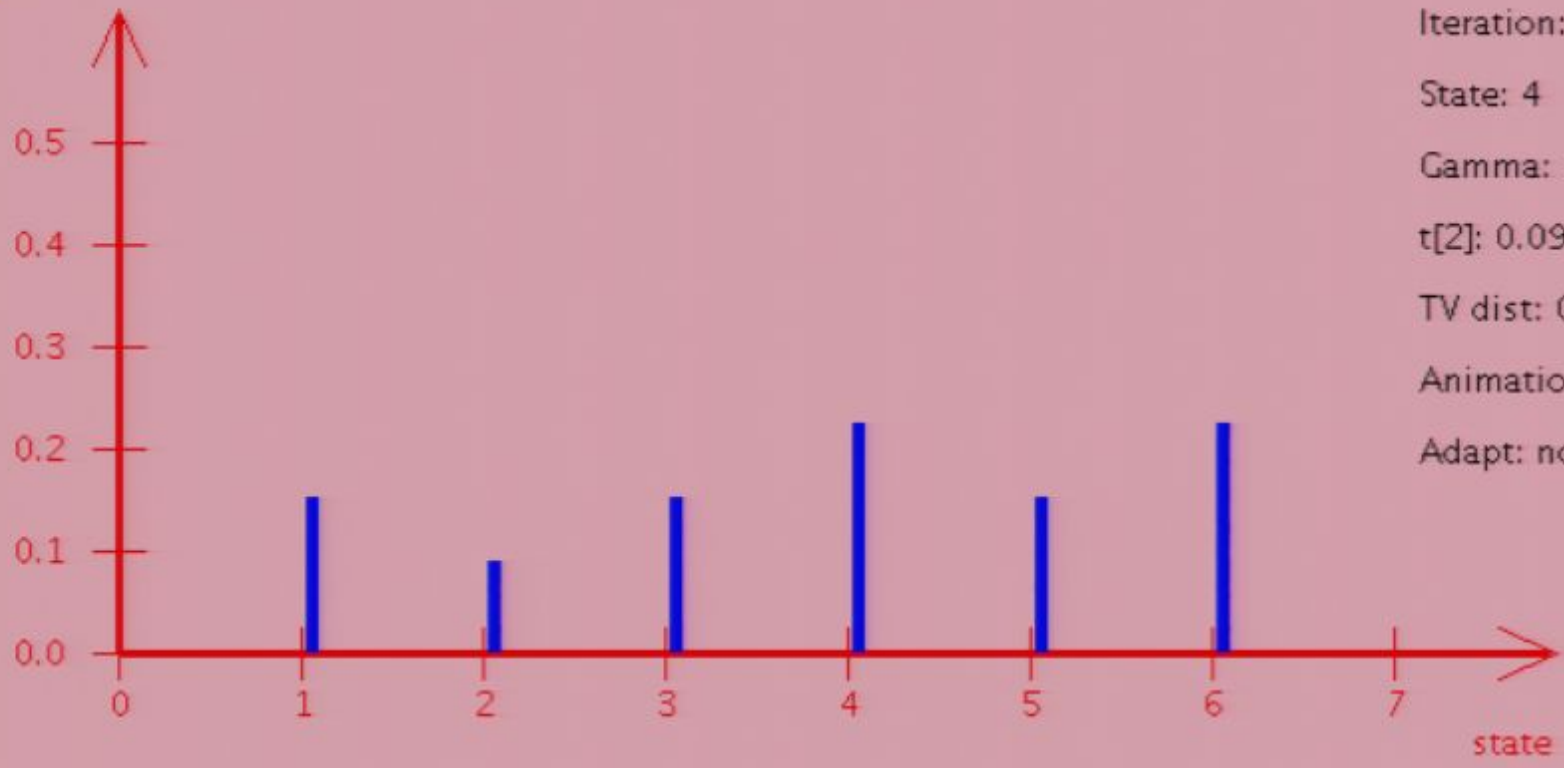
Mean state: 4.5  
Iteration: 2  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.



target

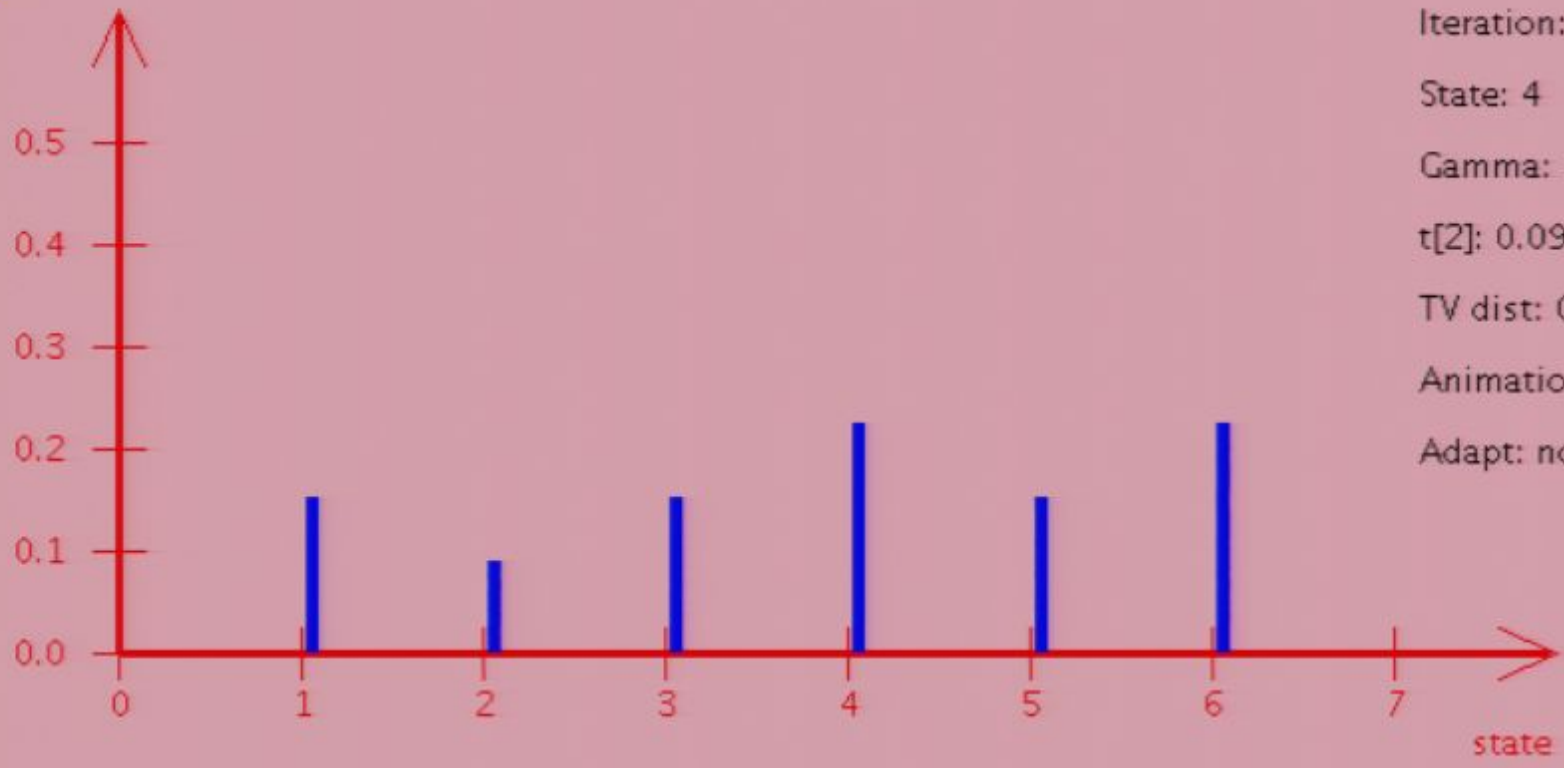


Mean state: 4.5  
Iteration: 2  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

target

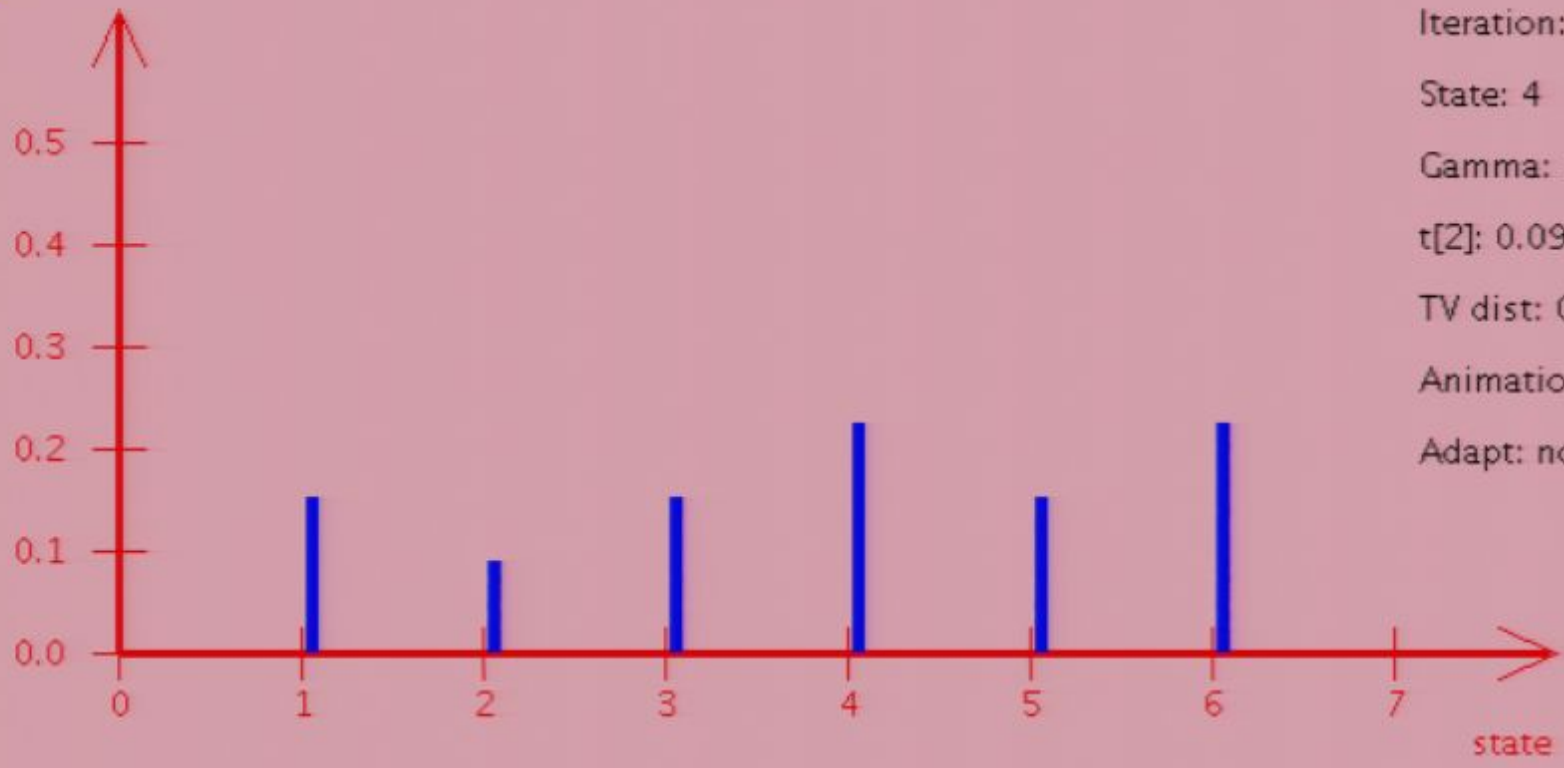


Mean state: 4.5  
Iteration: 2  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

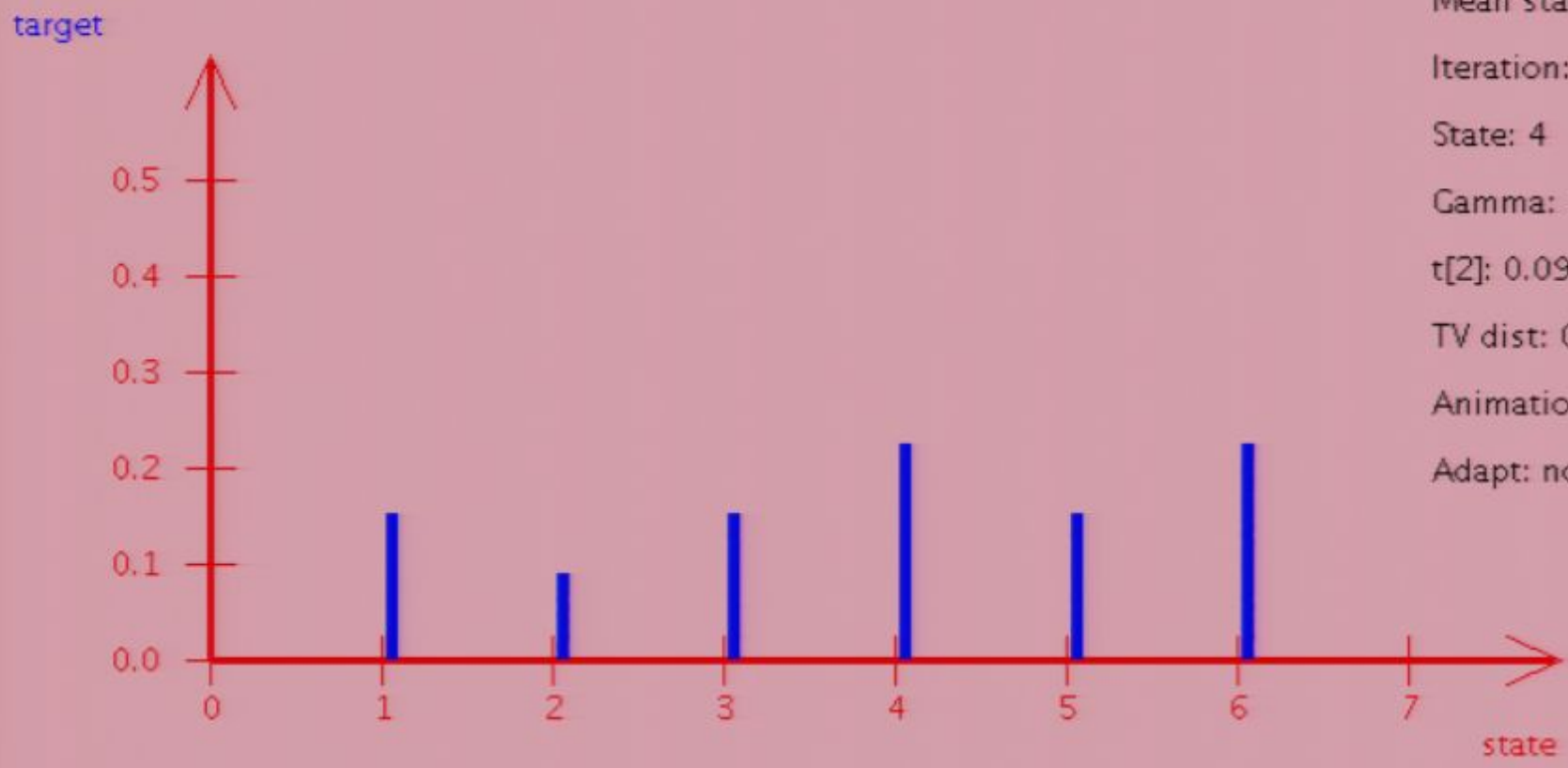
target



Mean state: 4.5  
Iteration: 2  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

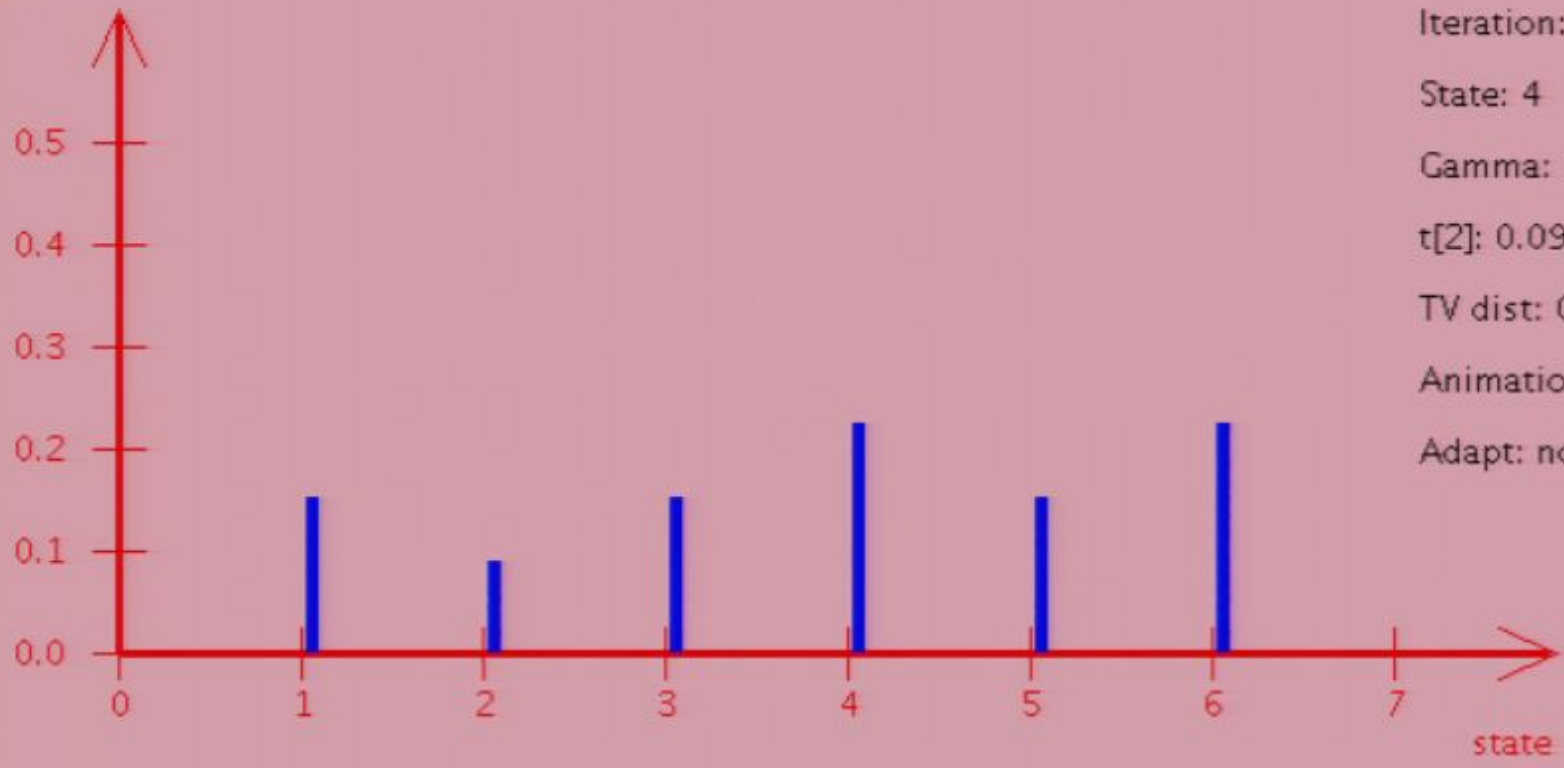


Mean state: 4.333  
Iteration: 3  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

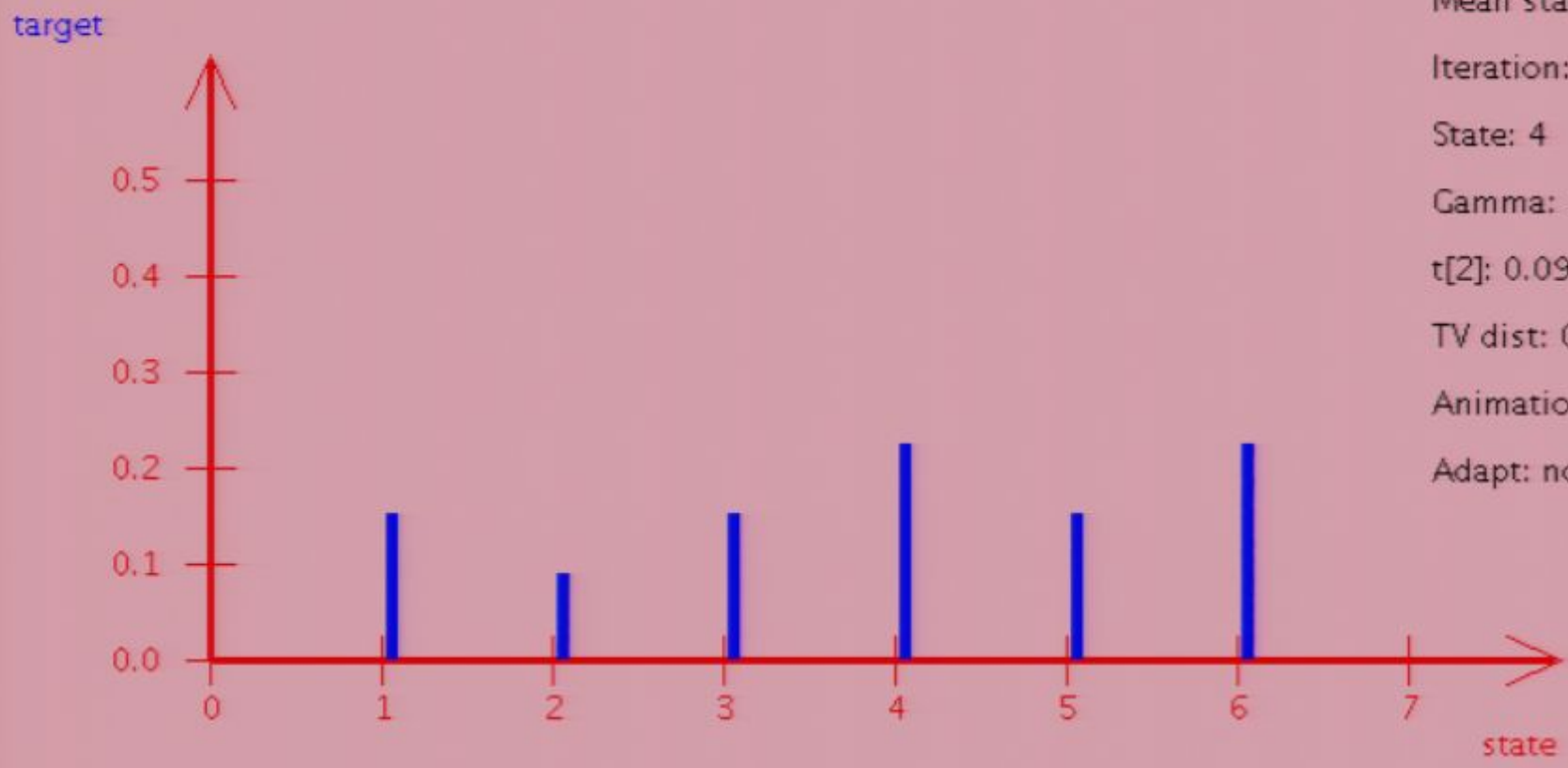
target



Mean state: 4.333  
Iteration: 3  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

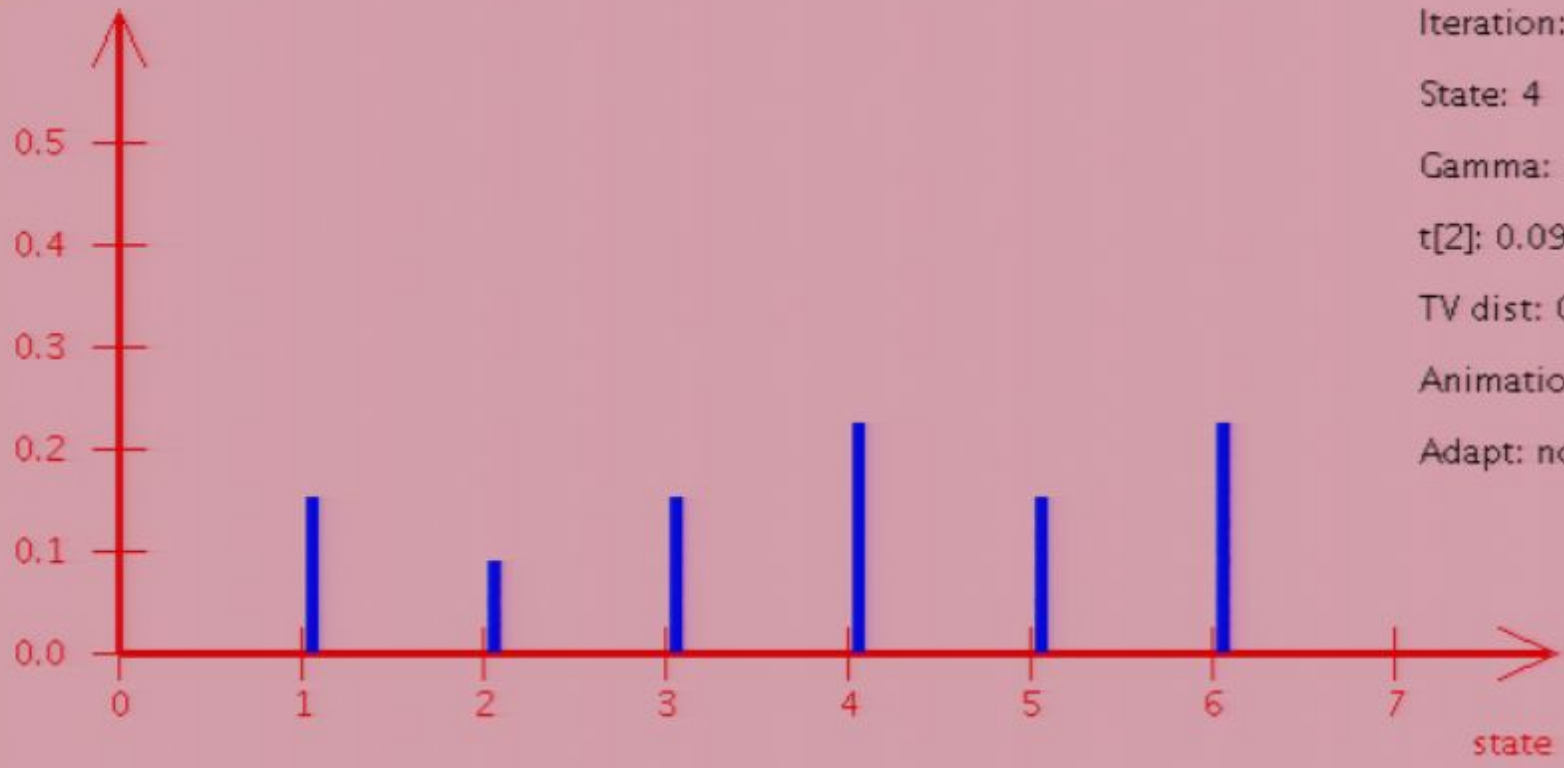


Mean state: 4.333  
Iteration: 3  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

target

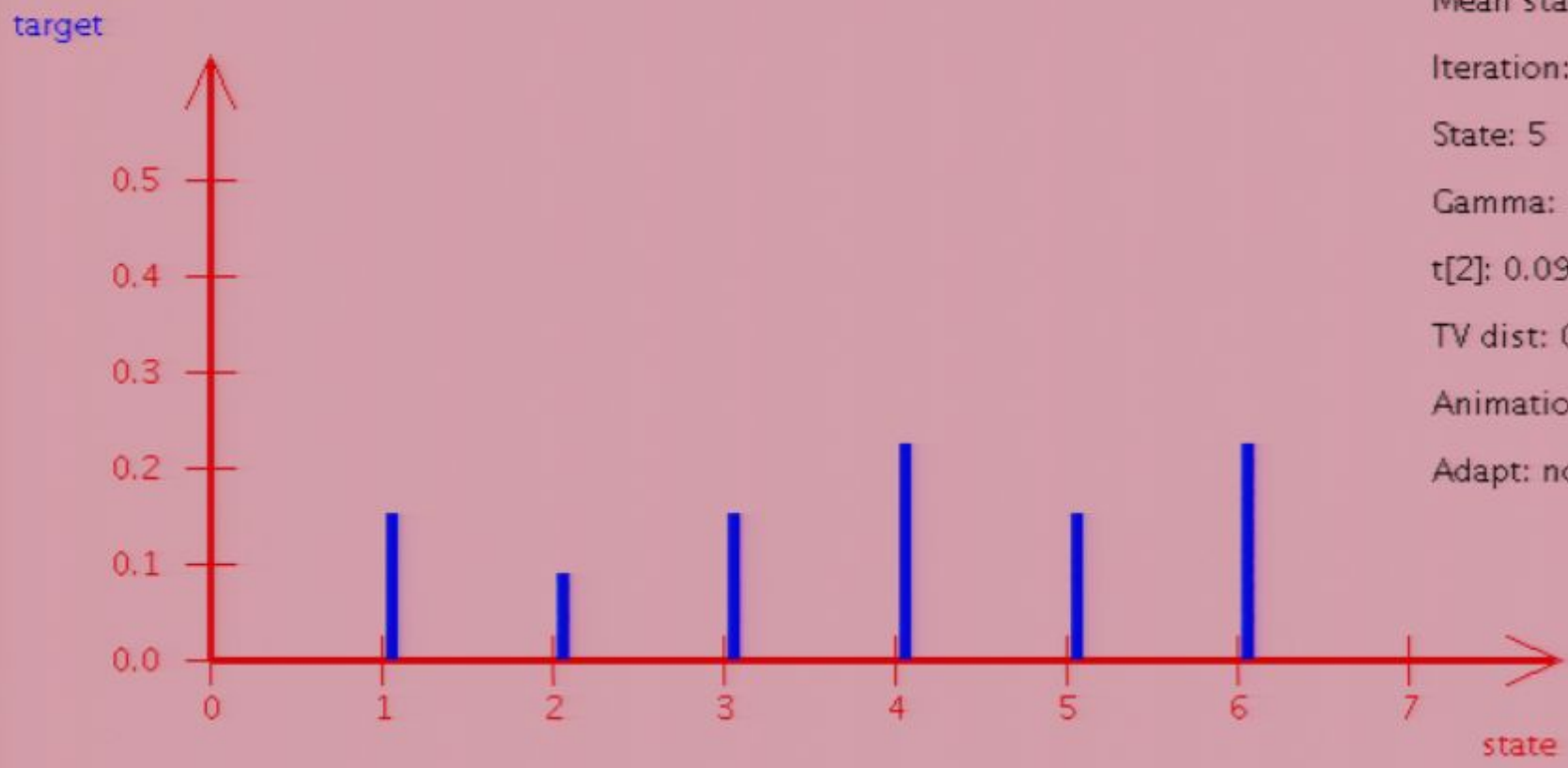


Mean state: 4.333  
Iteration: 3  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.





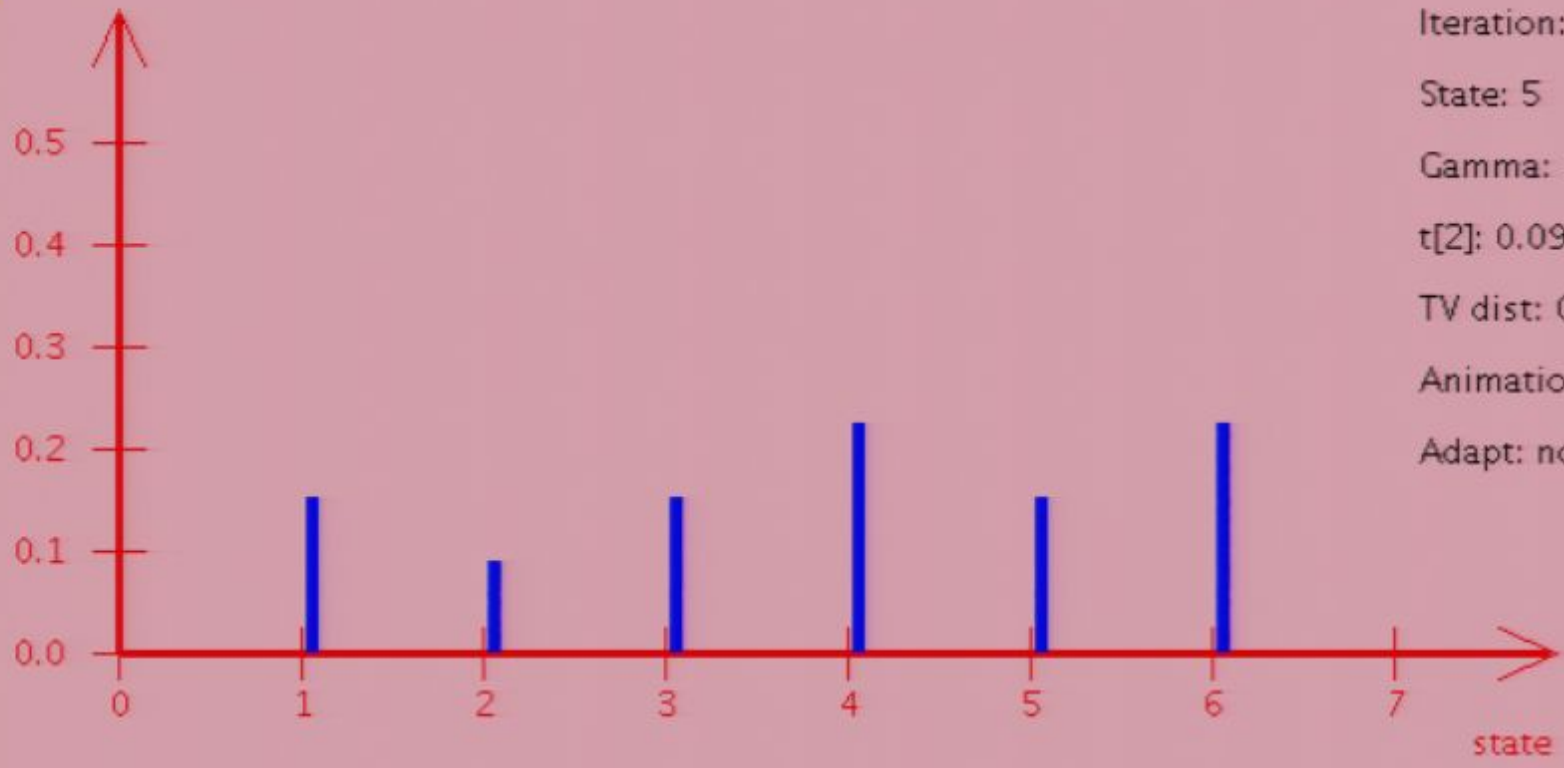
Mean state: 4.5  
Iteration: 4  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.



target

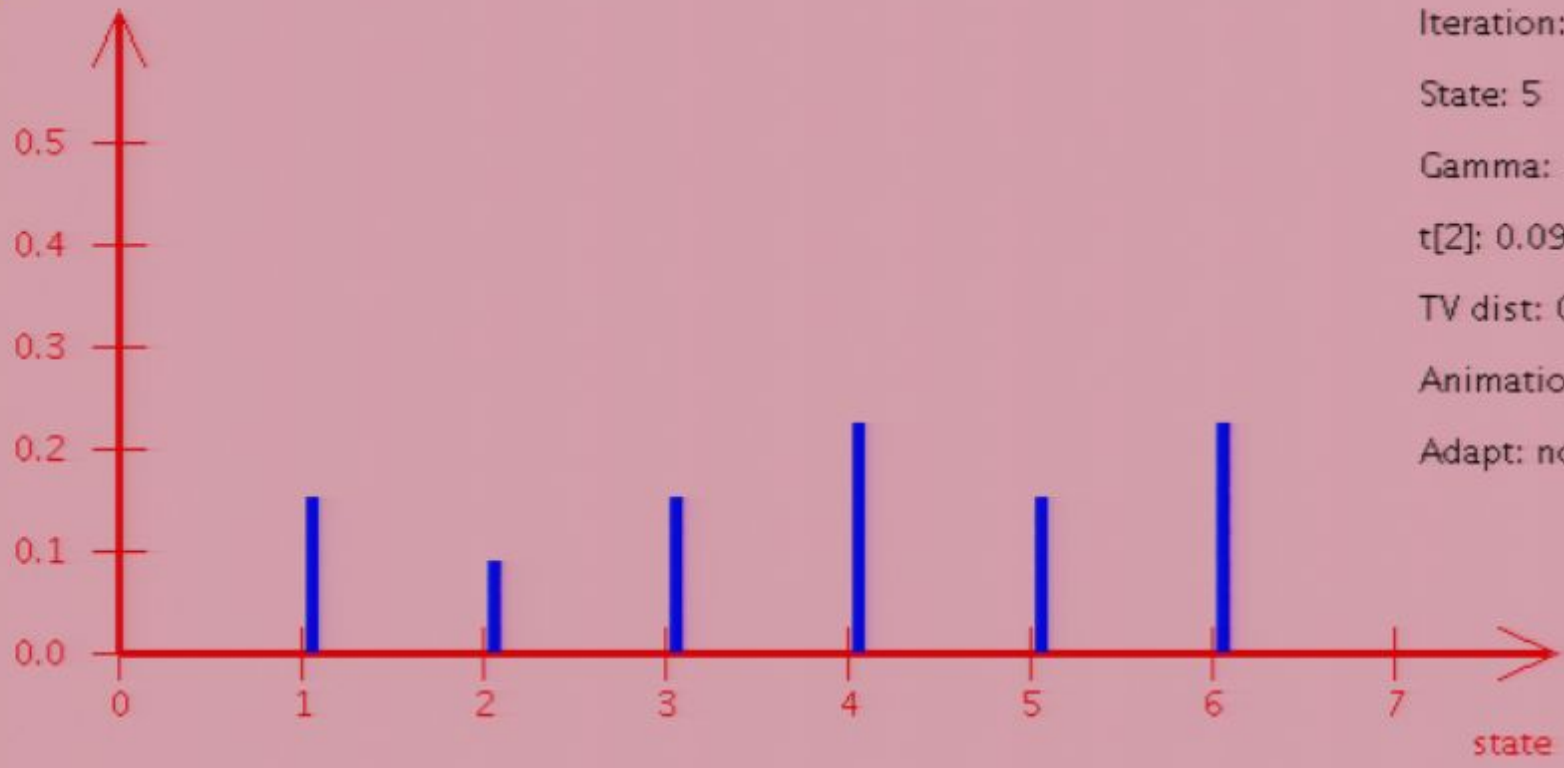


Mean state: 4.5  
Iteration: 4  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

target

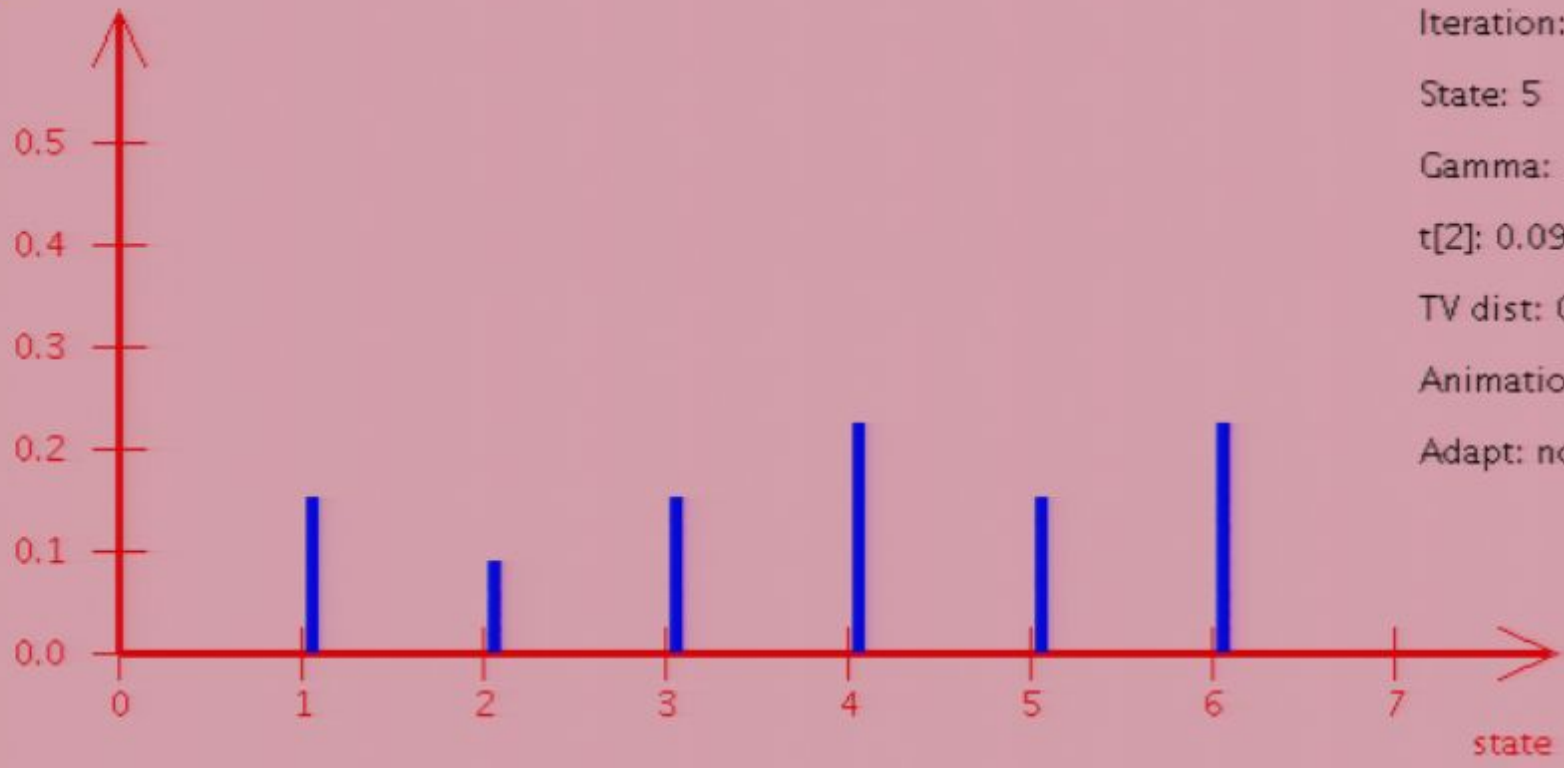


Mean state: 4.5  
Iteration: 4  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

target

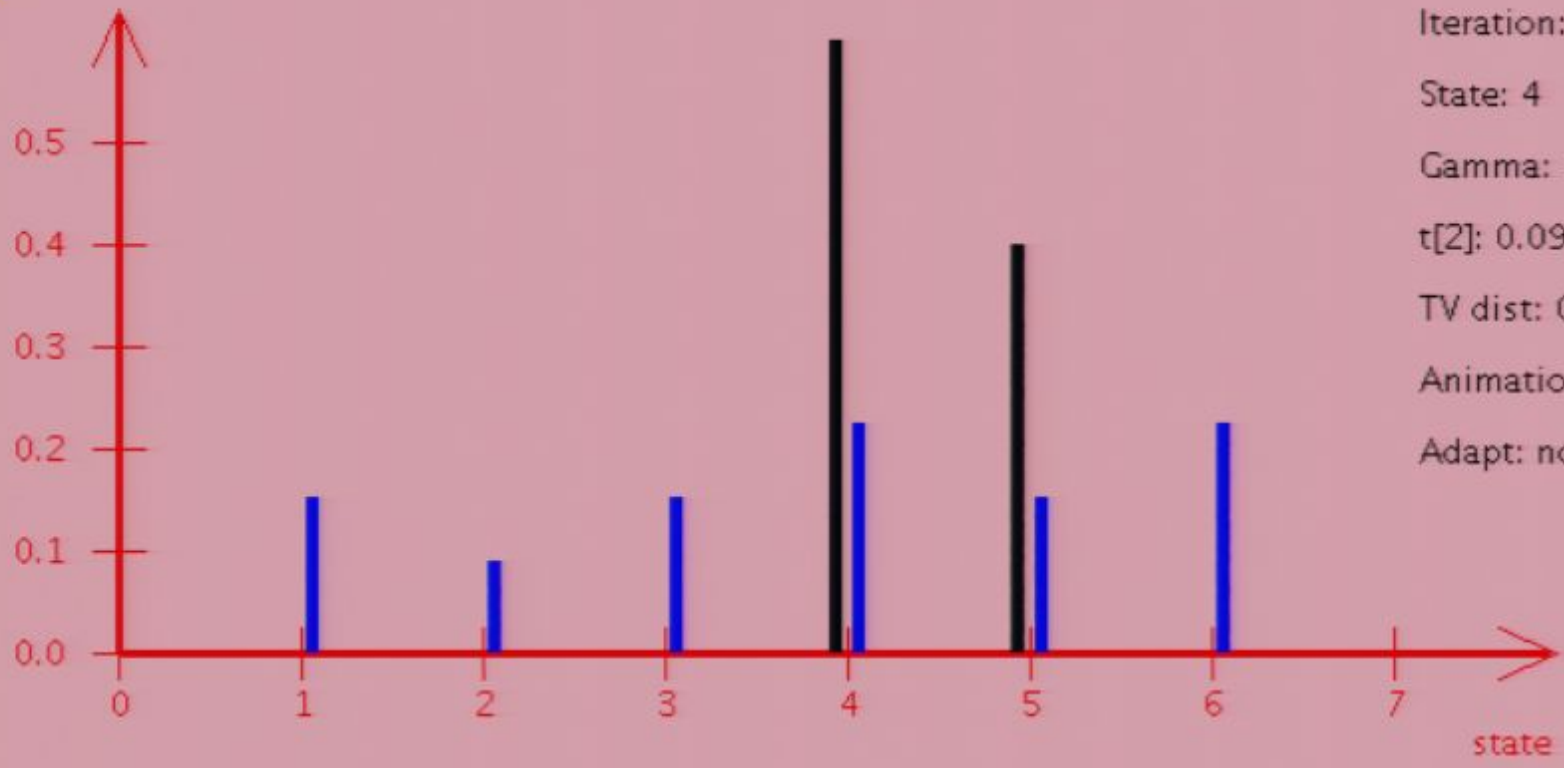


Mean state: 4.5  
Iteration: 4  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

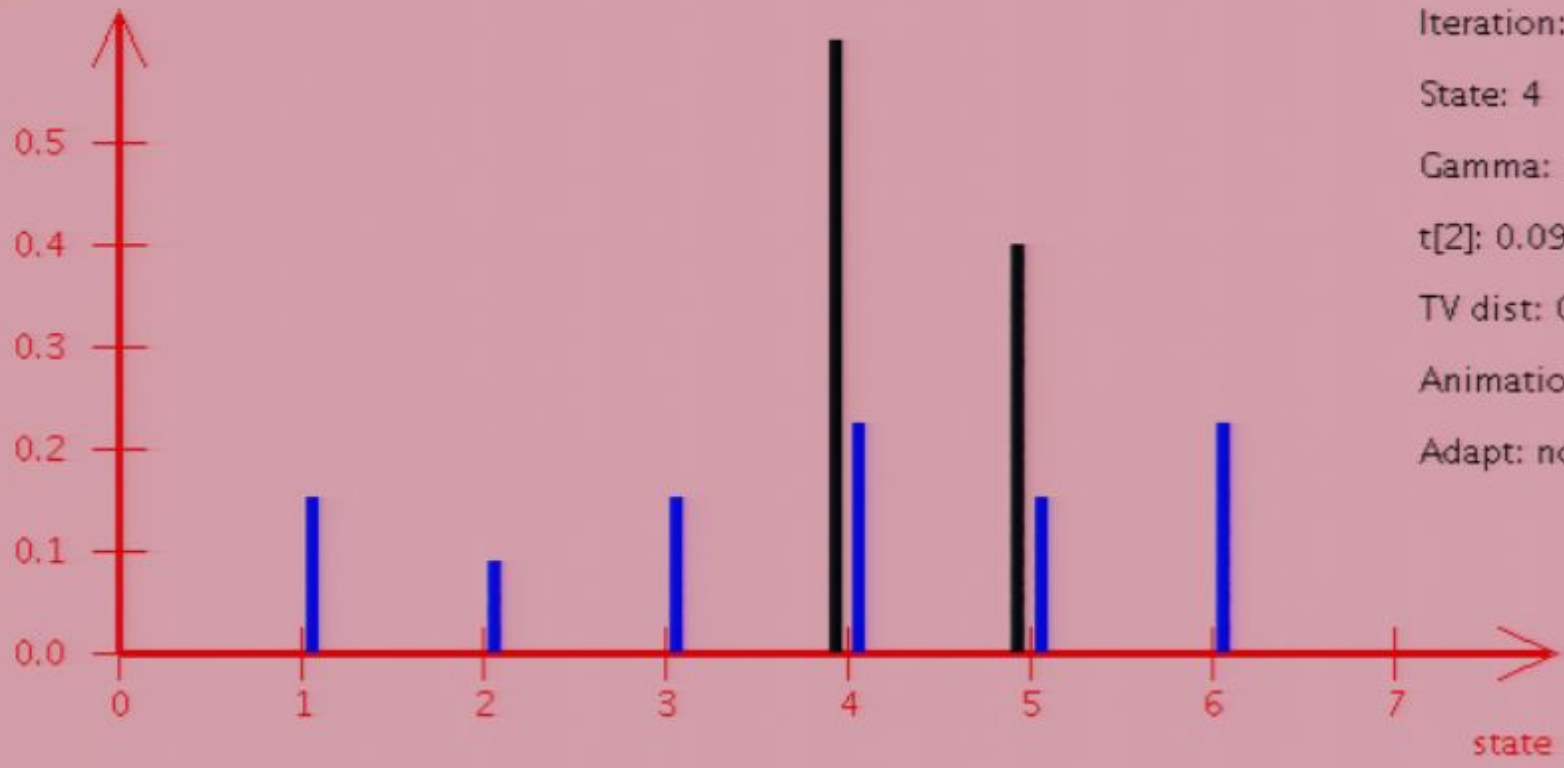
target



Mean state: 4.4  
Iteration: 5  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

Applet started.

target

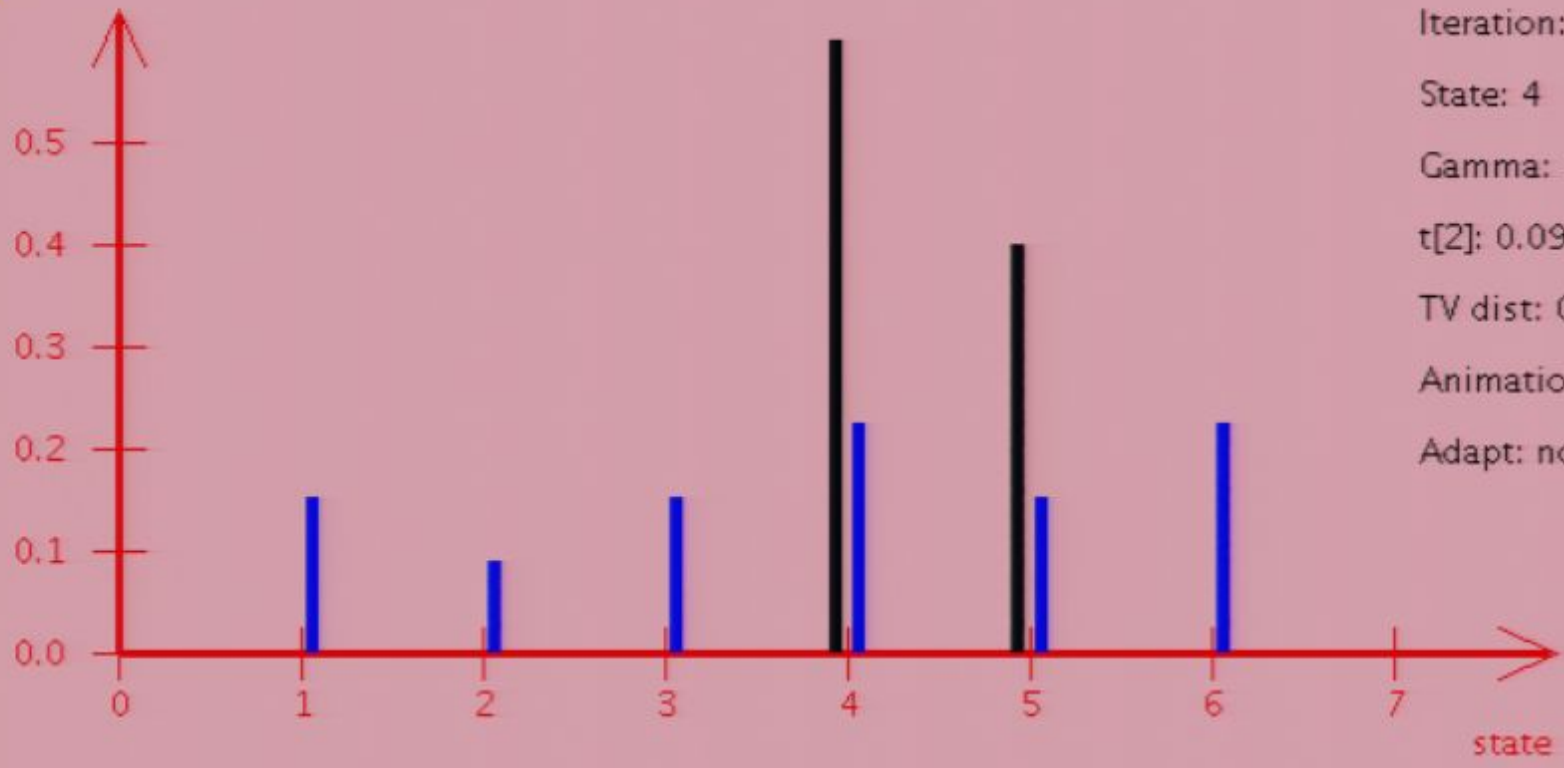


Mean state: 4.4  
Iteration: 5  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

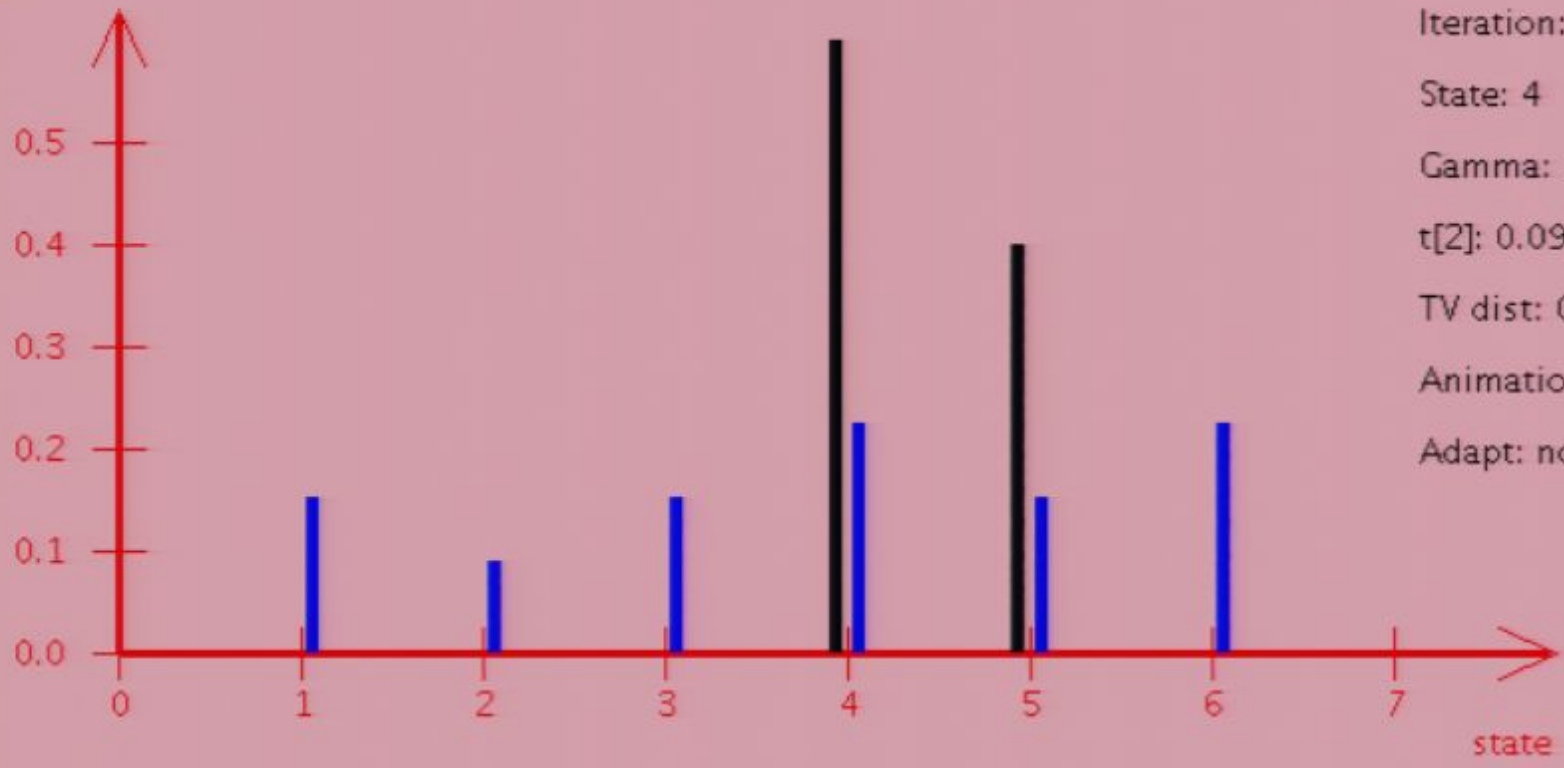
target



Mean state: 4.4  
Iteration: 5  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

Applet started.

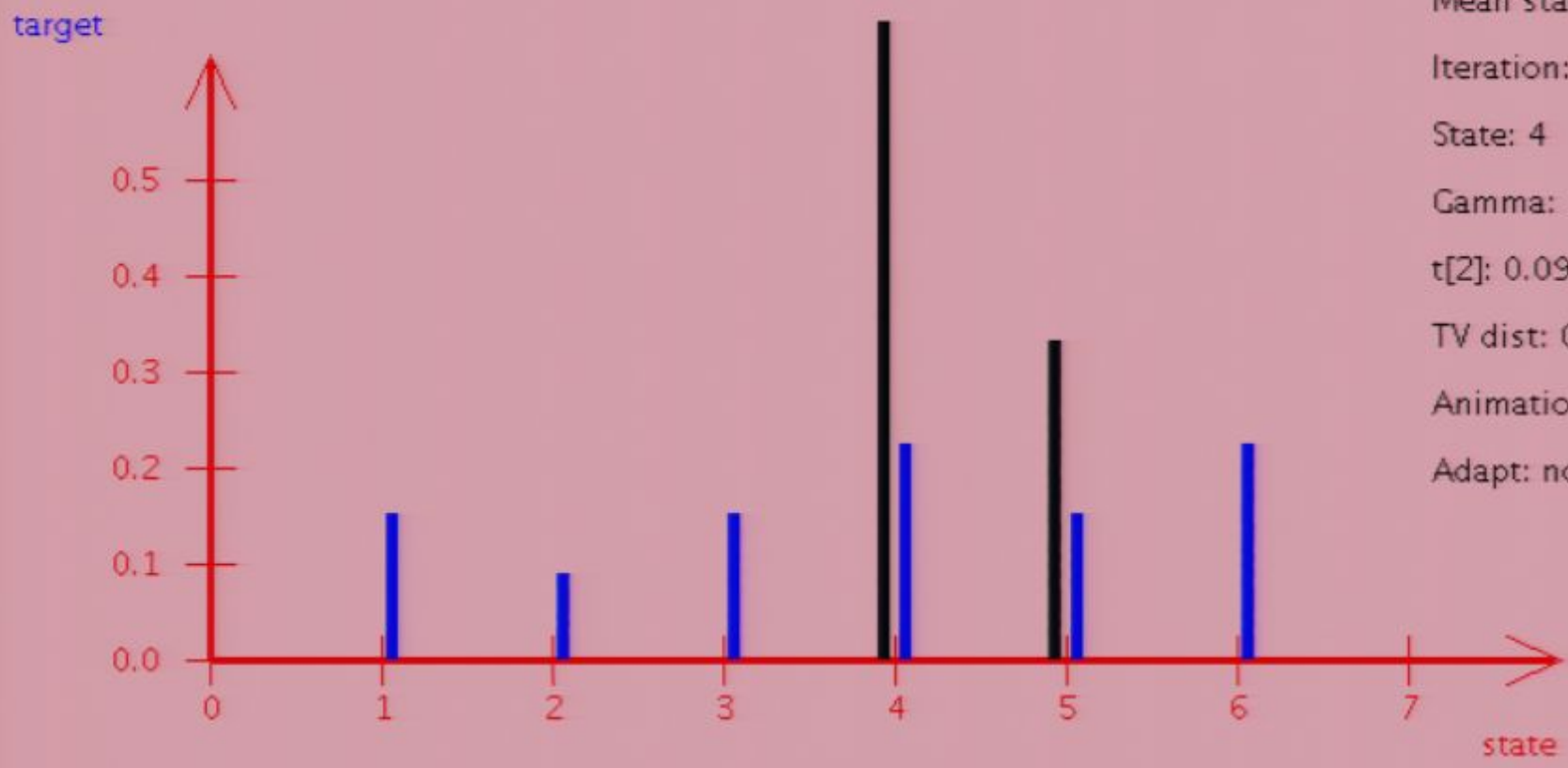
target



Mean state: 4.4  
Iteration: 5  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

Applet started.



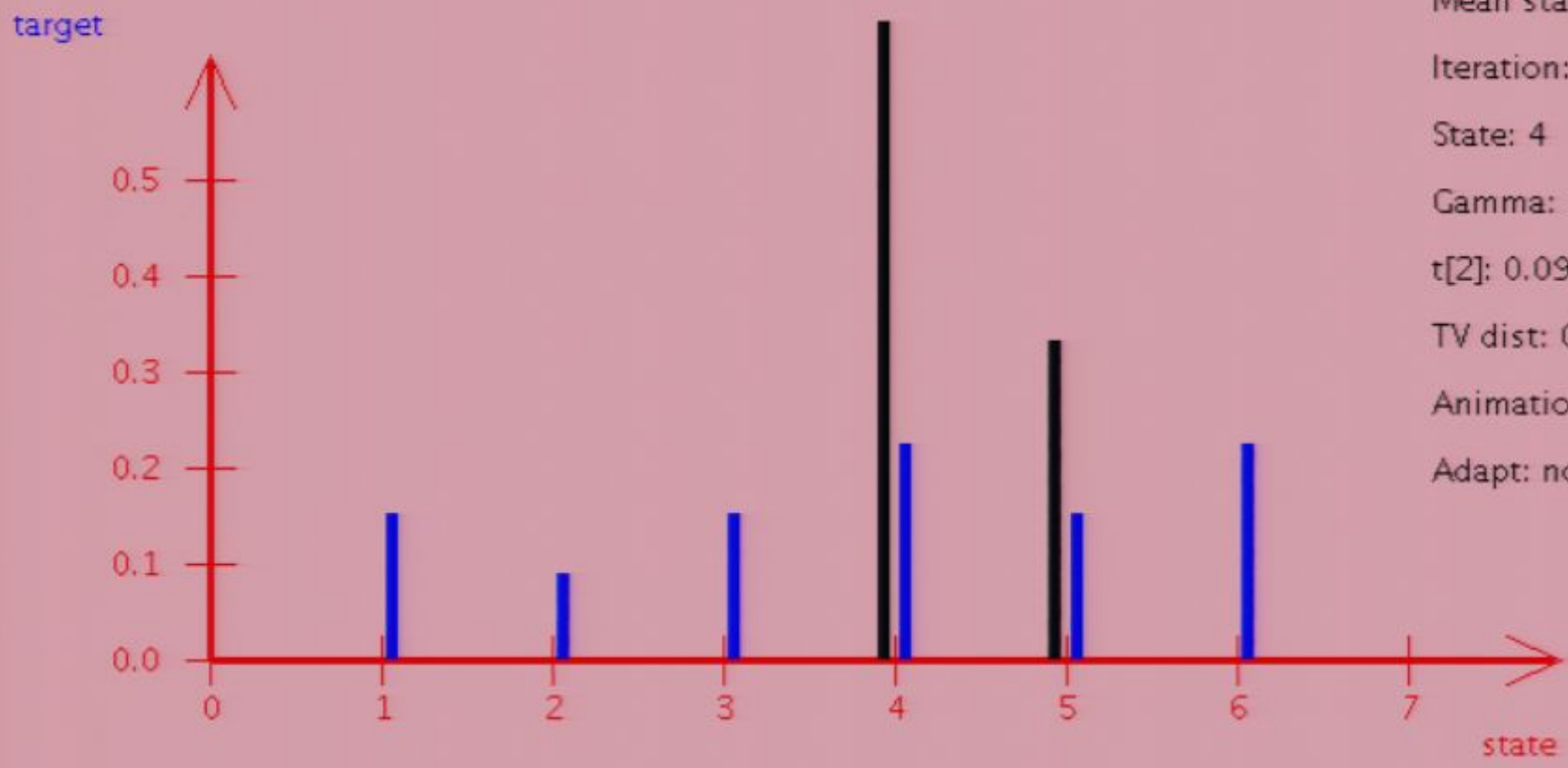


Mean state: 4.333  
Iteration: 6  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



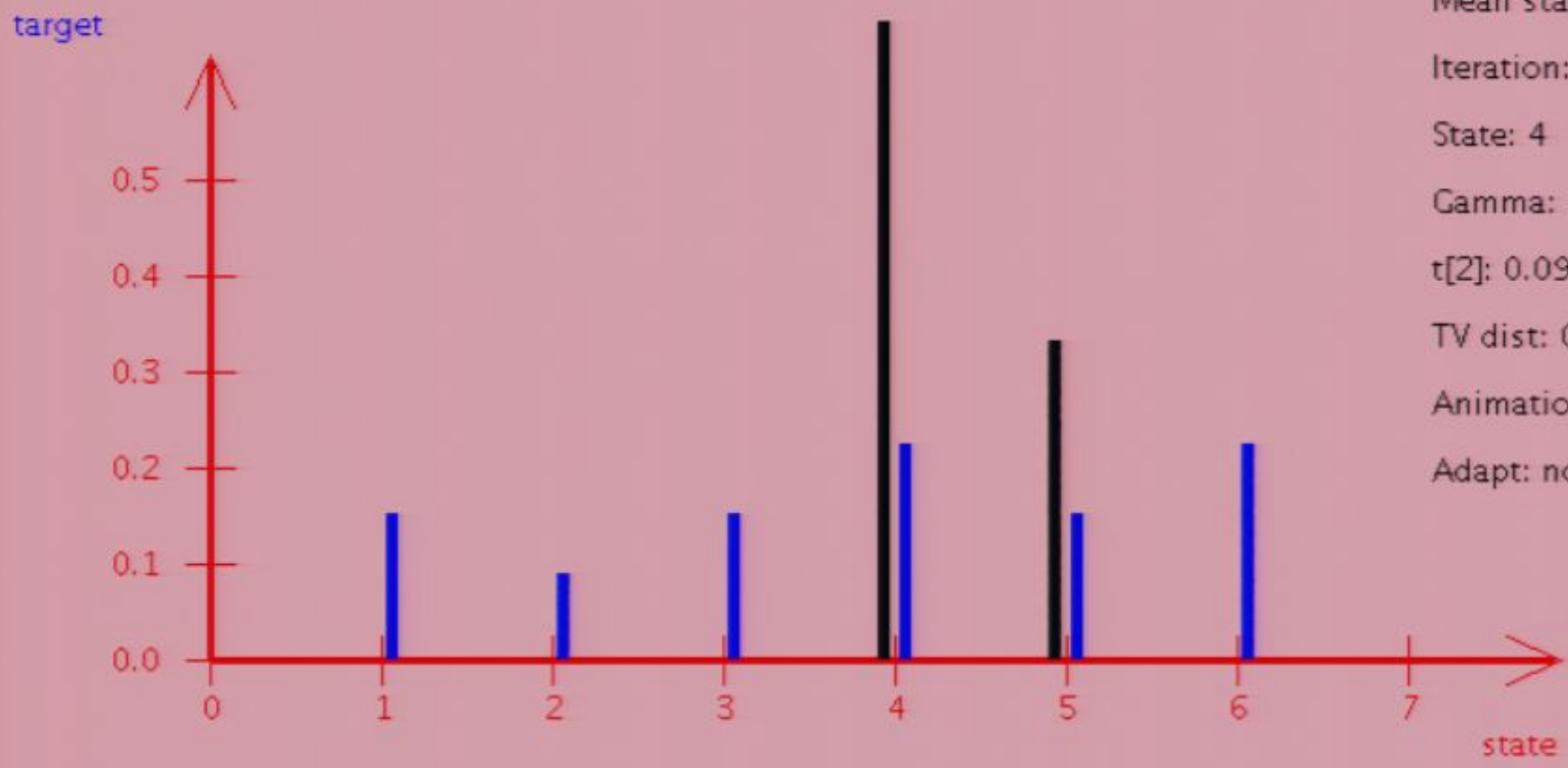
Applet started.





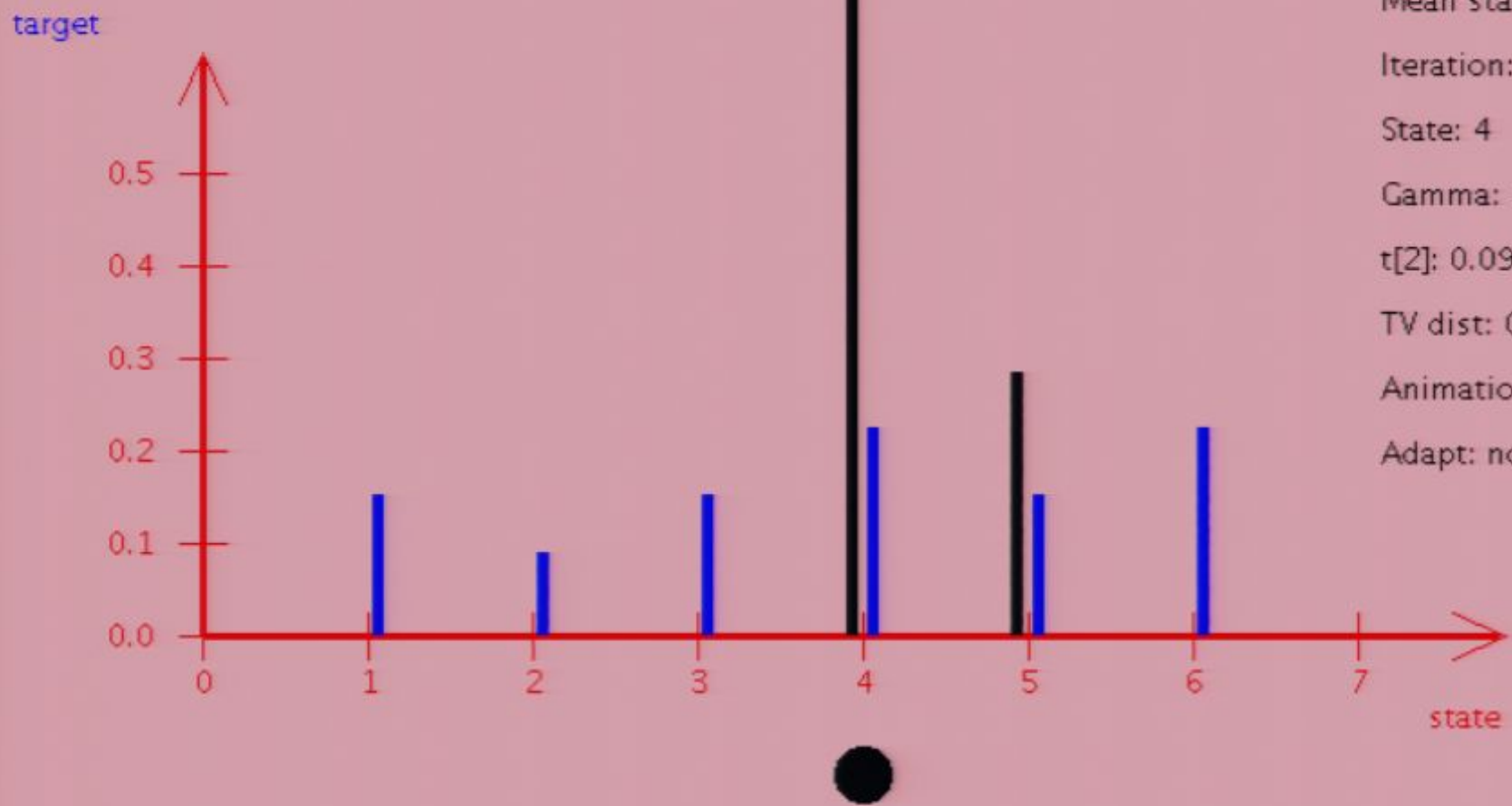
Mean state: 4.333  
Iteration: 6  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

Applet started.



Mean state: 4.333  
Iteration: 6  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

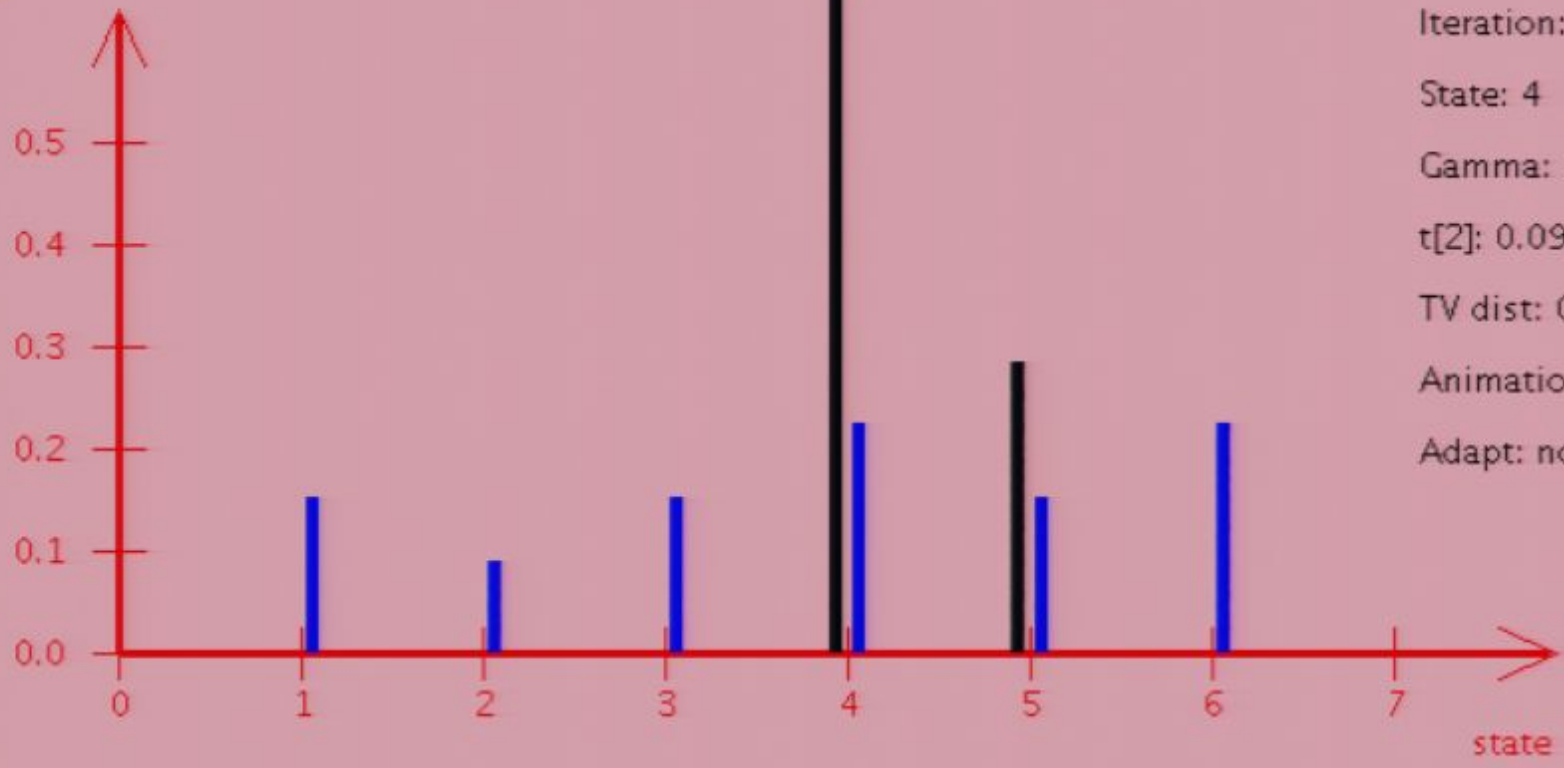
Applet started.



Mean state: 4.285  
Iteration: 7  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

Applet started.

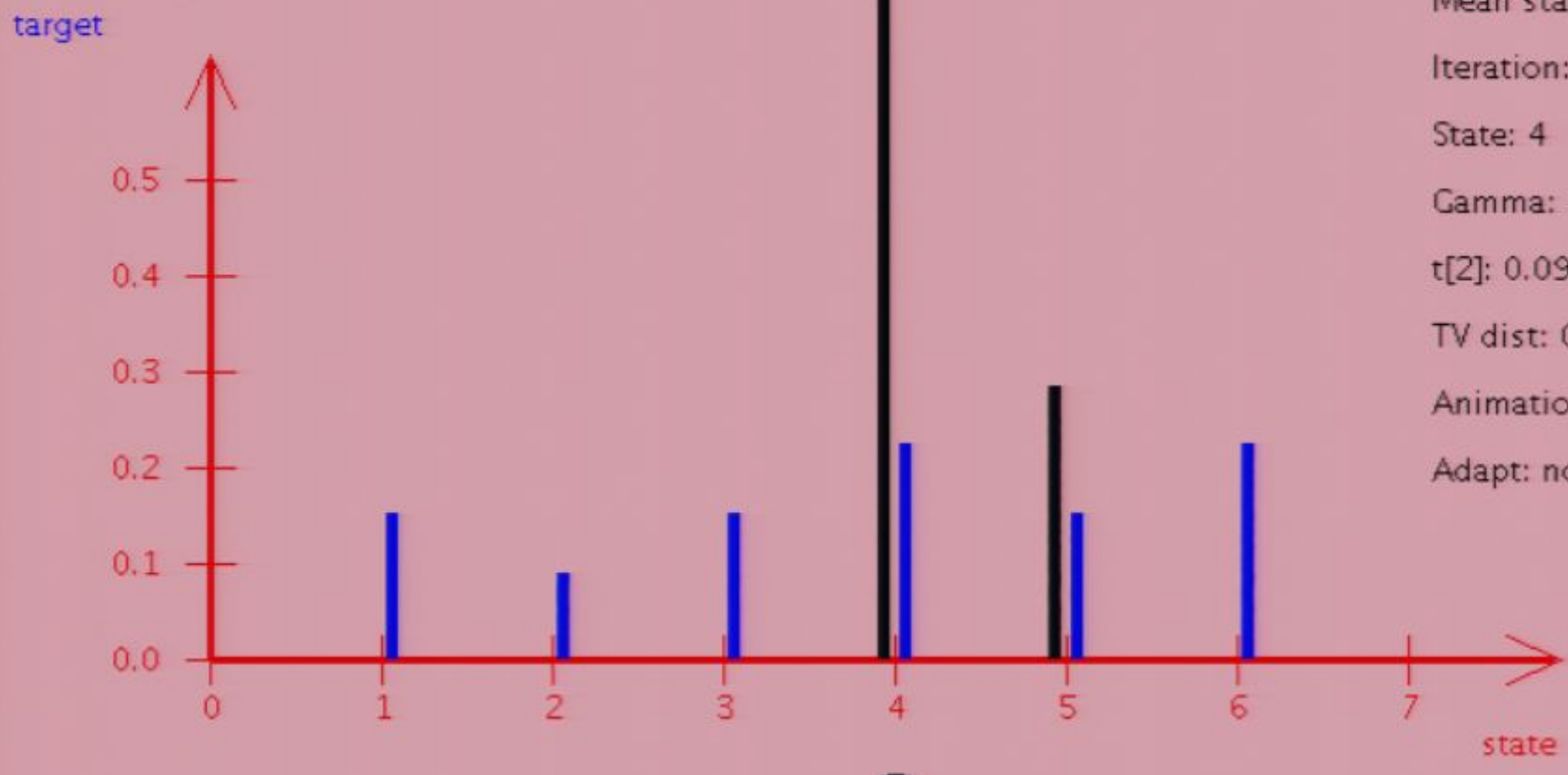
target



Mean state: 4.285  
Iteration: 7  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



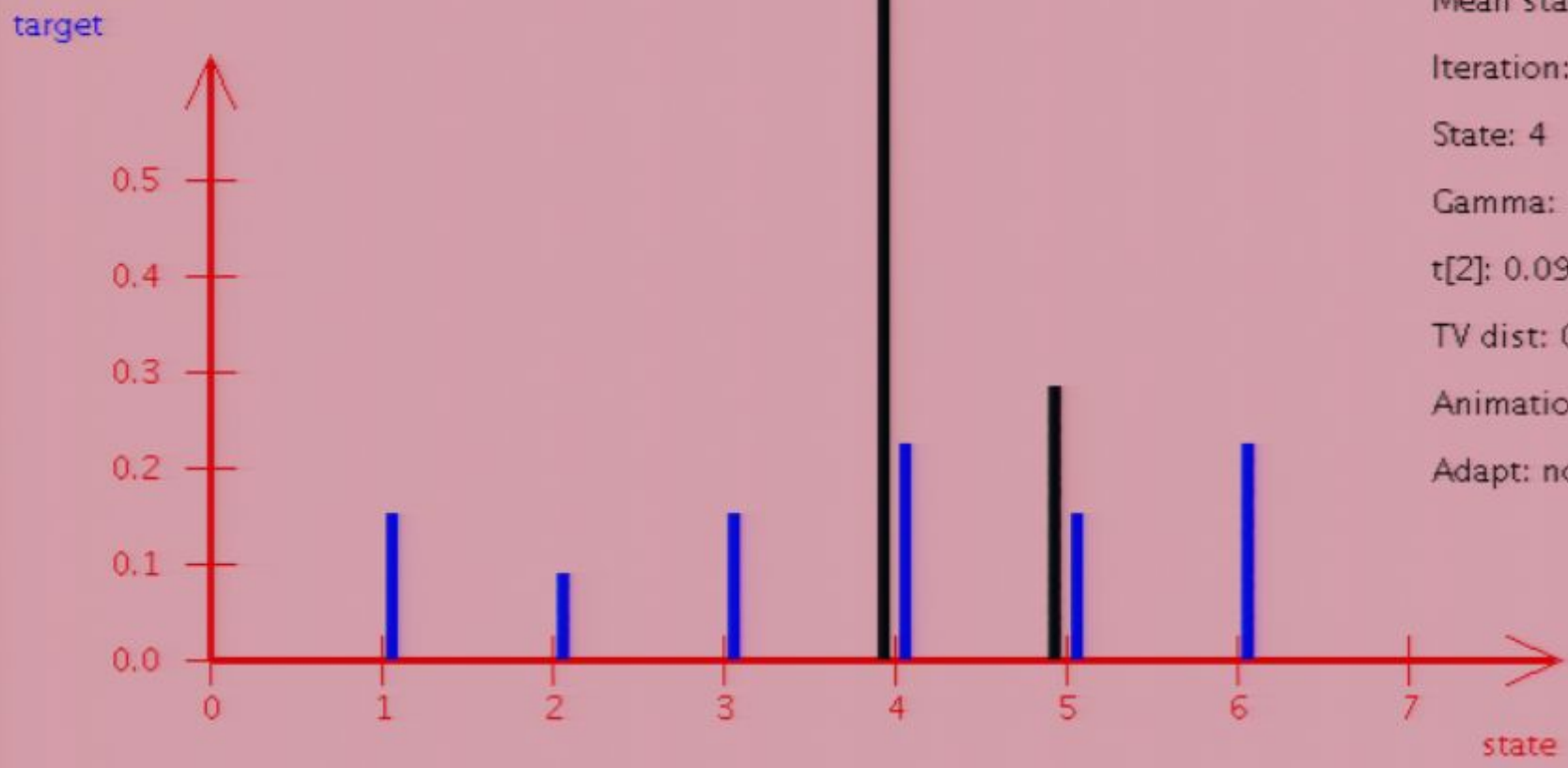
Applet started.



Mean state: 4.285  
Iteration: 7  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

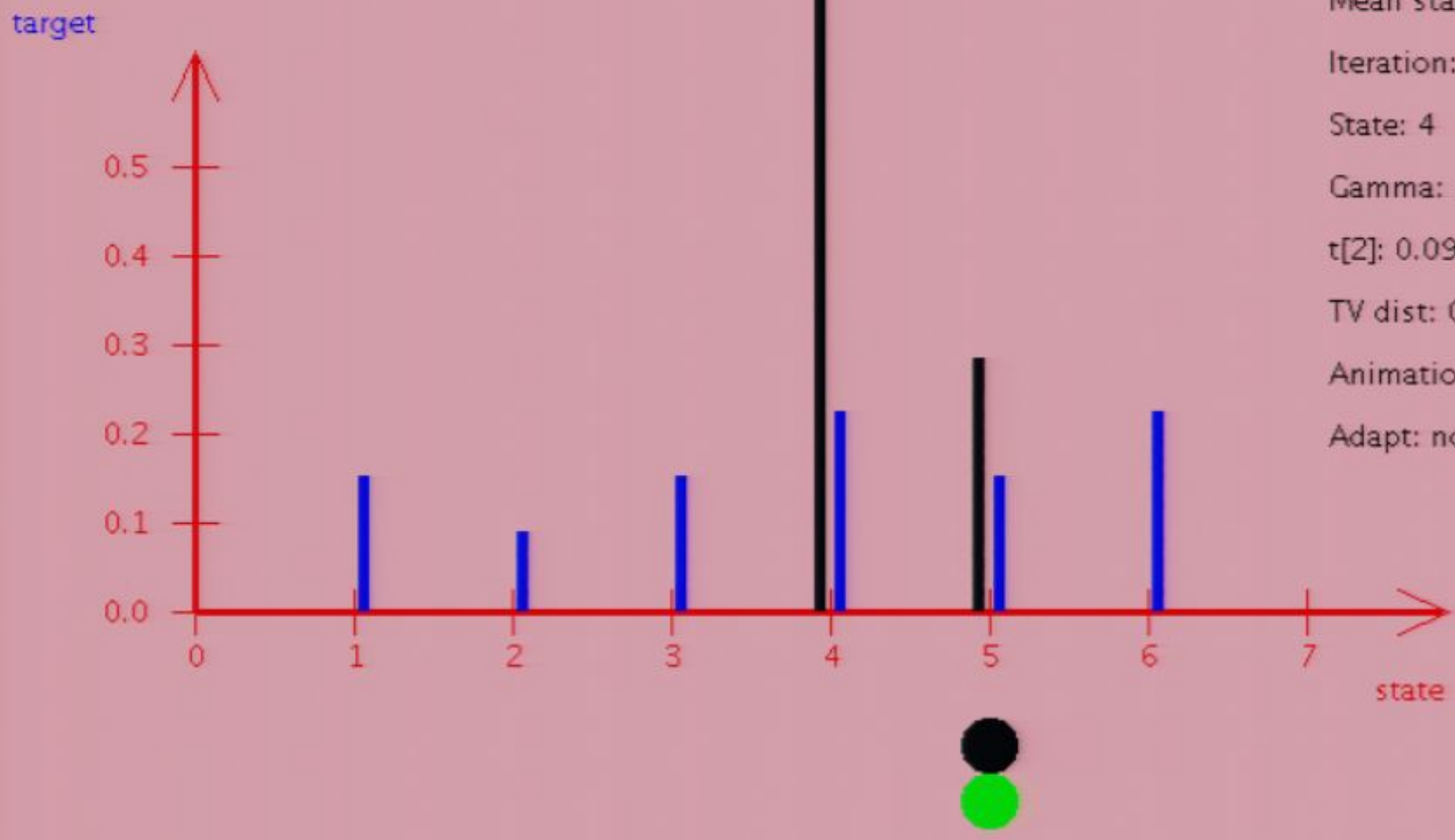


Applet started.



Mean state: 4.285  
Iteration: 7  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

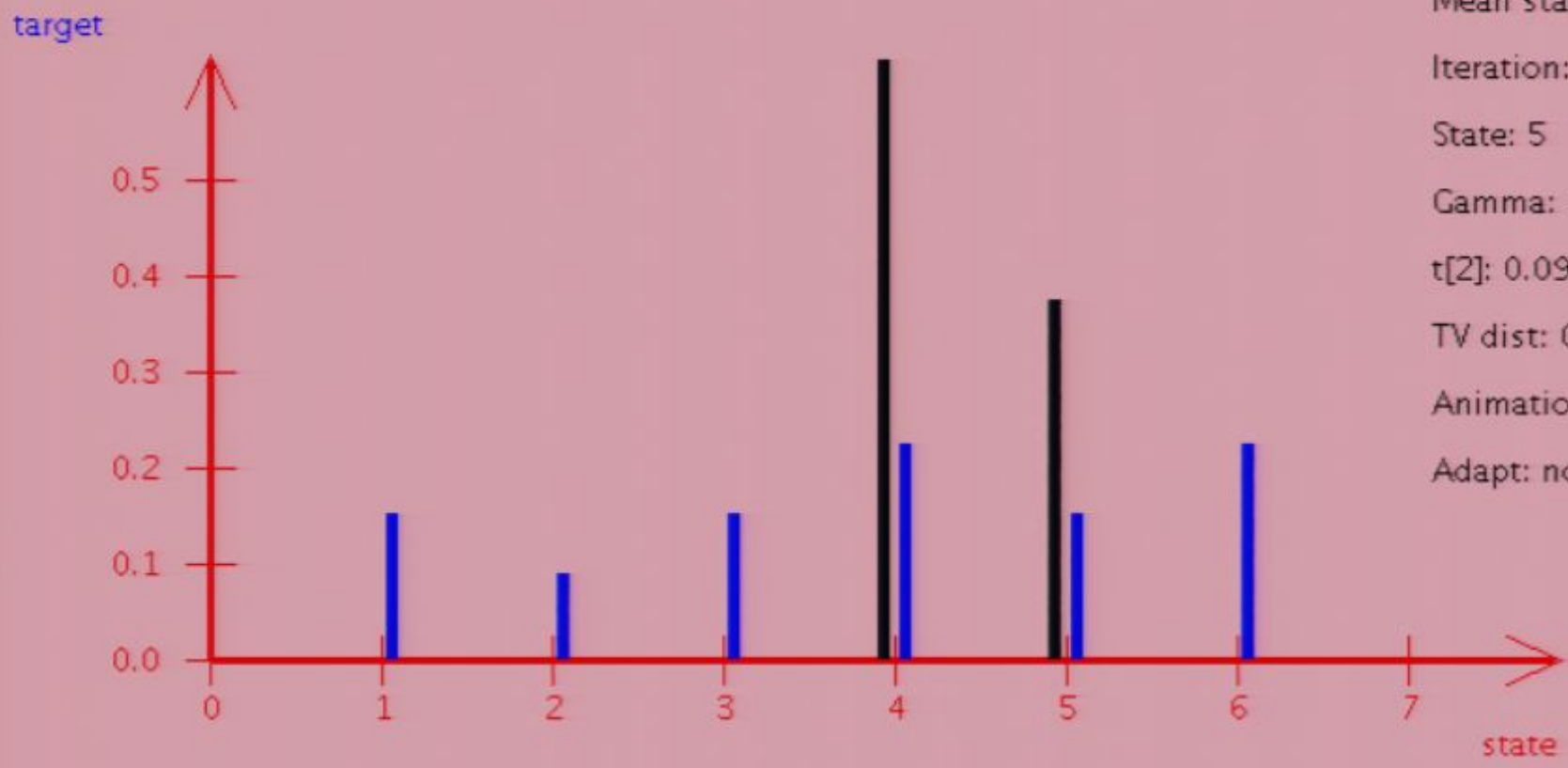
Applet started.



Mean state: 4.285  
Iteration: 7  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

Applet started.



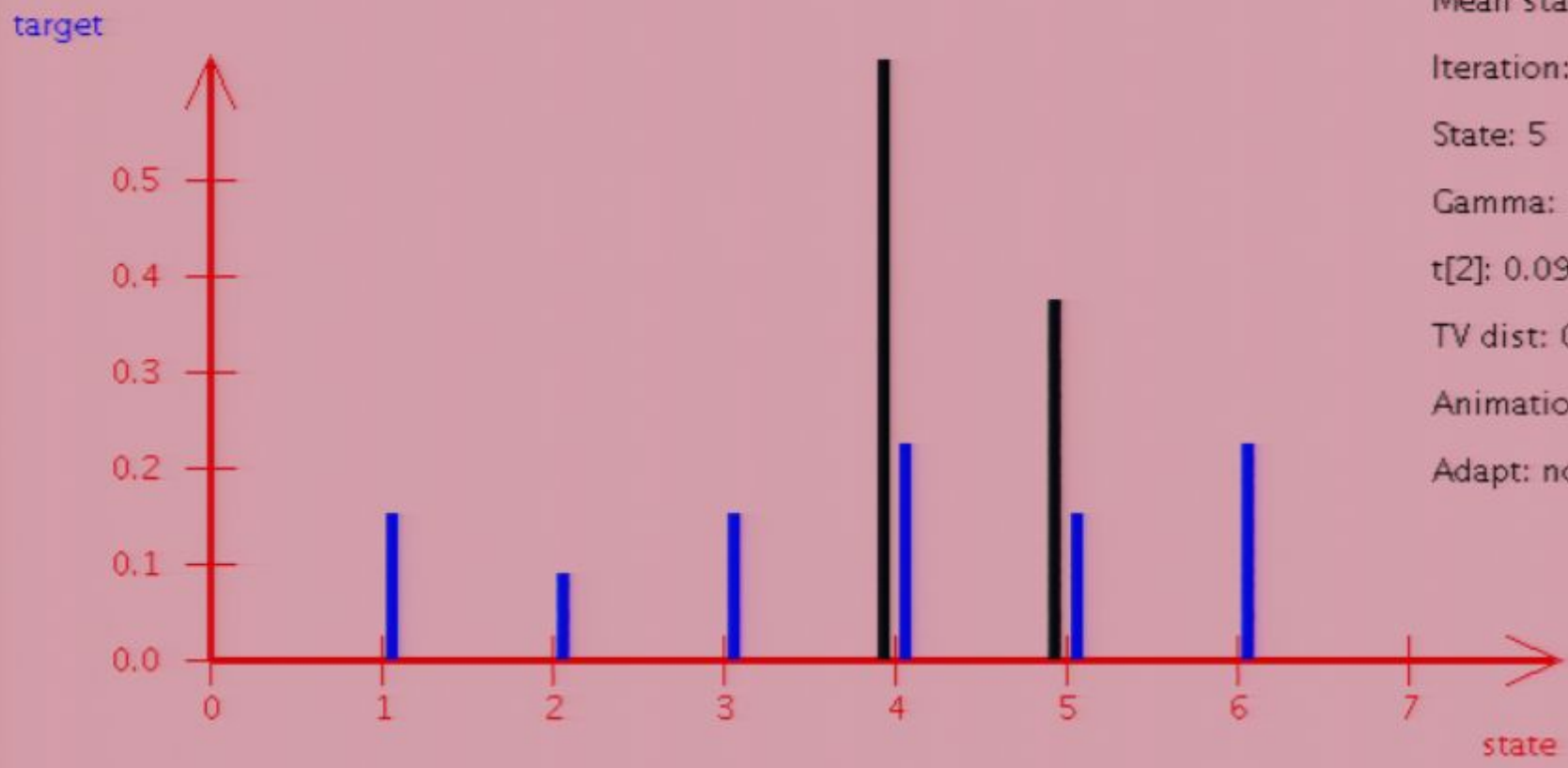


Mean state: 4.375  
Iteration: 8  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.



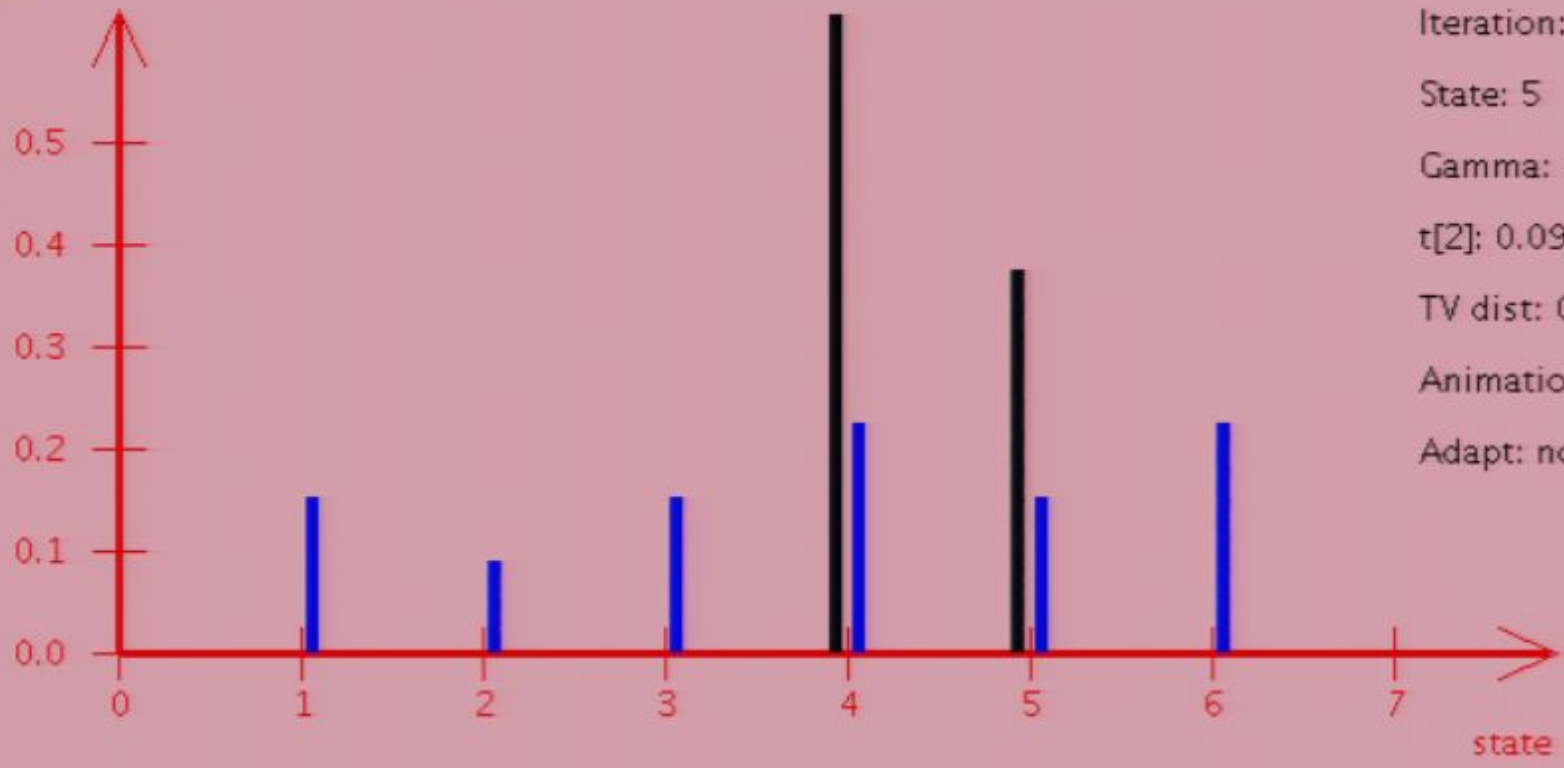


Mean state: 4.375  
Iteration: 8  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



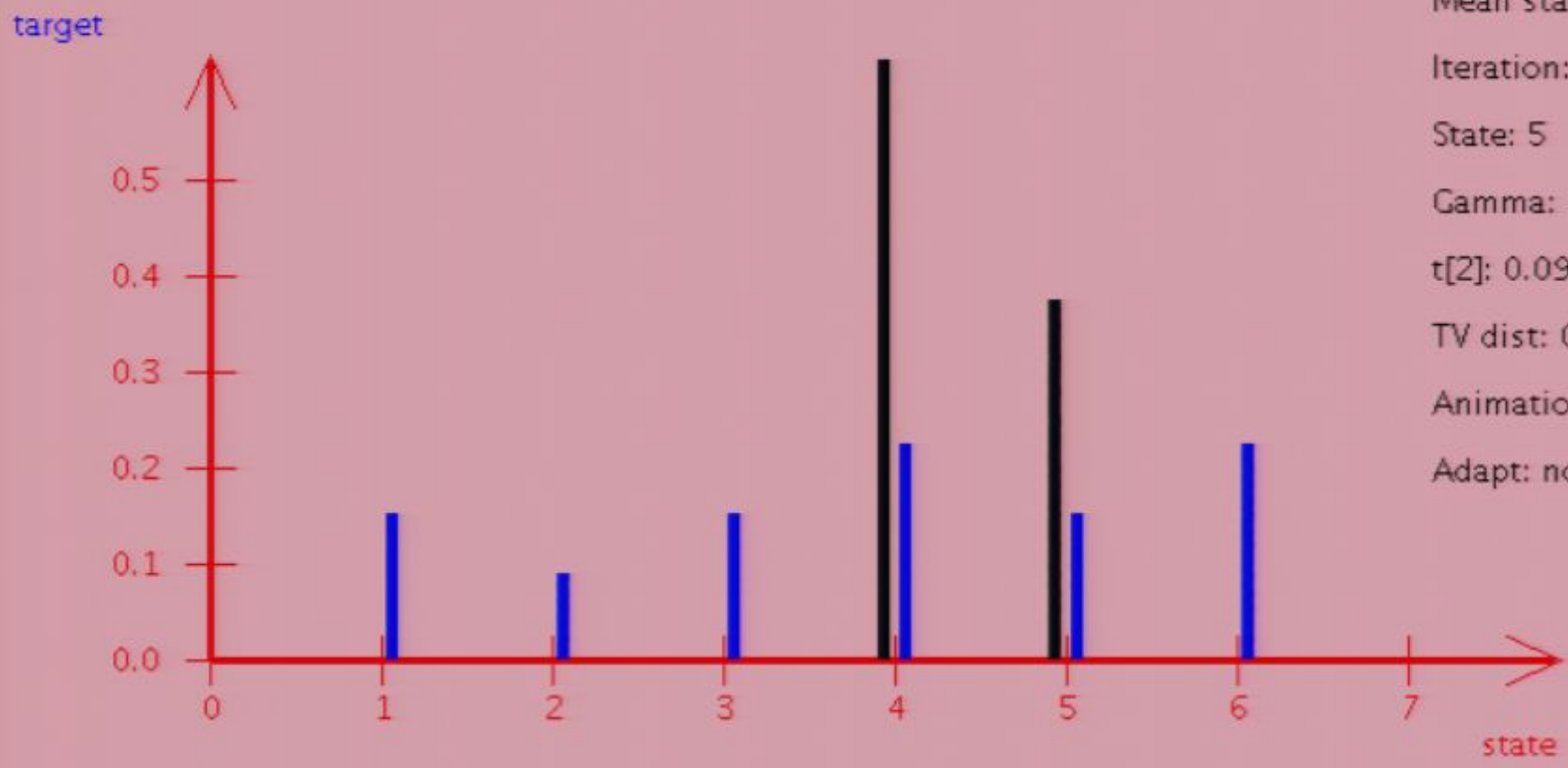
Applet started.

target



Mean state: 4.375  
Iteration: 8  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no

Applet started.

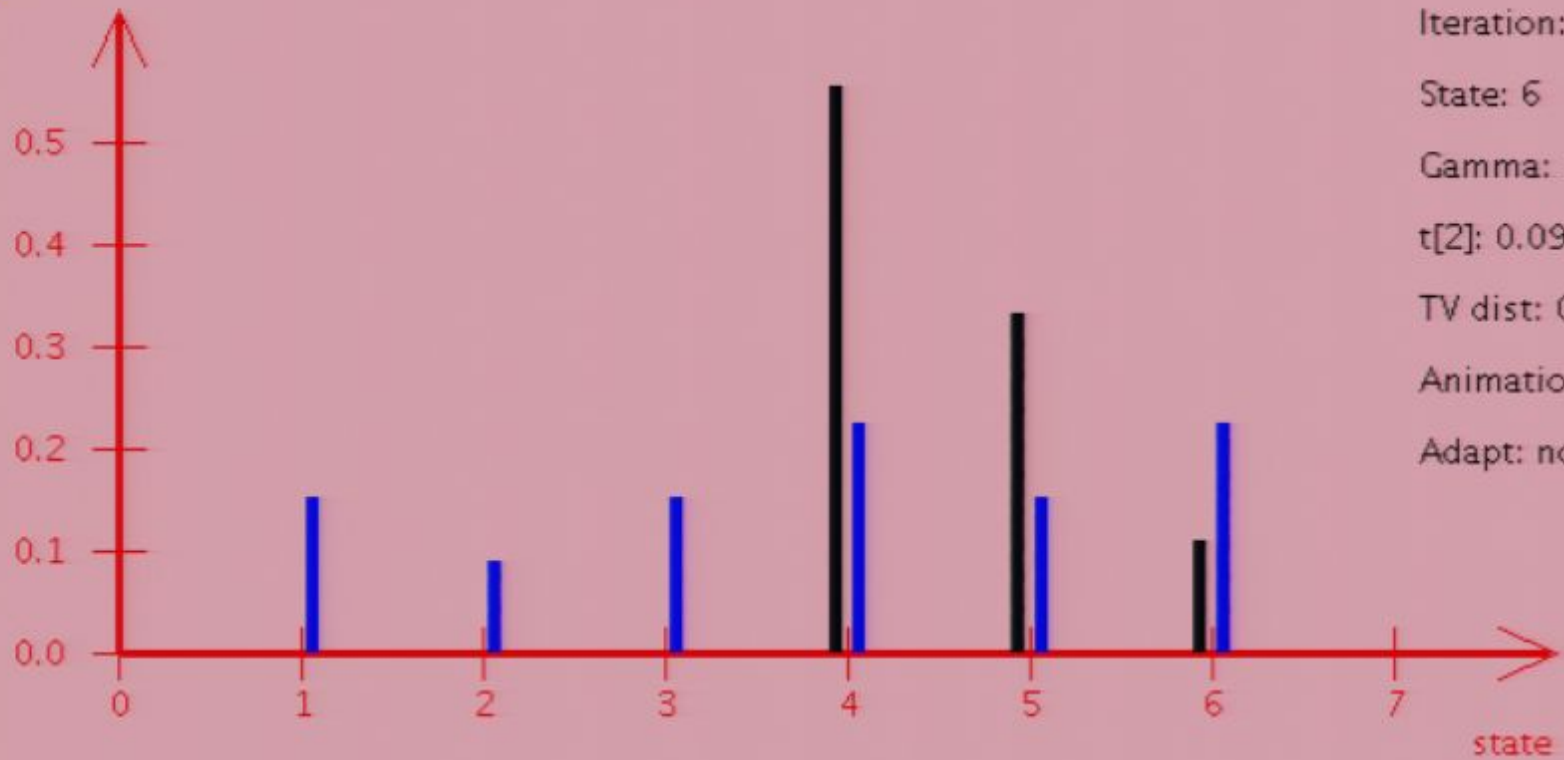


Mean state: 4.375  
Iteration: 8  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.621621  
Animation: 2  
Adapt: no



Applet started.

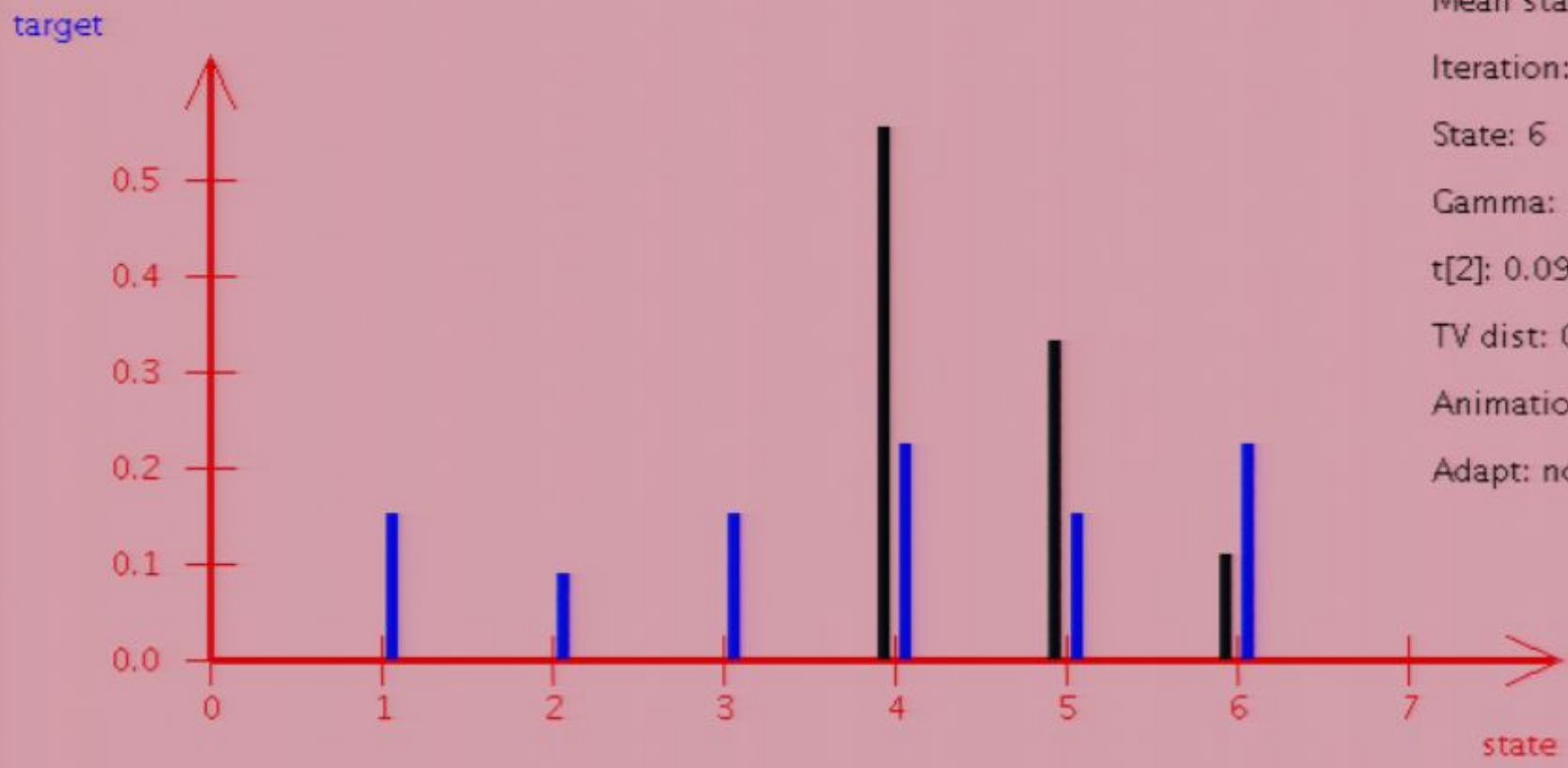
target



Mean state: 4.555  
Iteration: 9  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.51051  
Animation: 2  
Adapt: no



Applet started.

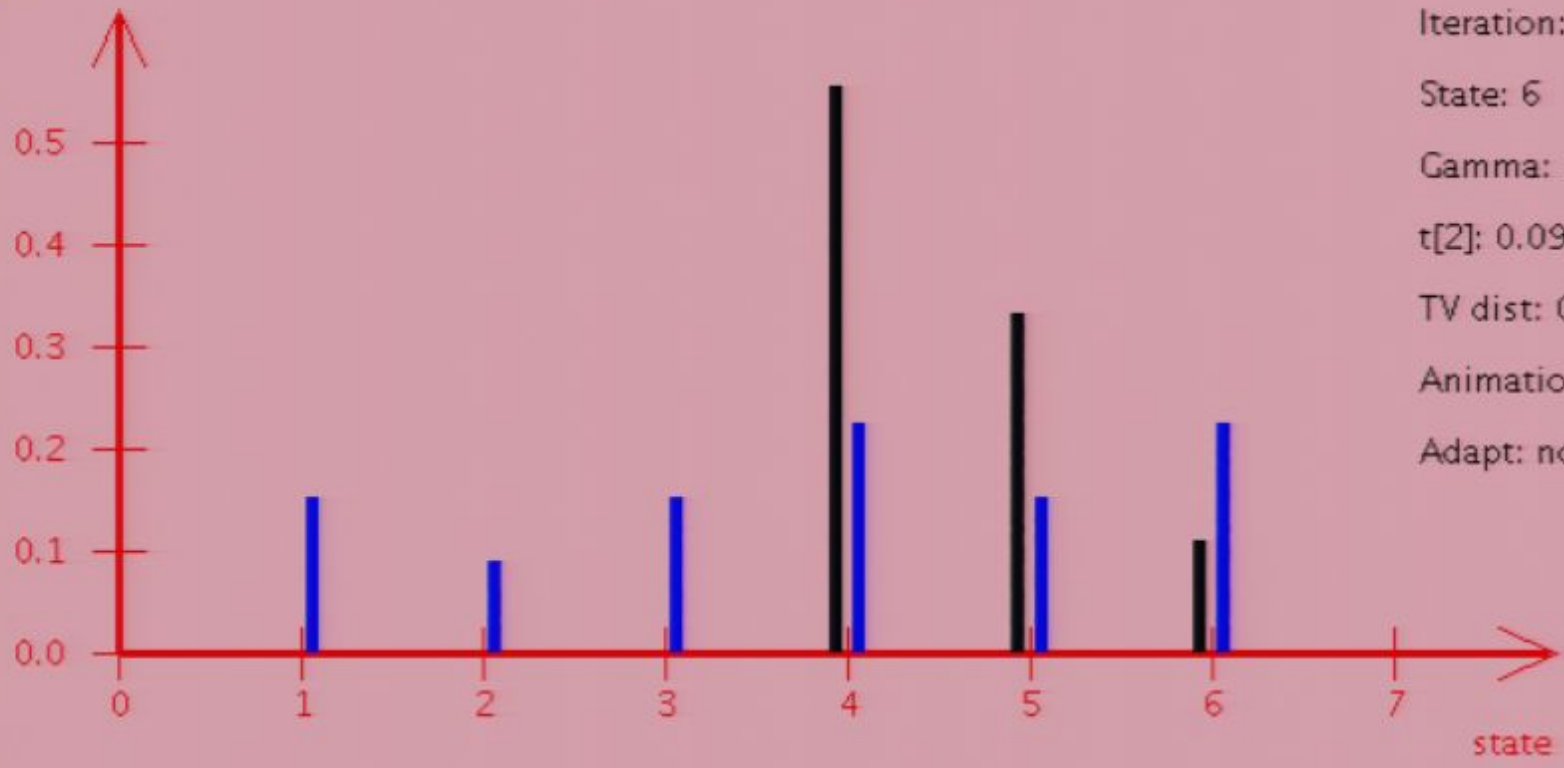


Mean state: 4.555  
Iteration: 9  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.51051  
Animation: 2  
Adapt: no



Applet started.

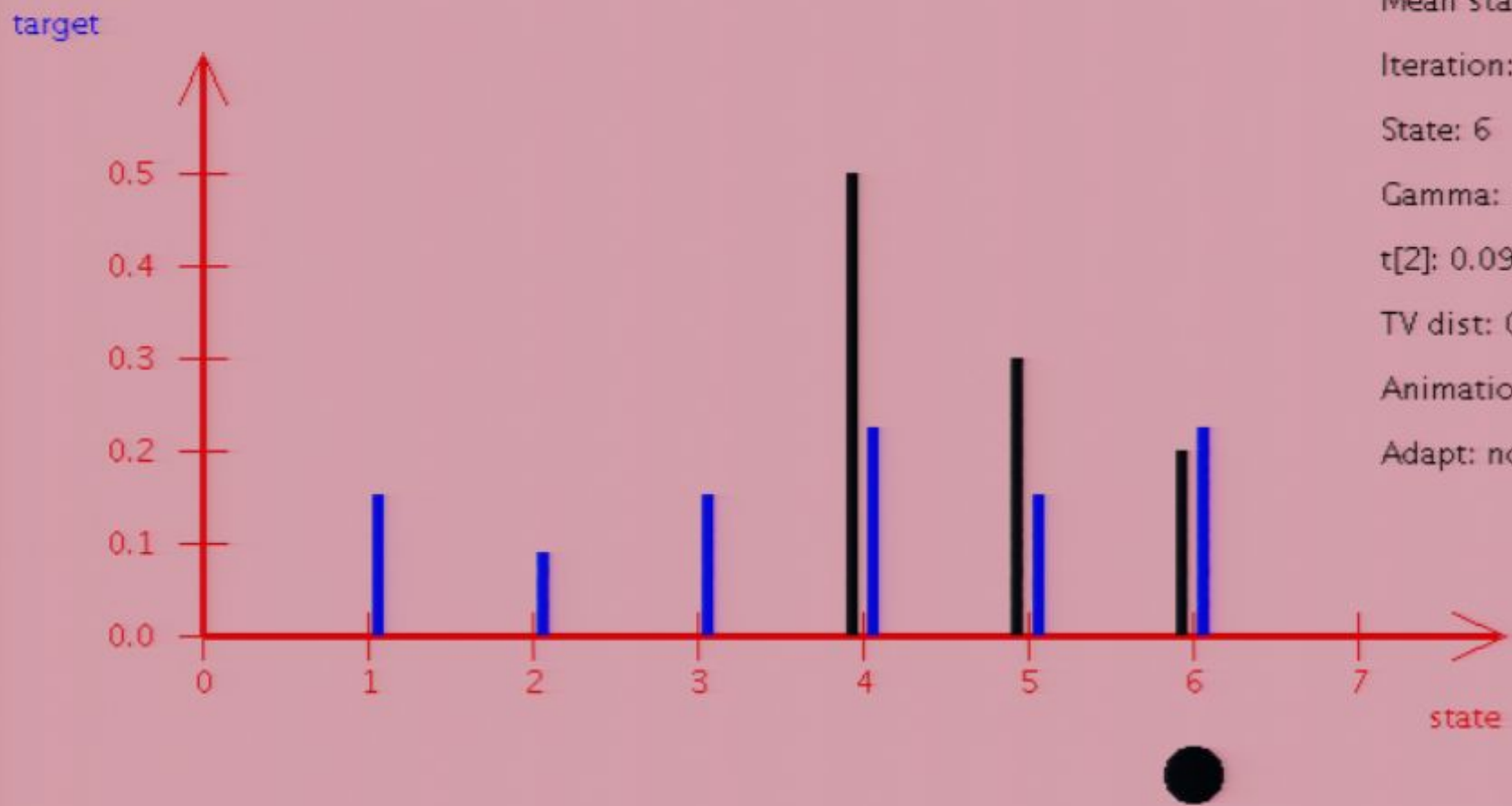
target



Mean state: 4.555  
Iteration: 9  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.51051  
Animation: 2  
Adapt: no



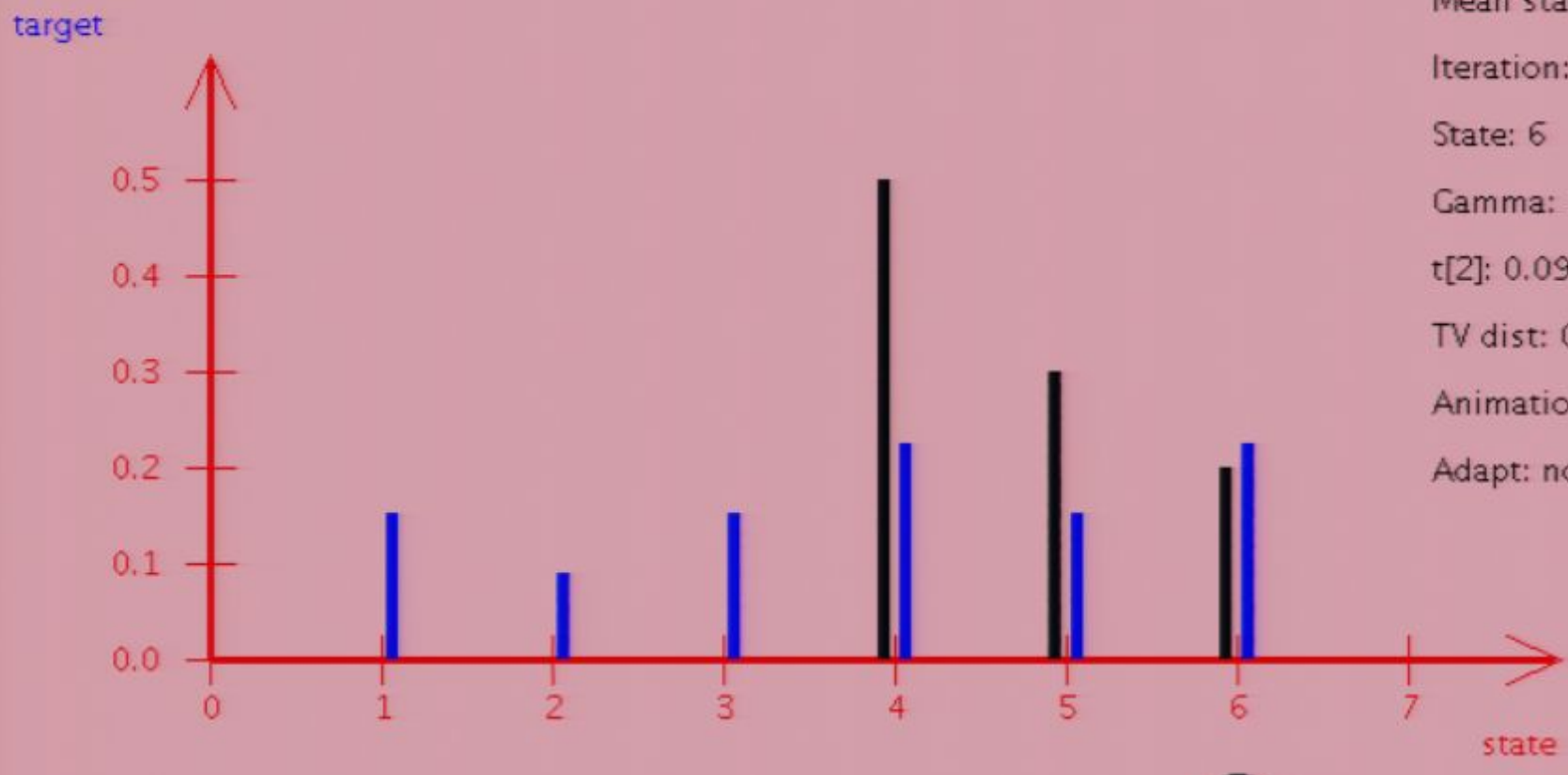
Applet started.



Mean state: 4.7  
Iteration: 10  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.421621  
Animation: 2  
Adapt: no

Applet started.



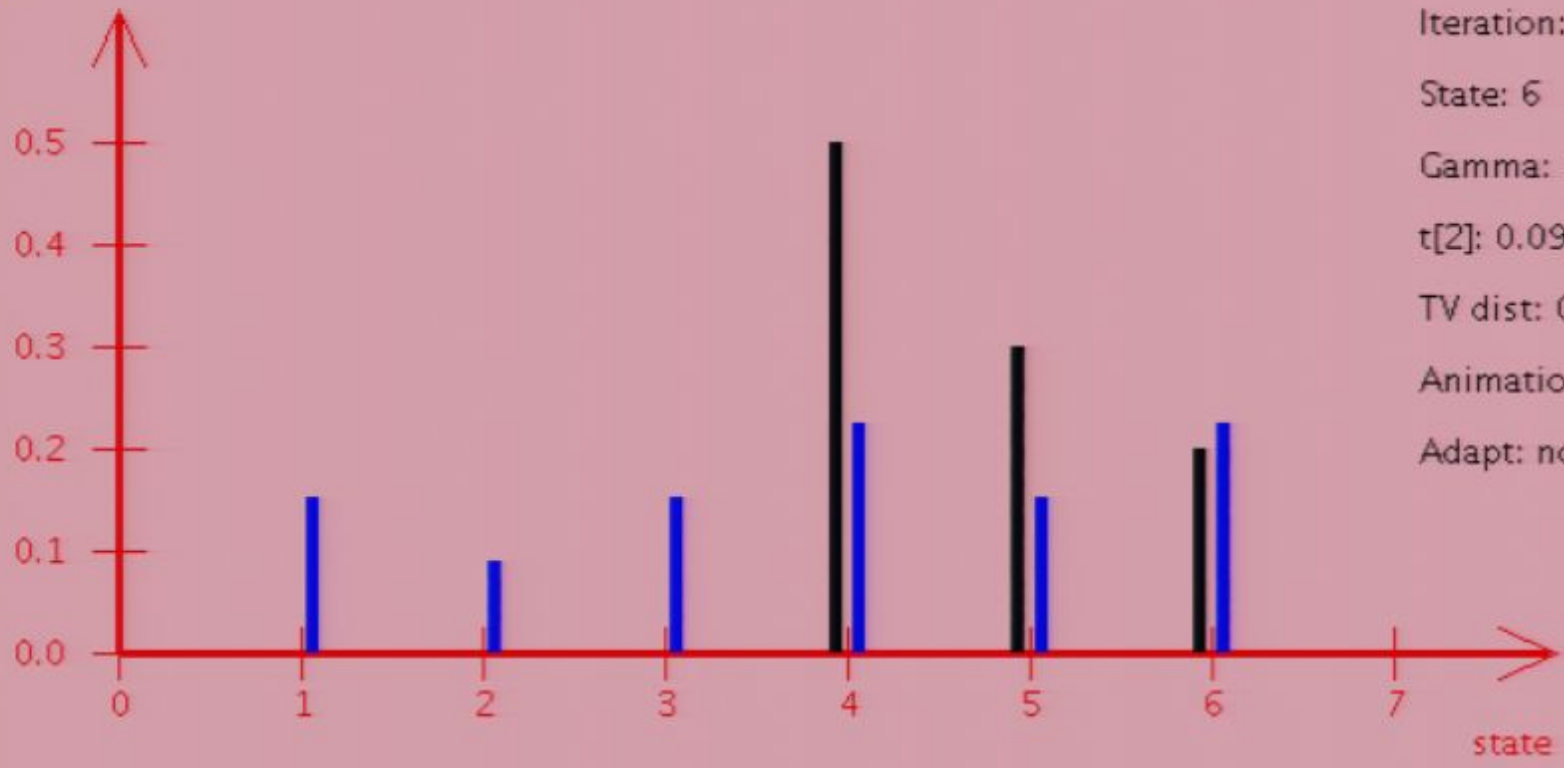


Mean state: 4.7  
Iteration: 10  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.421621  
Animation: 2  
Adapt: no

Applet started.

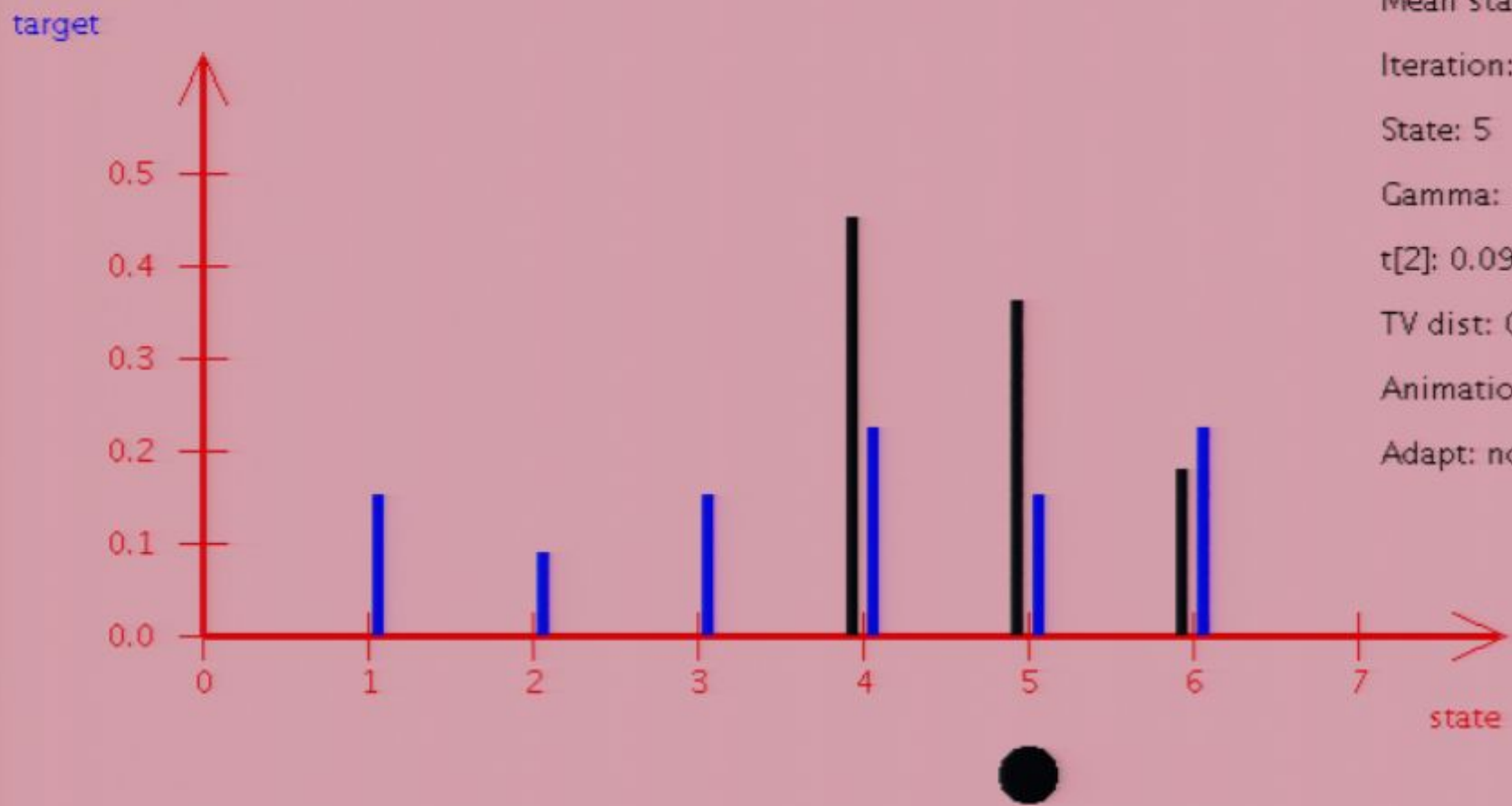


target



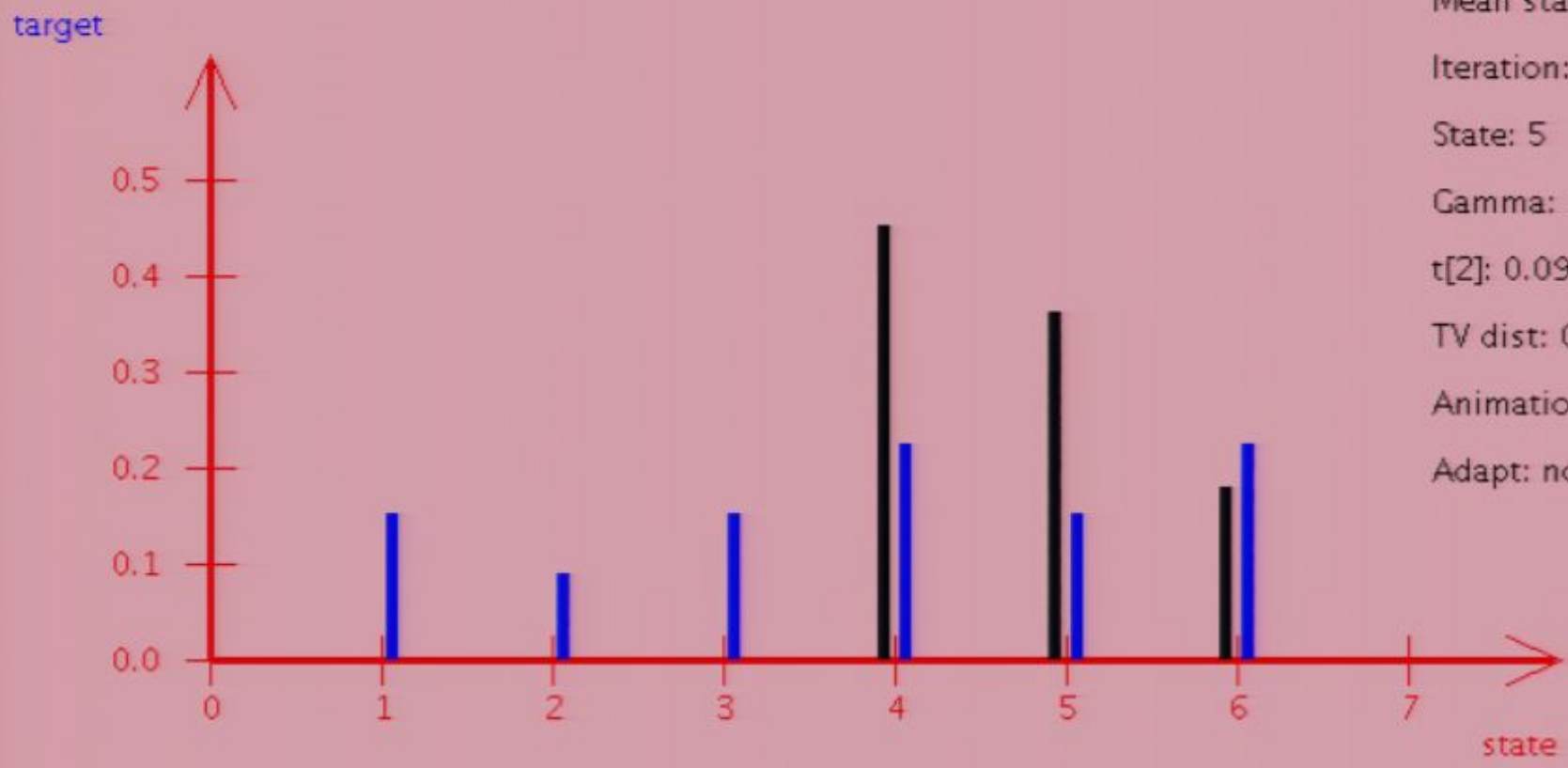
Mean state: 4.7  
Iteration: 10  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.421621  
Animation: 3  
Adapt: no

Applet started.



Mean state: 4.7  
Iteration: 10  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.439803  
Animation: 3  
Adapt: no

Applet started.

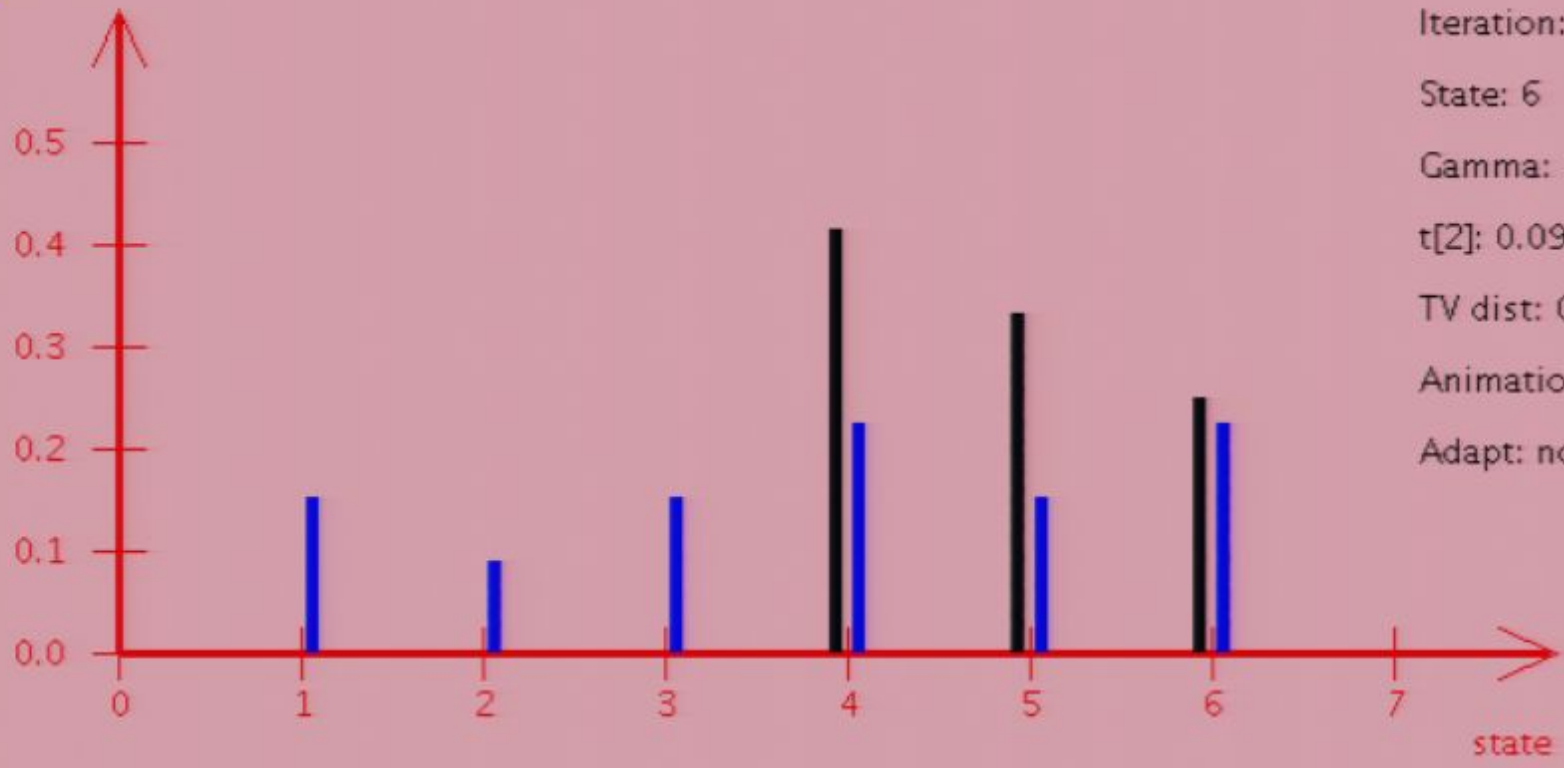


Mean state: 4.727  
Iteration: 11  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.439803  
Animation: 3  
Adapt: no



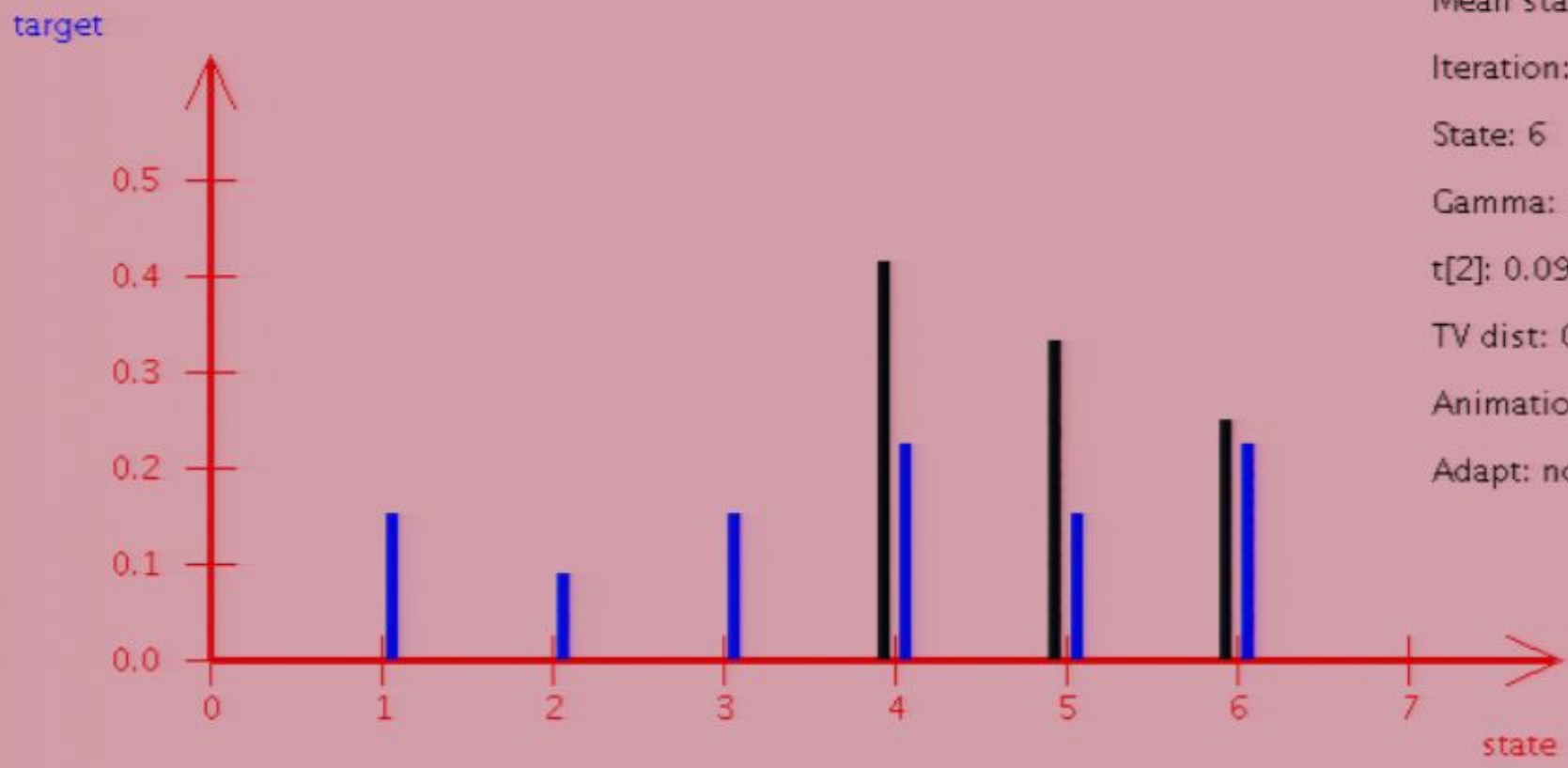
Applet started.

target



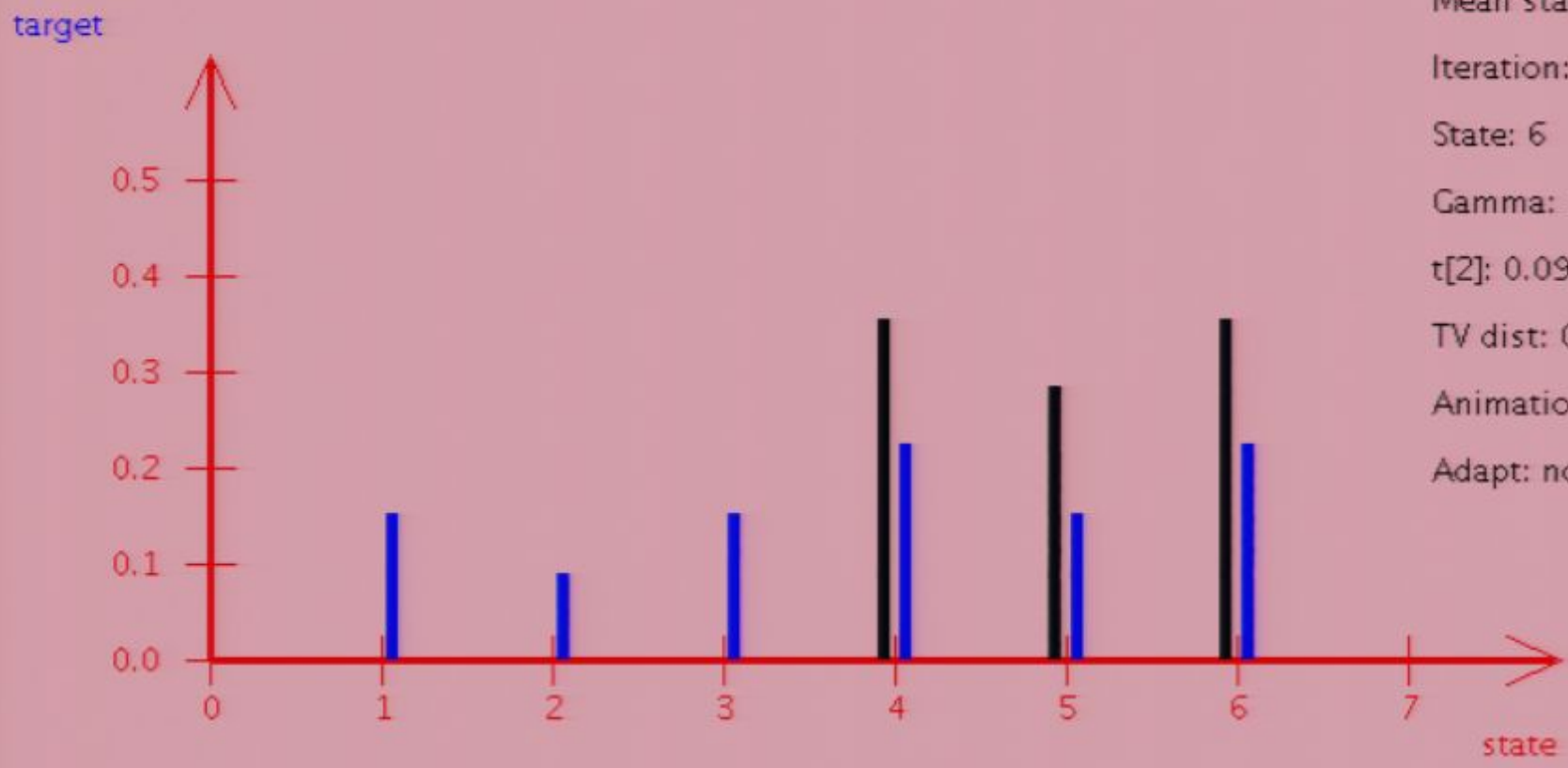
Mean state: 4.833  
Iteration: 12  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no

Applet started.



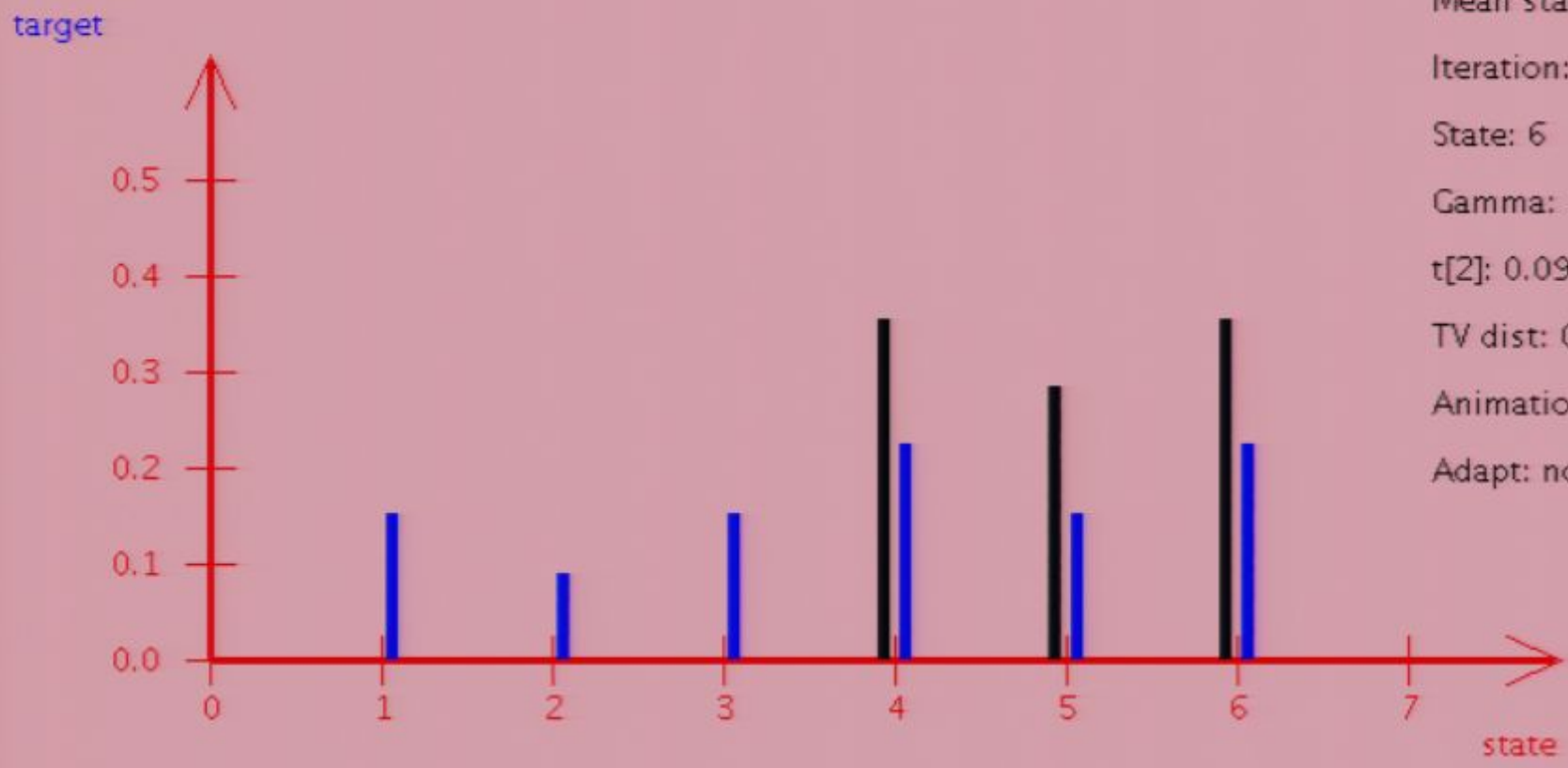
Mean state: 4.833  
Iteration: 12  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no

Applet started.



Mean state: 5.0  
Iteration: 14  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no

Applet started.

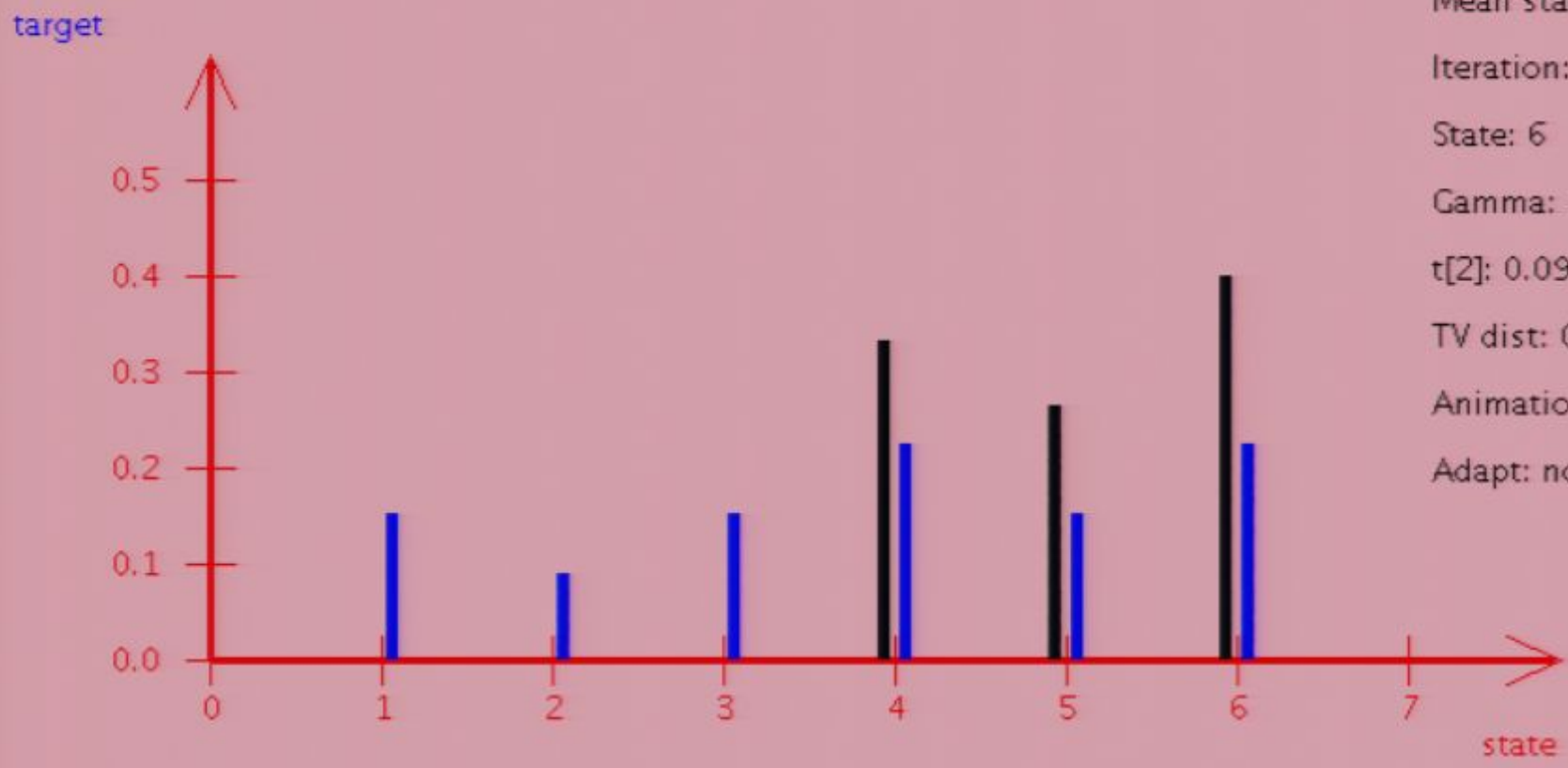


Mean state: 5.0  
Iteration: 14  
State: 6  
Gamma: 1  
t[2]: 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no



Applet started.





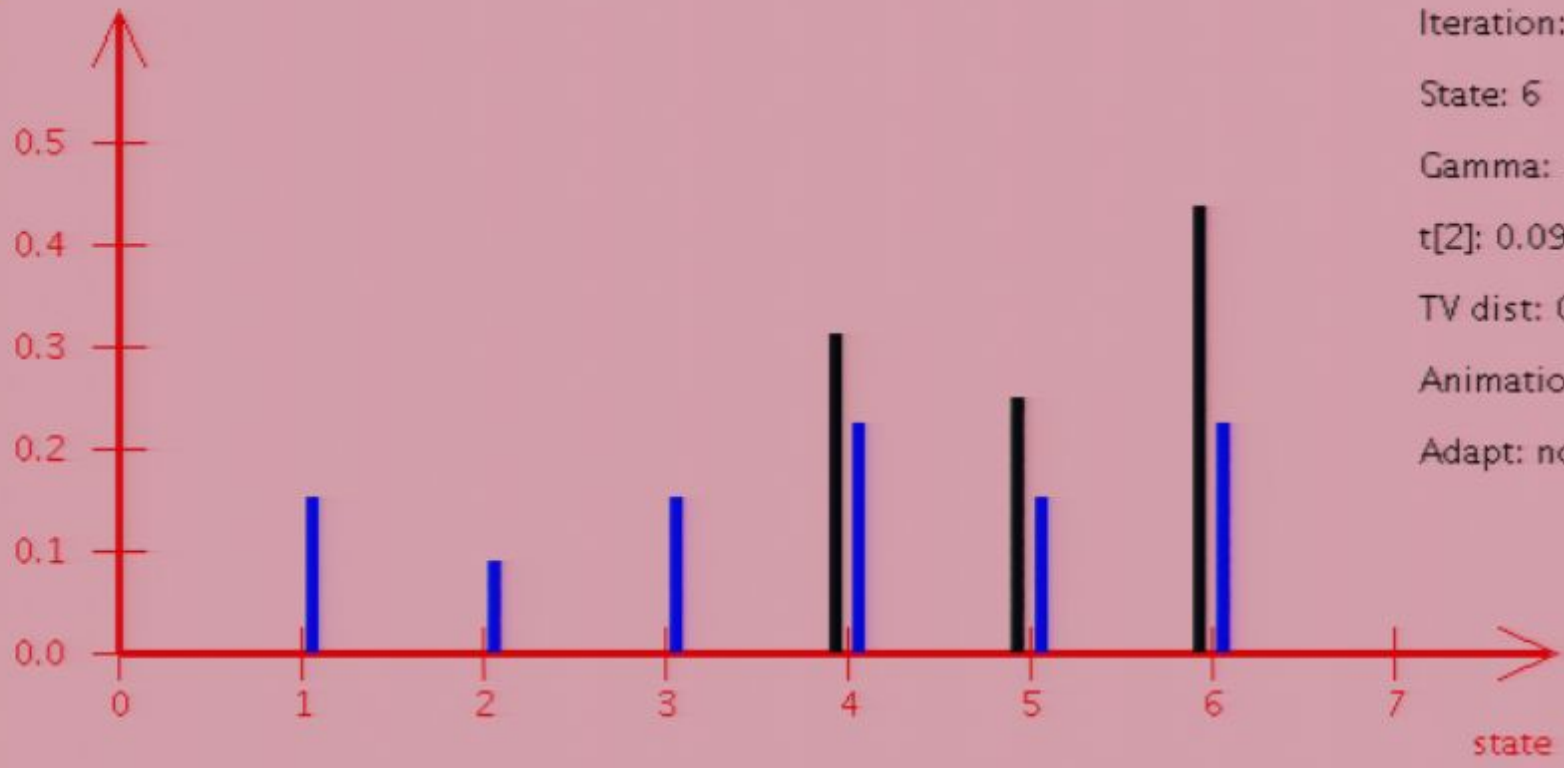
Mean state: 5.066  
Iteration: 15  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no



Applet started.



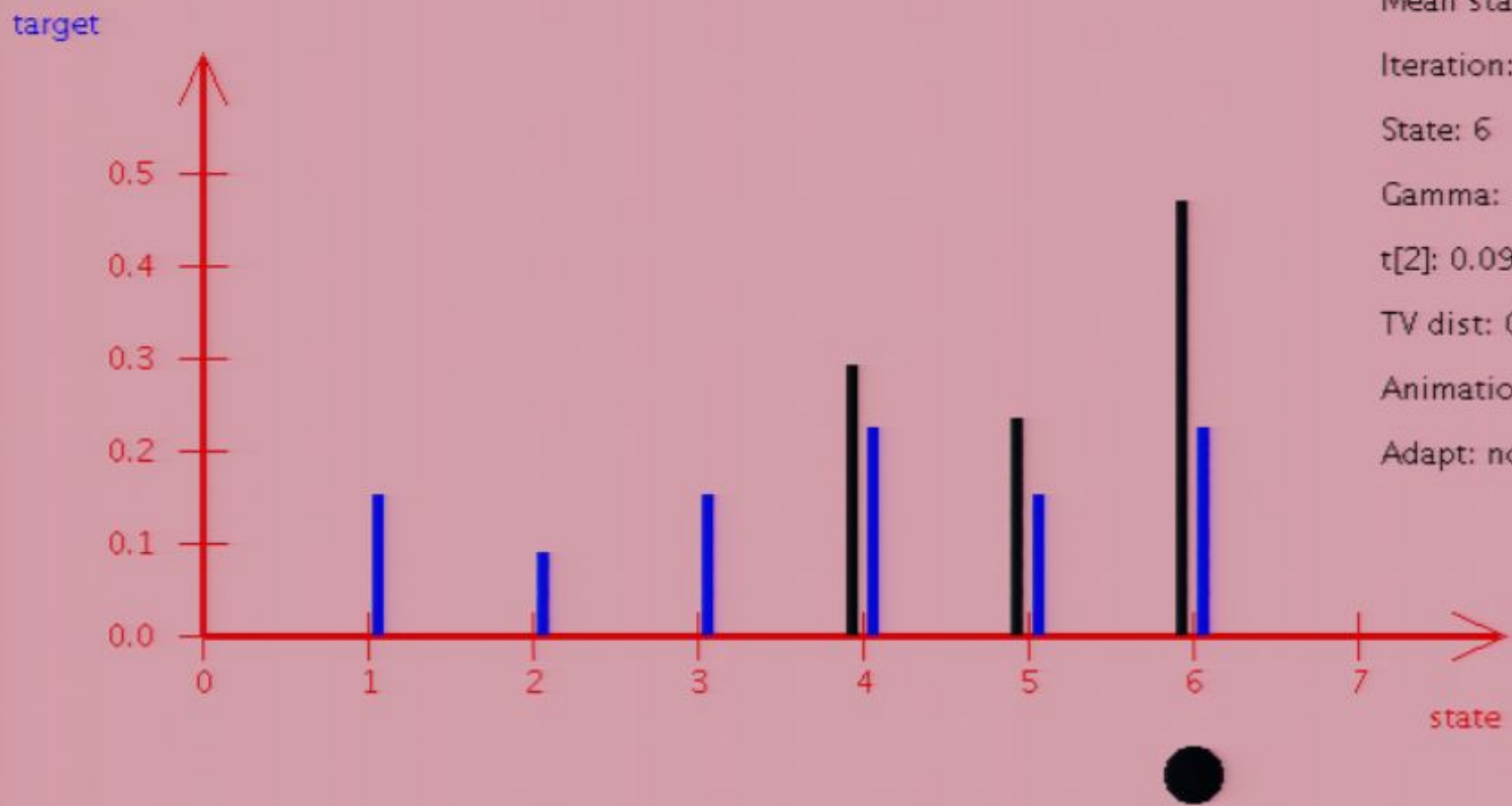
target



Mean state: 5.125  
Iteration: 16  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no

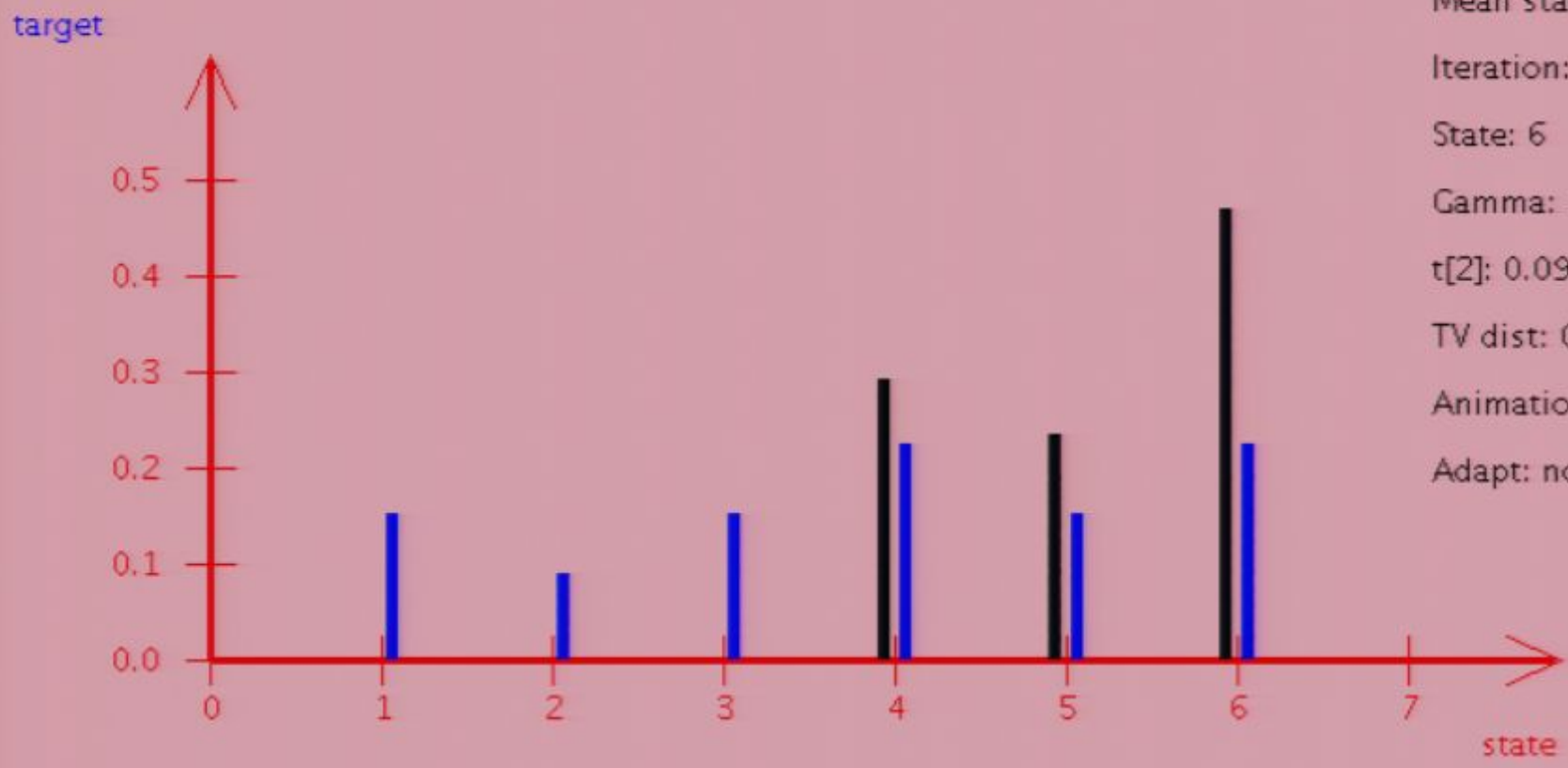


Applet started.



Mean state: 5.176  
Iteration: 17  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no

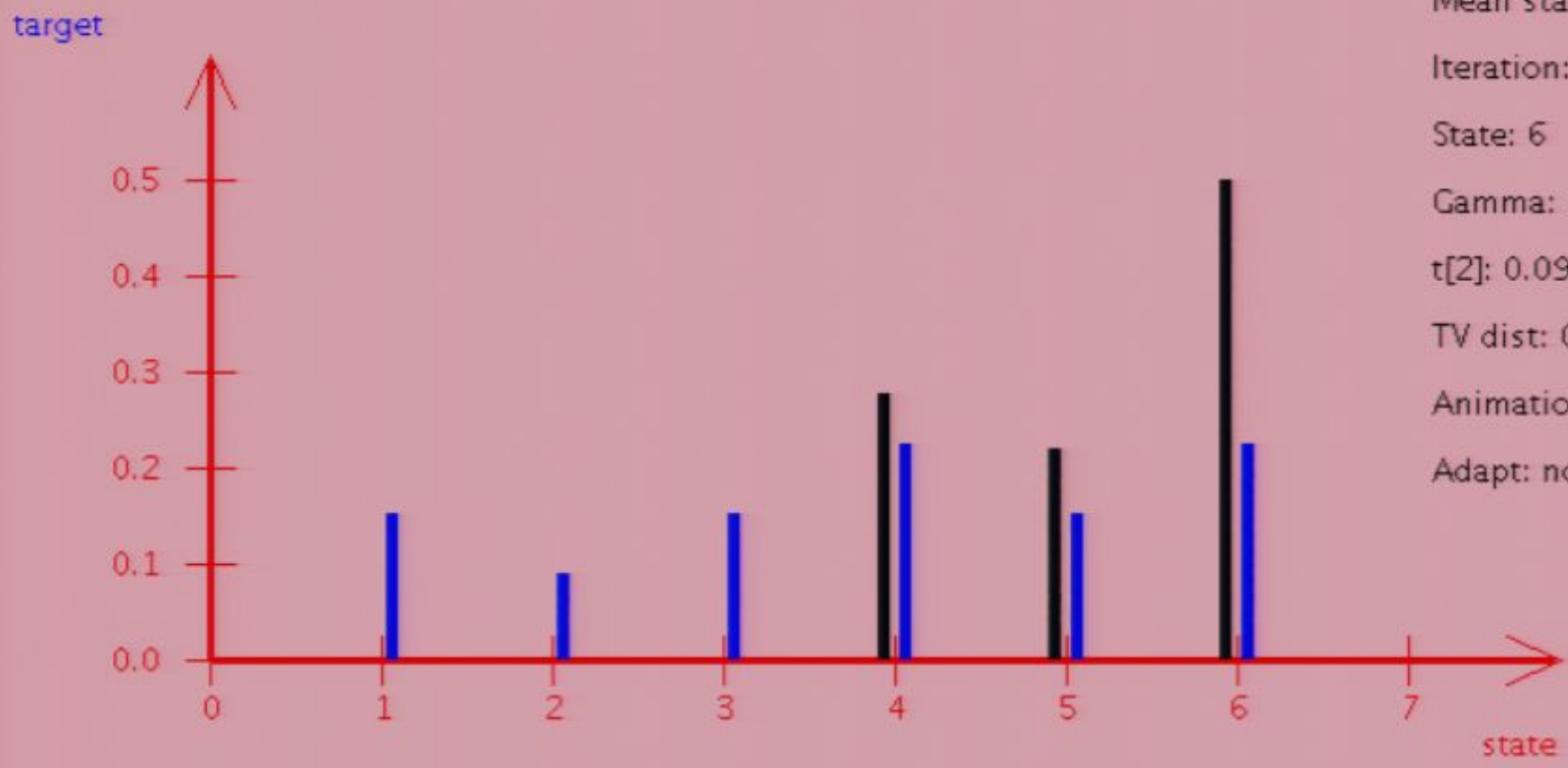
Applet started.



Mean state: 5.176  
Iteration: 17  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no



Applet started.

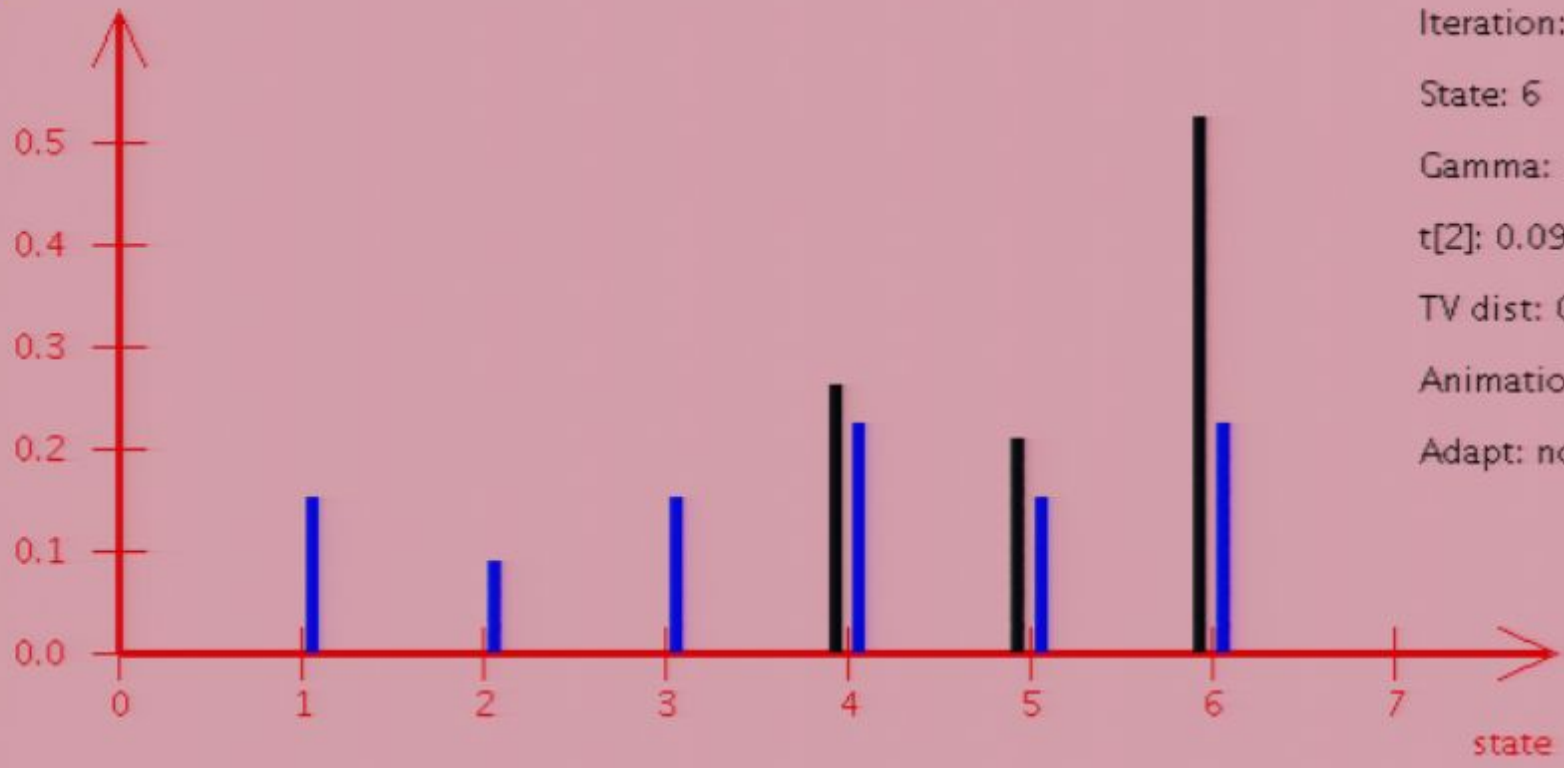


Mean state: 5.222  
Iteration: 18  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no



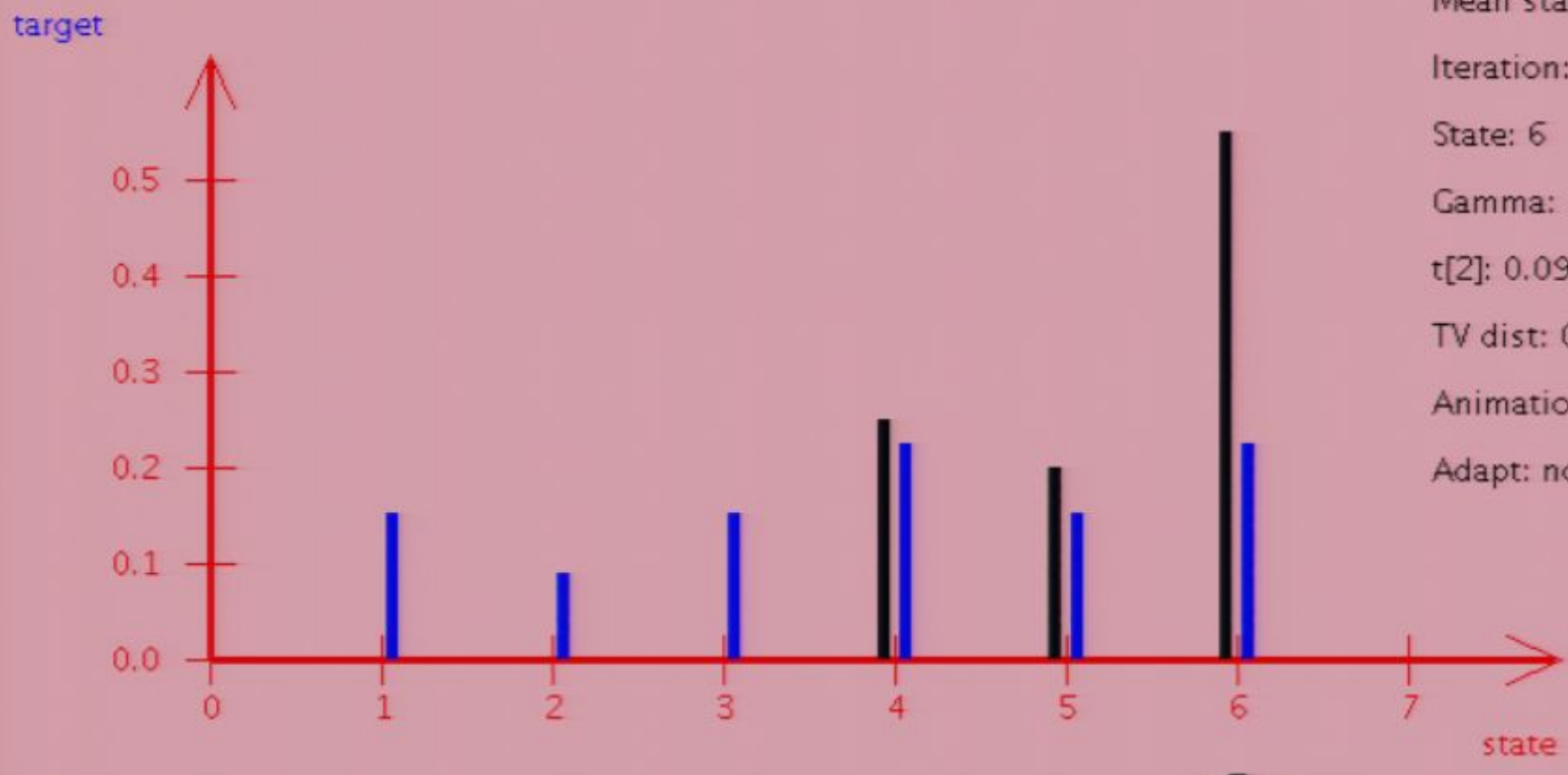
Applet started.

target



Mean state: 5.263  
Iteration: 19  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no

Applet started.

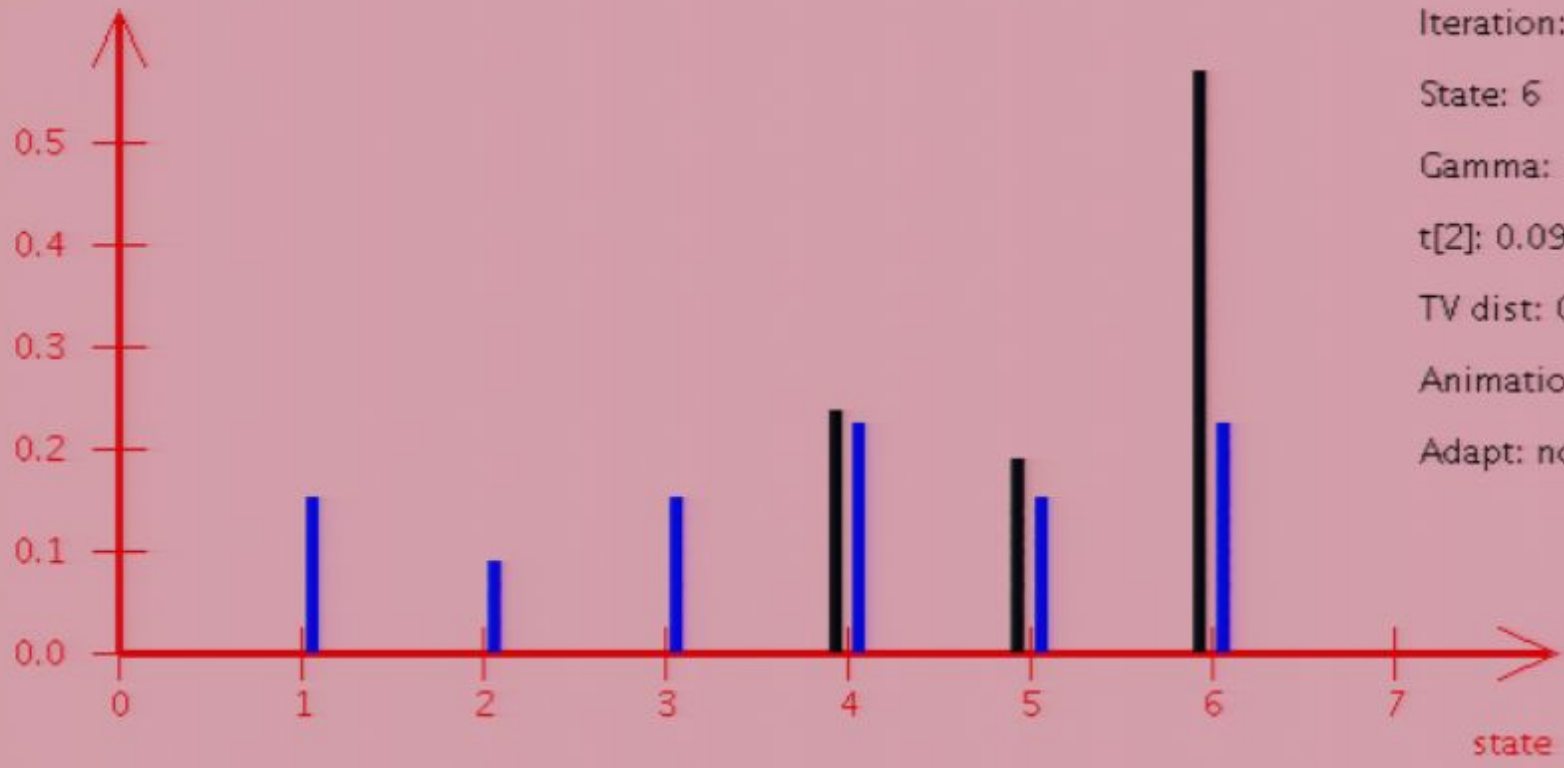


Mean state: 5.3  
Iteration: 20  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no



Applet started.

target

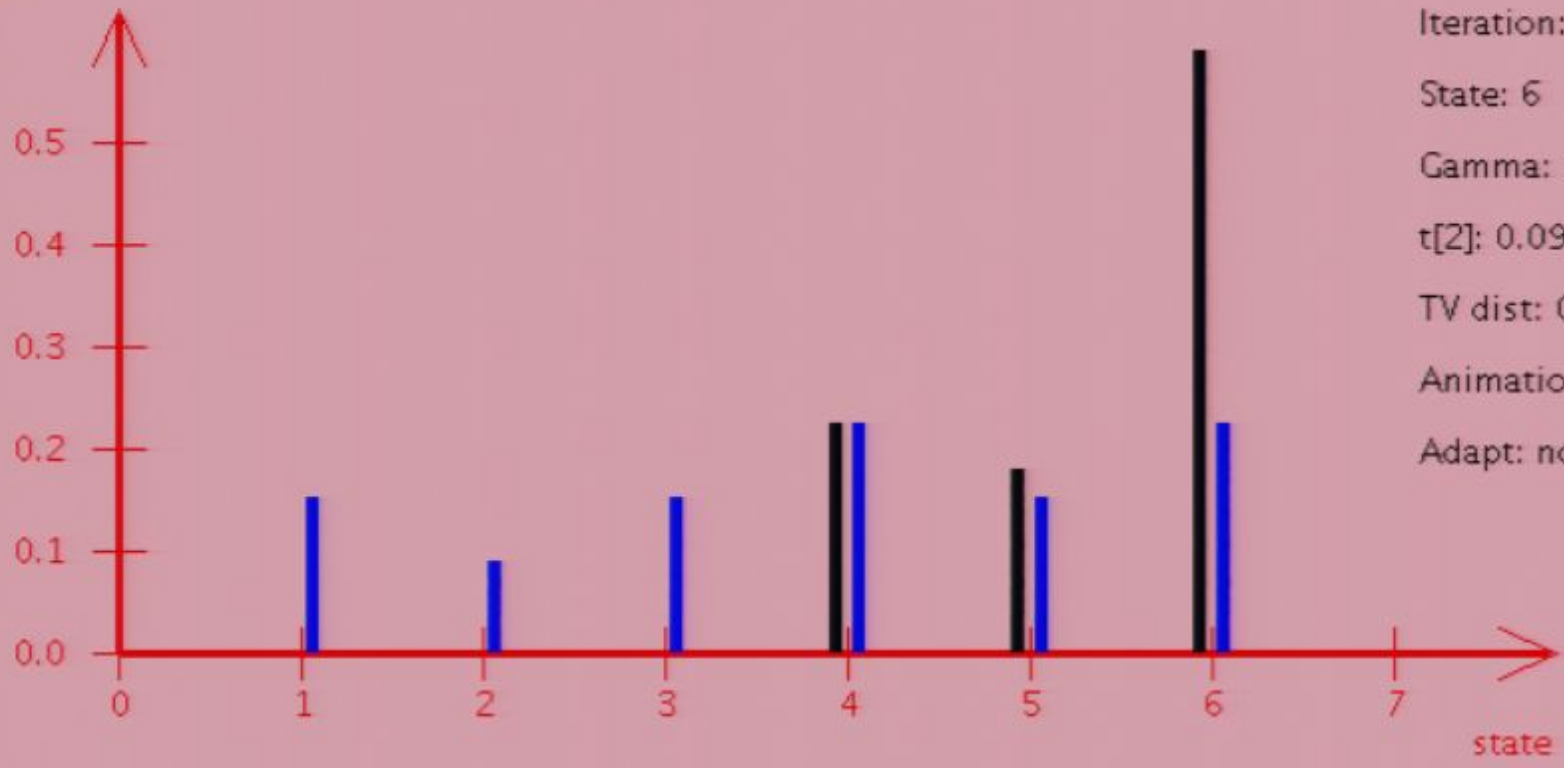


Mean state: 5.333  
Iteration: 21  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no

Applet started.



target

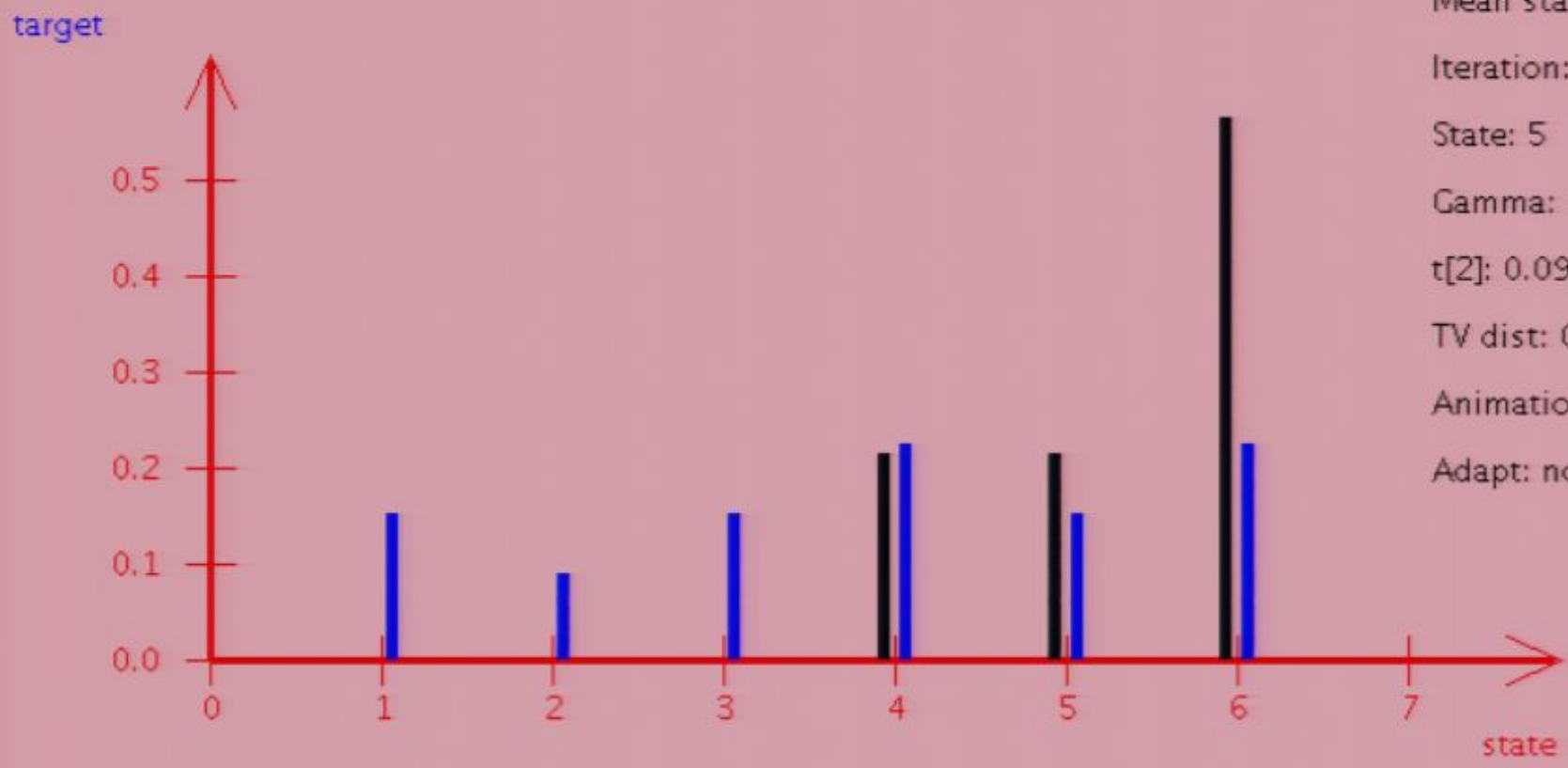


Mean state: 5.363  
Iteration: 22  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no



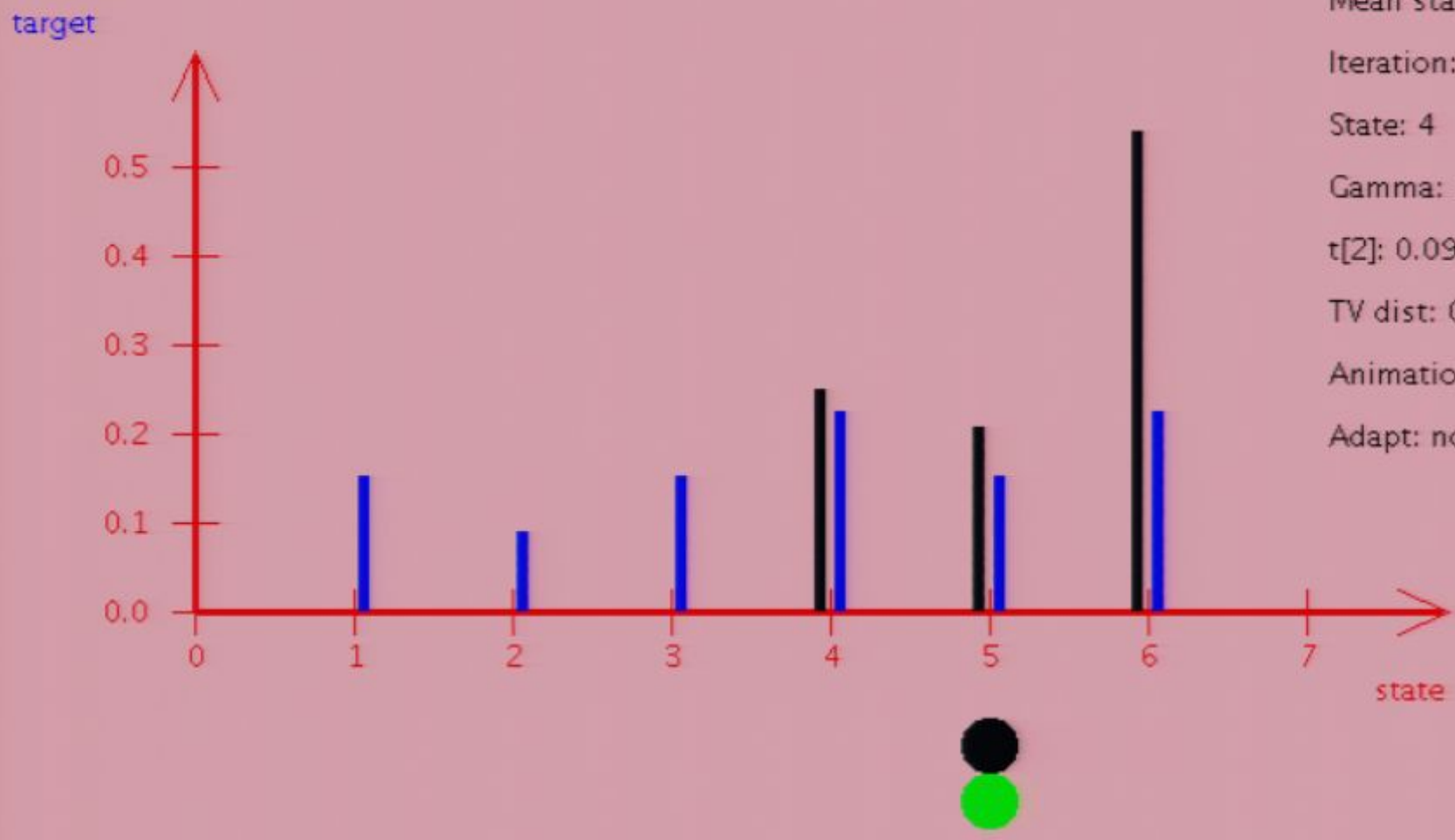
Applet started.





Mean state: 5.347  
Iteration: 23  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.40423  
Animation: 3  
Adapt: no

Applet started.

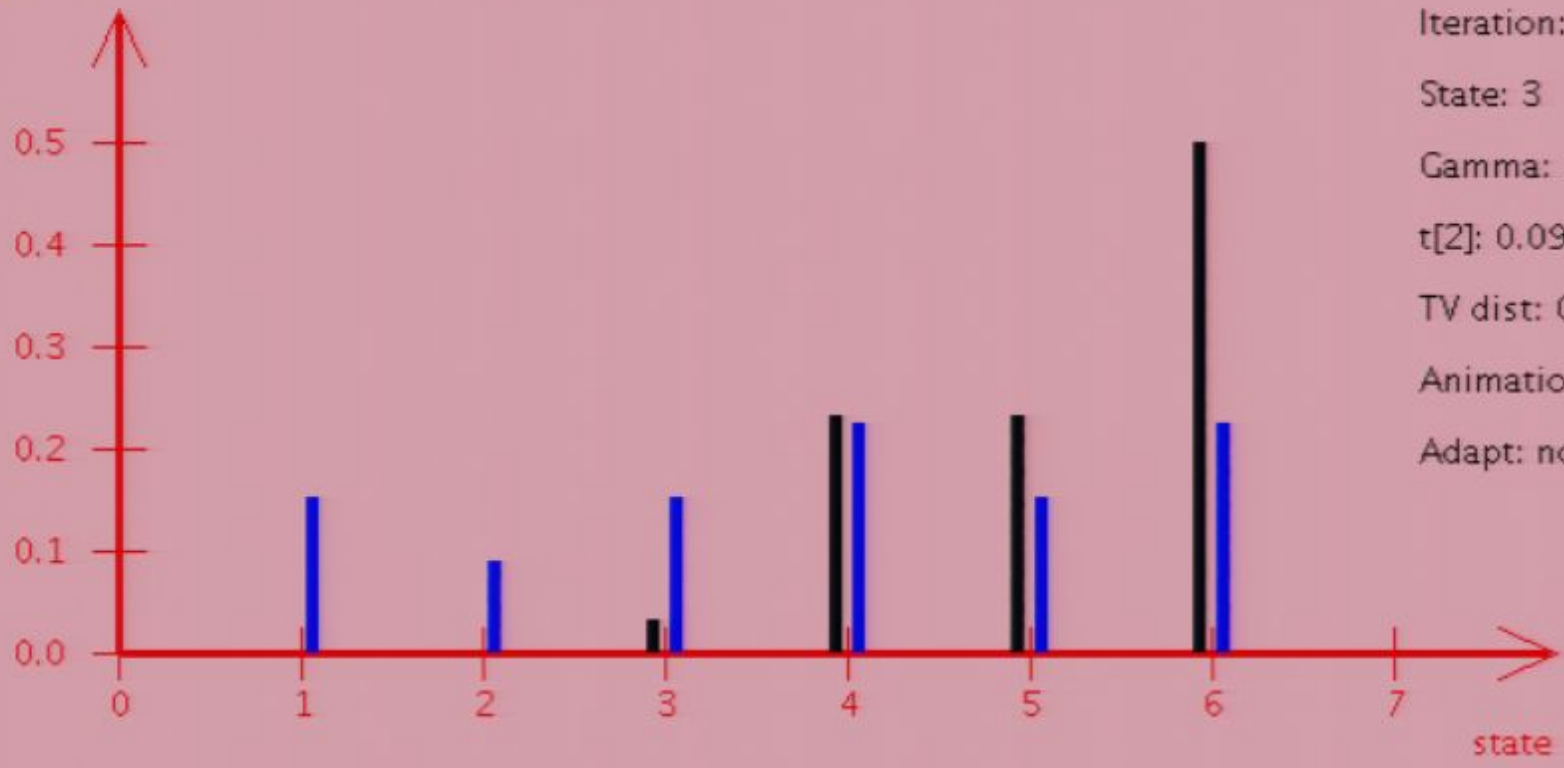


Mean state: 5.291  
Iteration: 24  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.396396  
Animation: 3  
Adapt: no



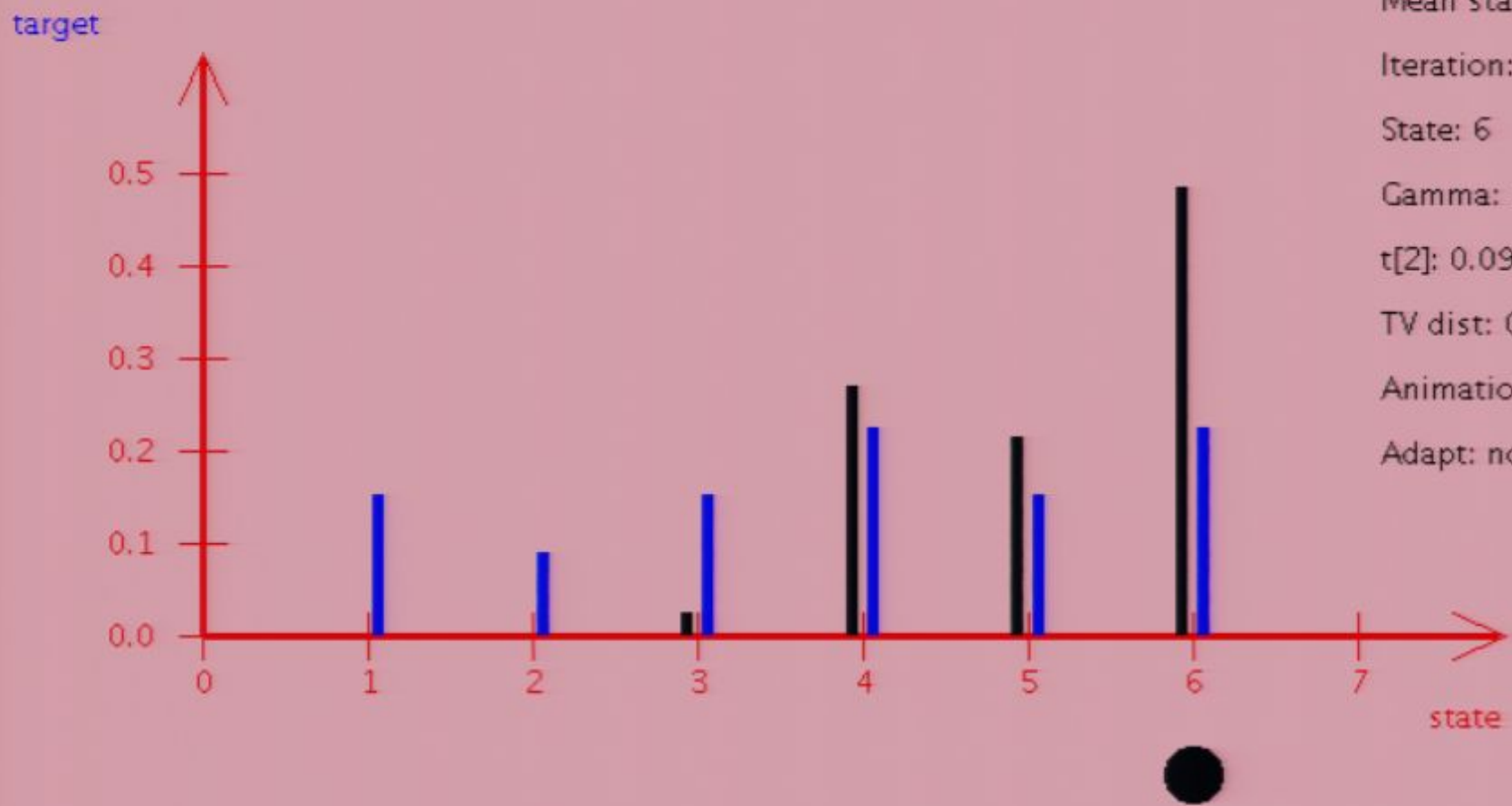
Applet started.

target



Mean state: 5.2  
Iteration: 30  
State: 3  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.363063  
Animation: 4  
Adapt: no

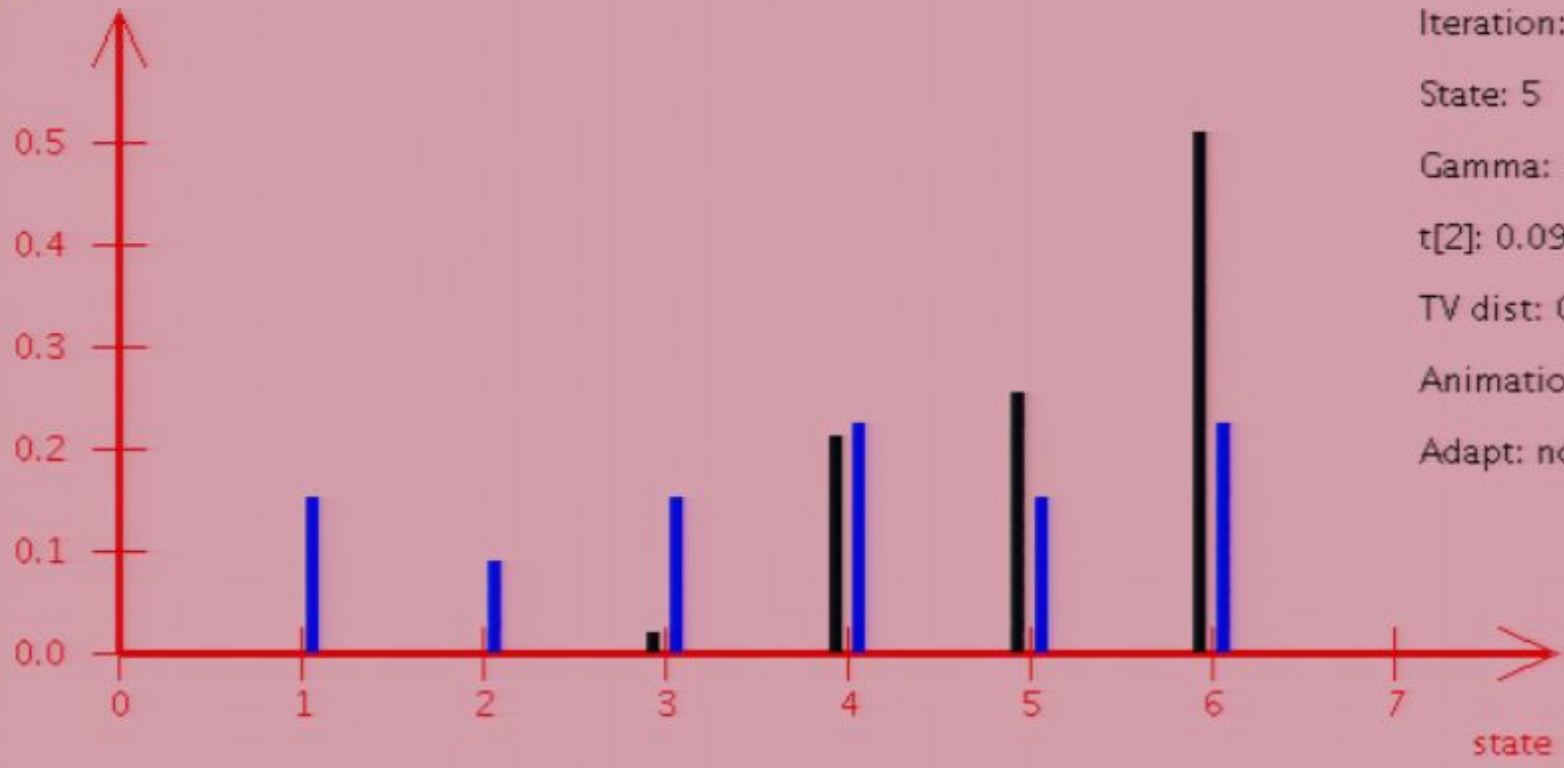
Applet started.



Mean state: 5.162  
Iteration: 37  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.369369  
Animation: 4  
Adapt: no

Applet started.

target

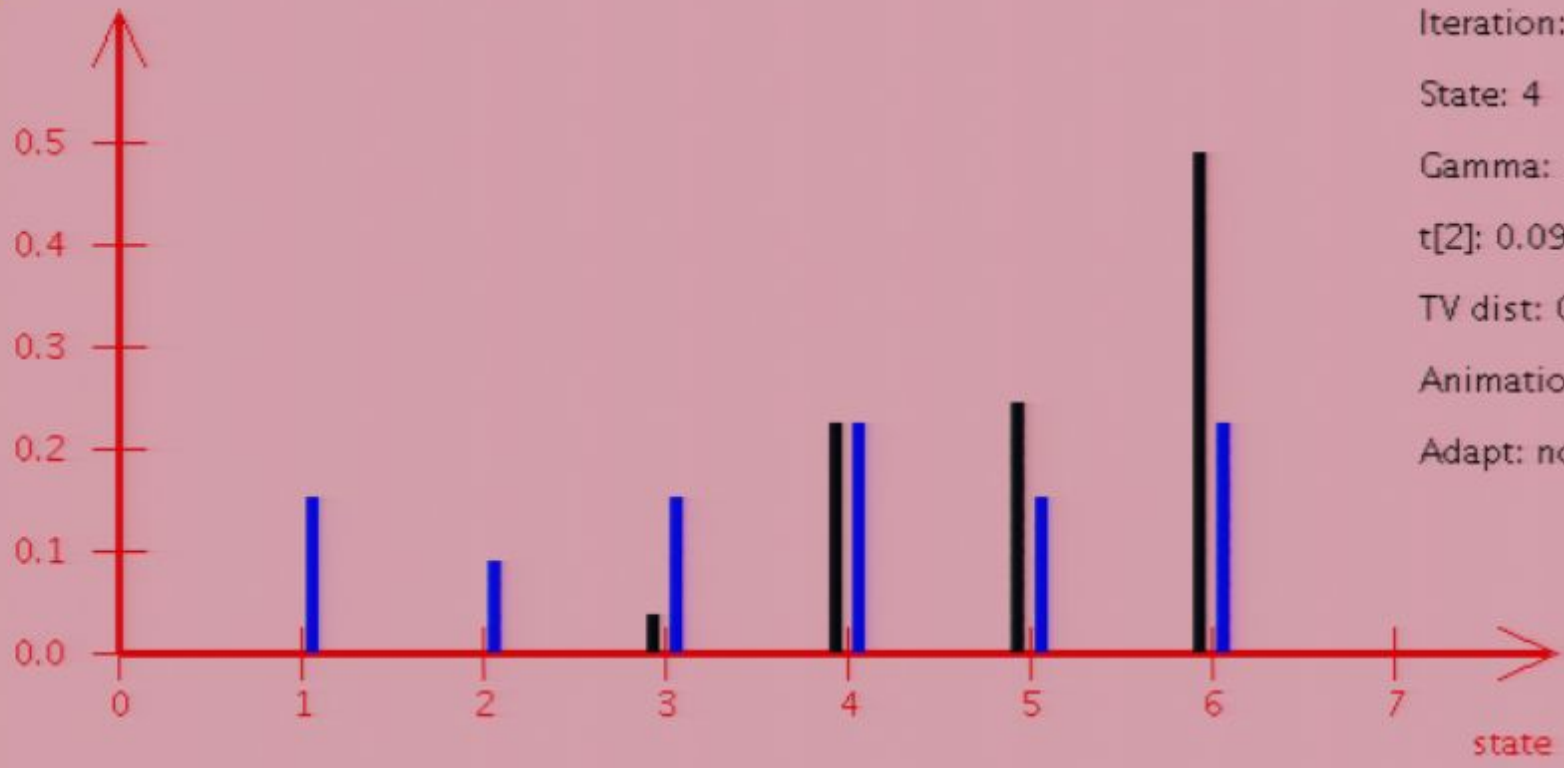


Mean state: 5.255  
Iteration: 47  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.387579  
Animation: 4  
Adapt: no



Applet started.

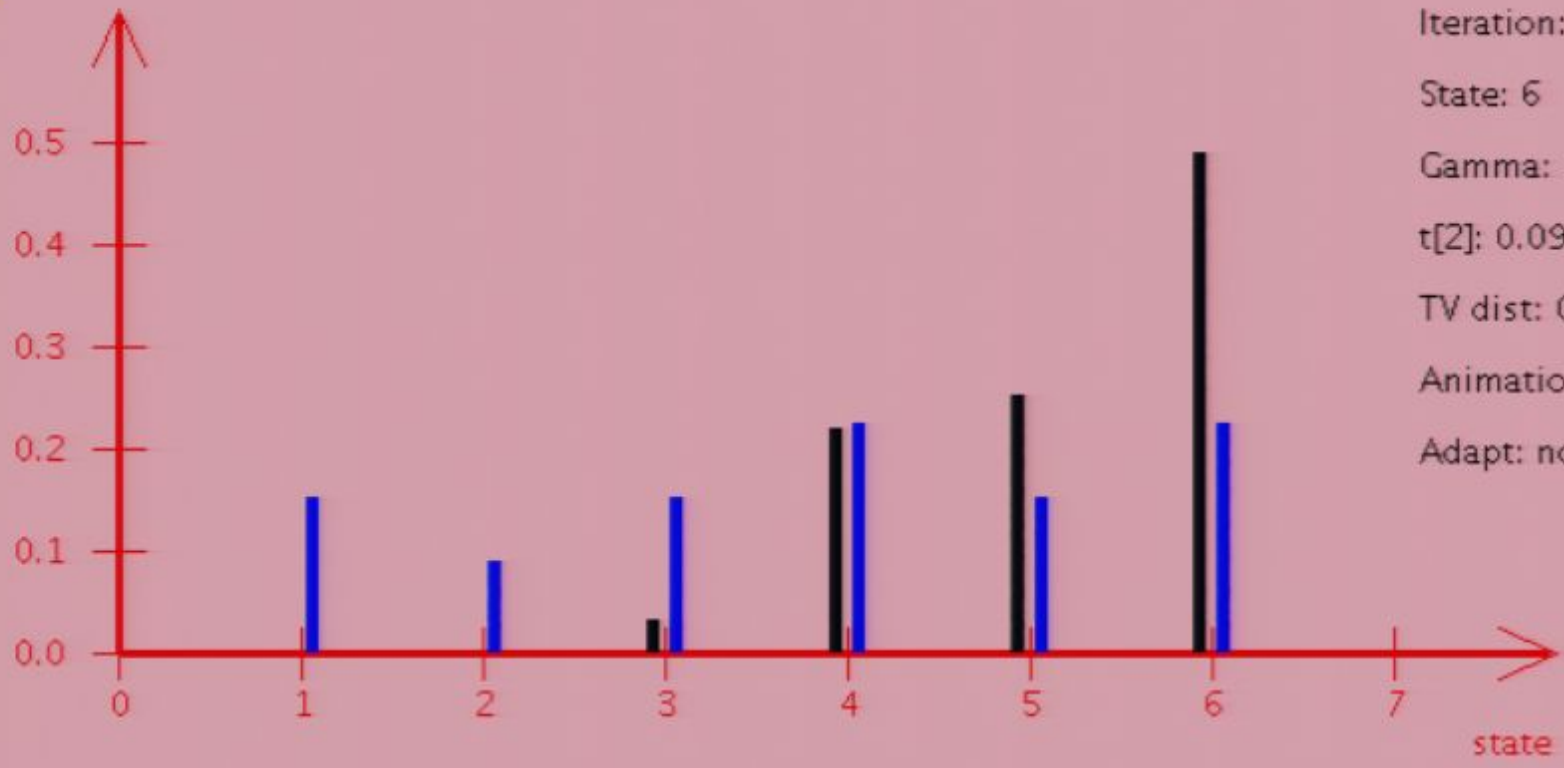
target



Mean state: 5.188  
Iteration: 53  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.35866  
Animation: 4  
Adapt: no

Applet started.

target

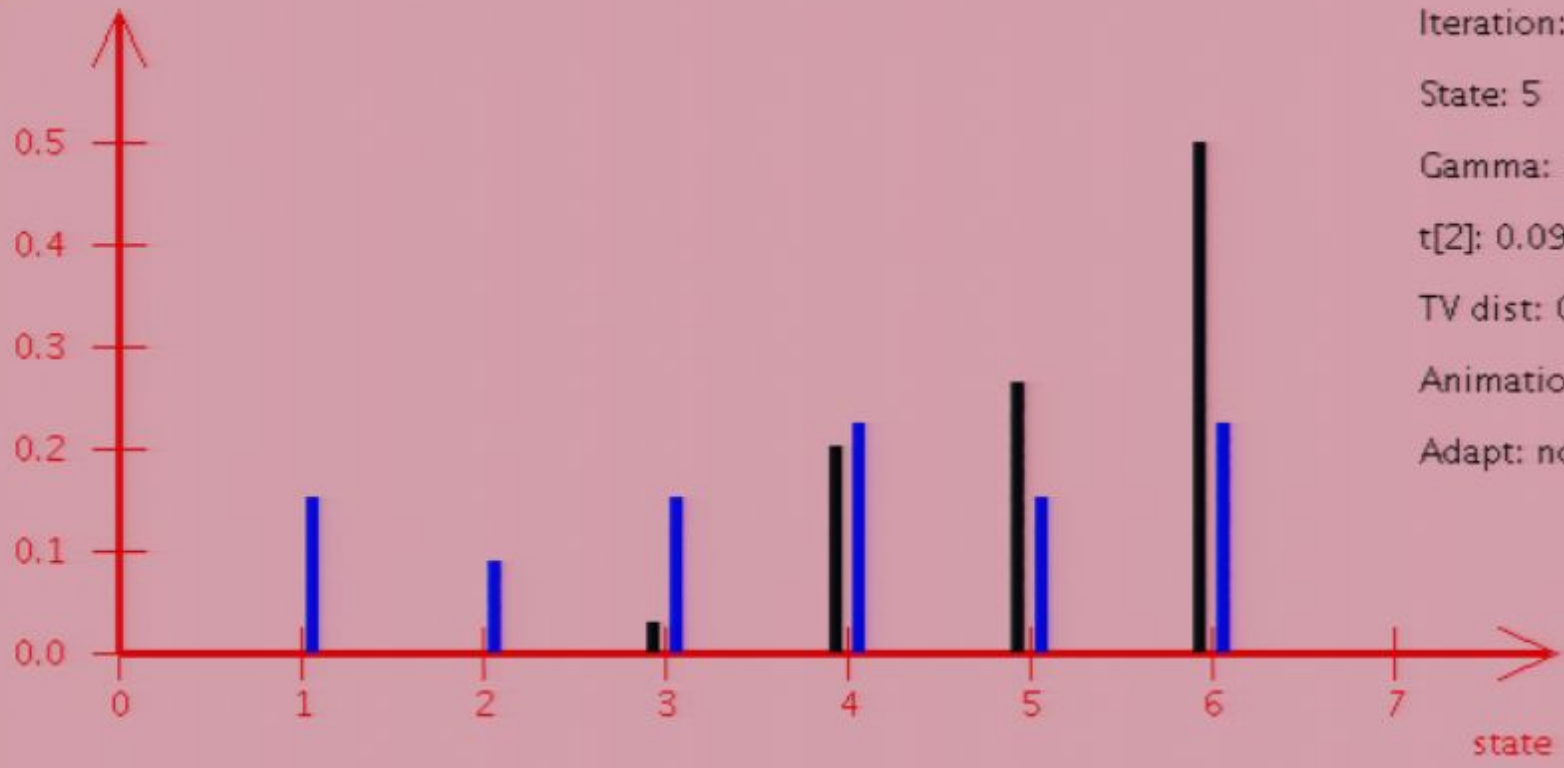


Mean state: 5.203  
Iteration: 59  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.367384  
Animation: 4  
Adapt: no

Applet started.



target

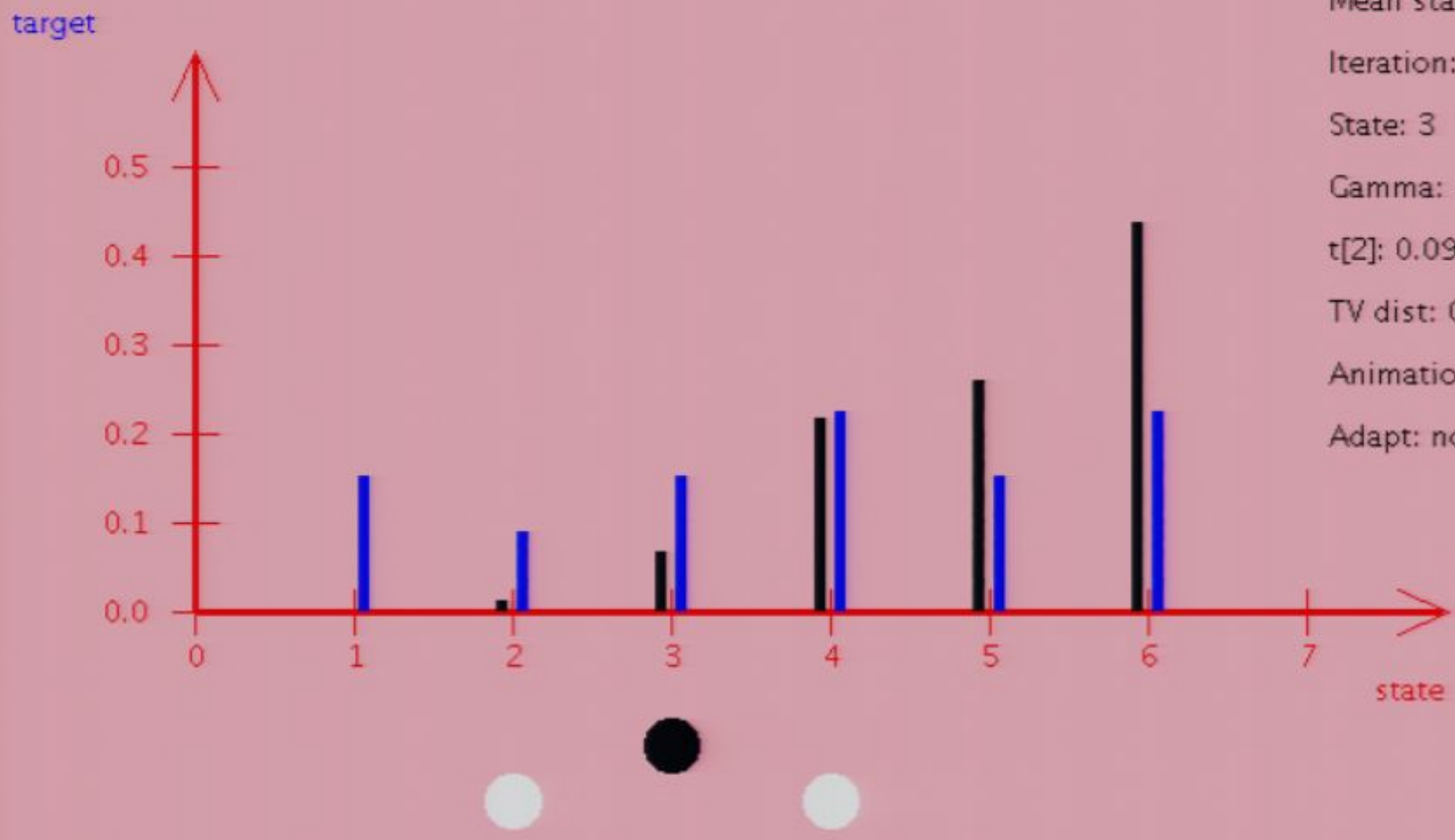


Mean state: 5.234  
Iteration: 64  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.387246  
Animation: 4  
Adapt: no



Applet started.

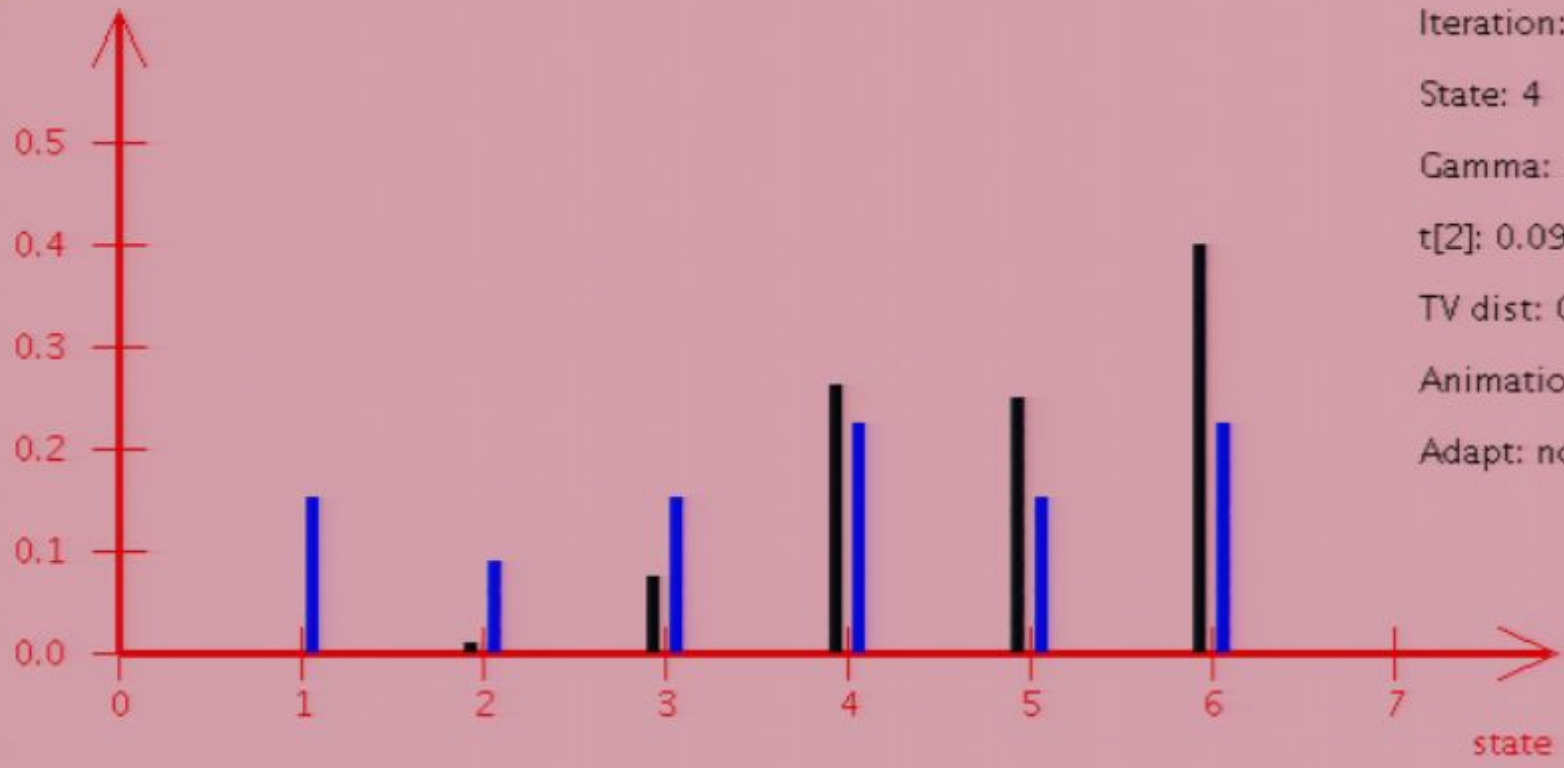




Mean state: 5.041  
Iteration: 73  
State: 3  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.320251  
Animation: 4  
Adapt: no

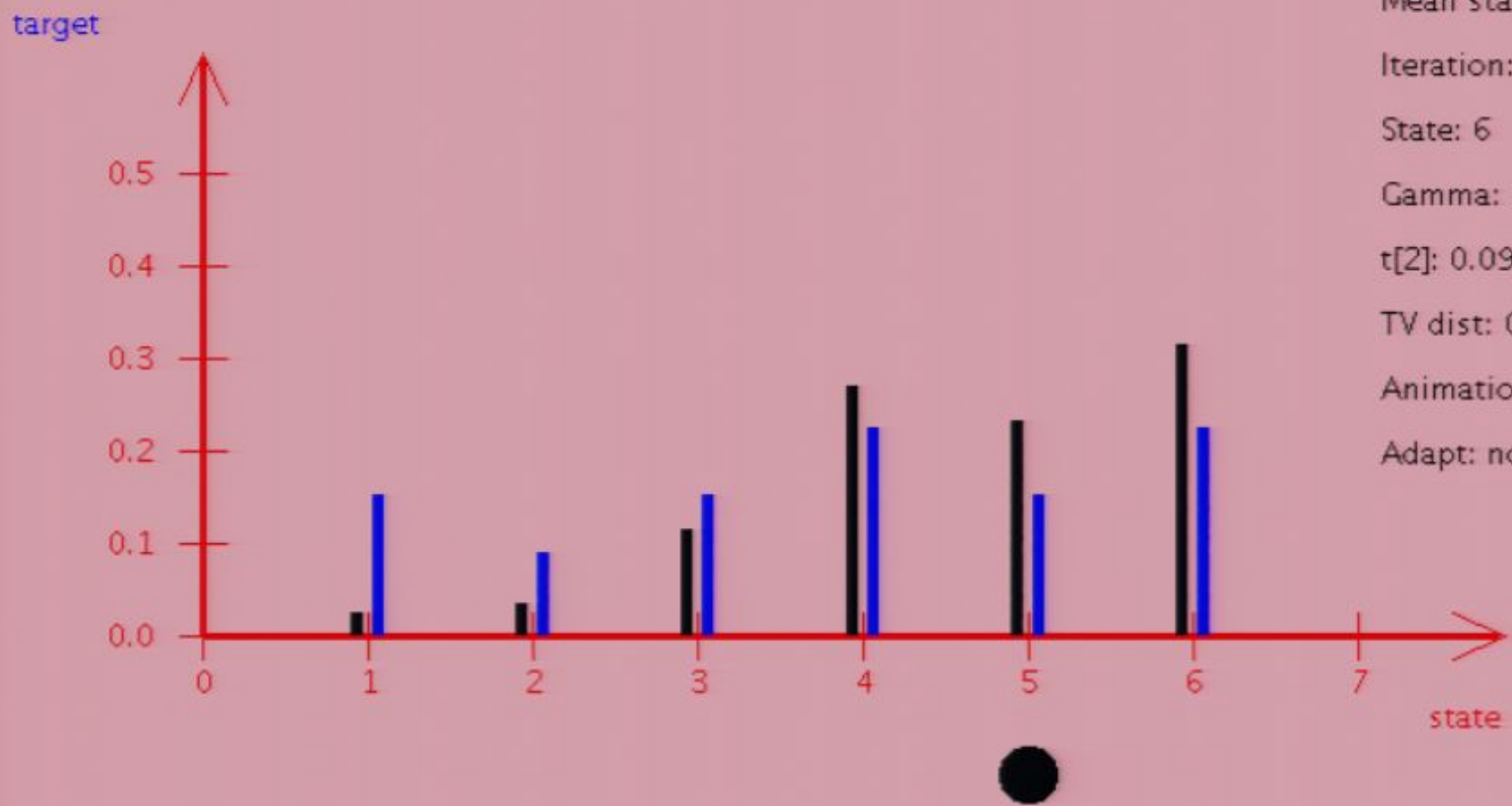
Applet started.

target



Mean state: 4.95  
Iteration: 80  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.308896  
Animation: 5  
Adapt: no

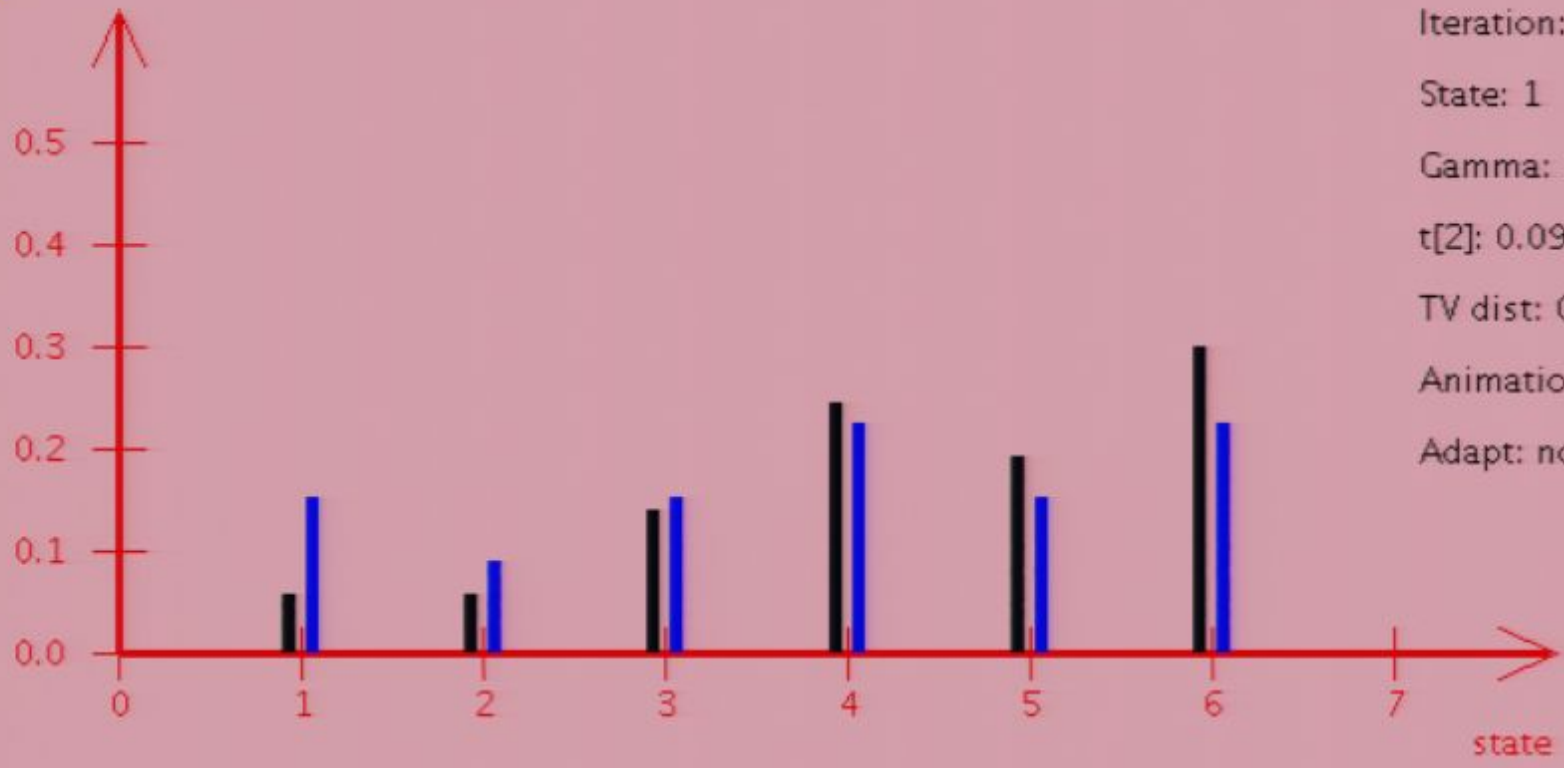
Applet started.



Mean state: 4.59  
Iteration: 110  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.216216  
Animation: 5  
Adapt: no

Applet started.

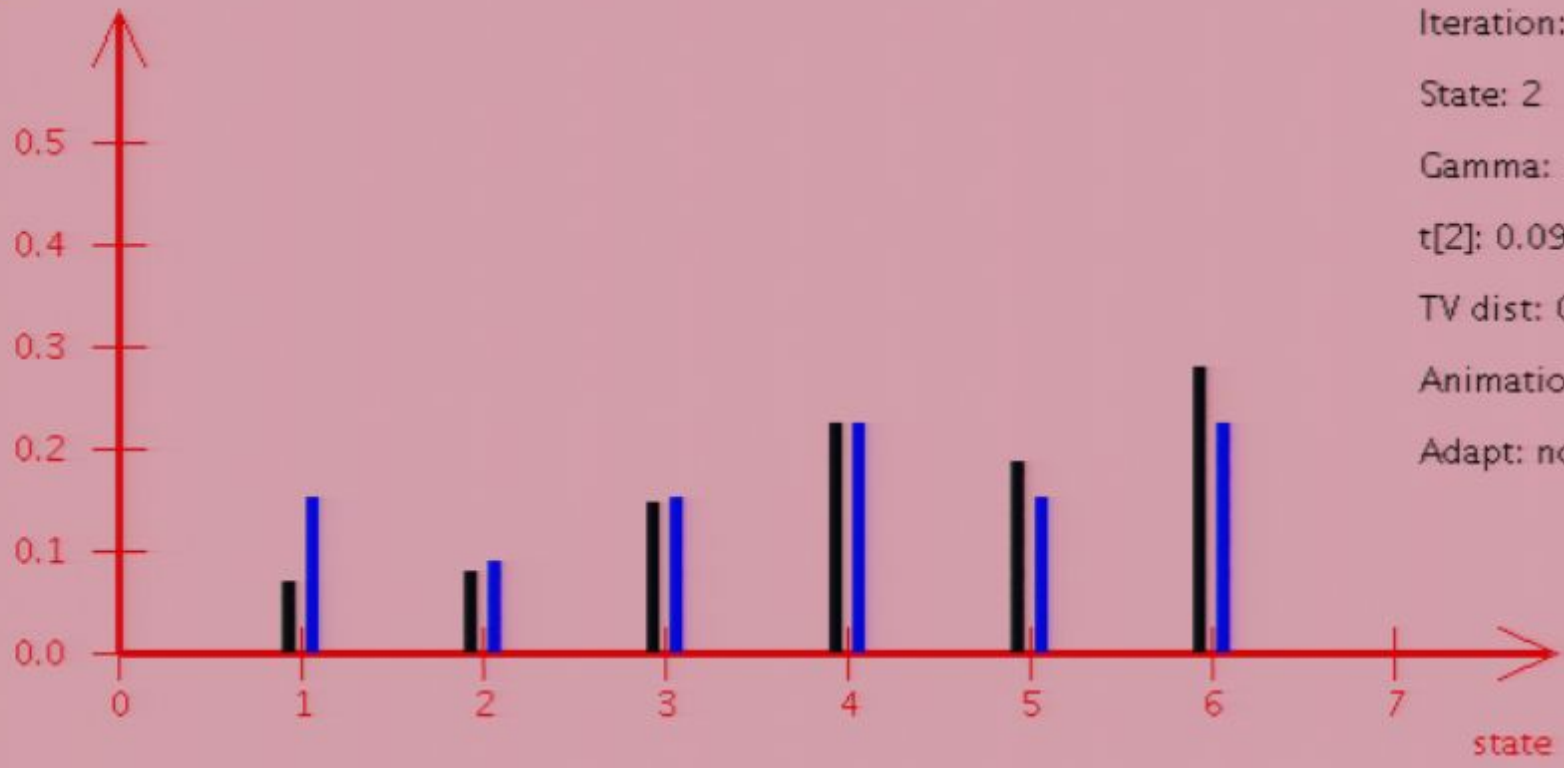
target



Mean state: 4.353  
Iteration: 150  
State: 1  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.136396  
Animation: 5  
Adapt: no

Applet started.

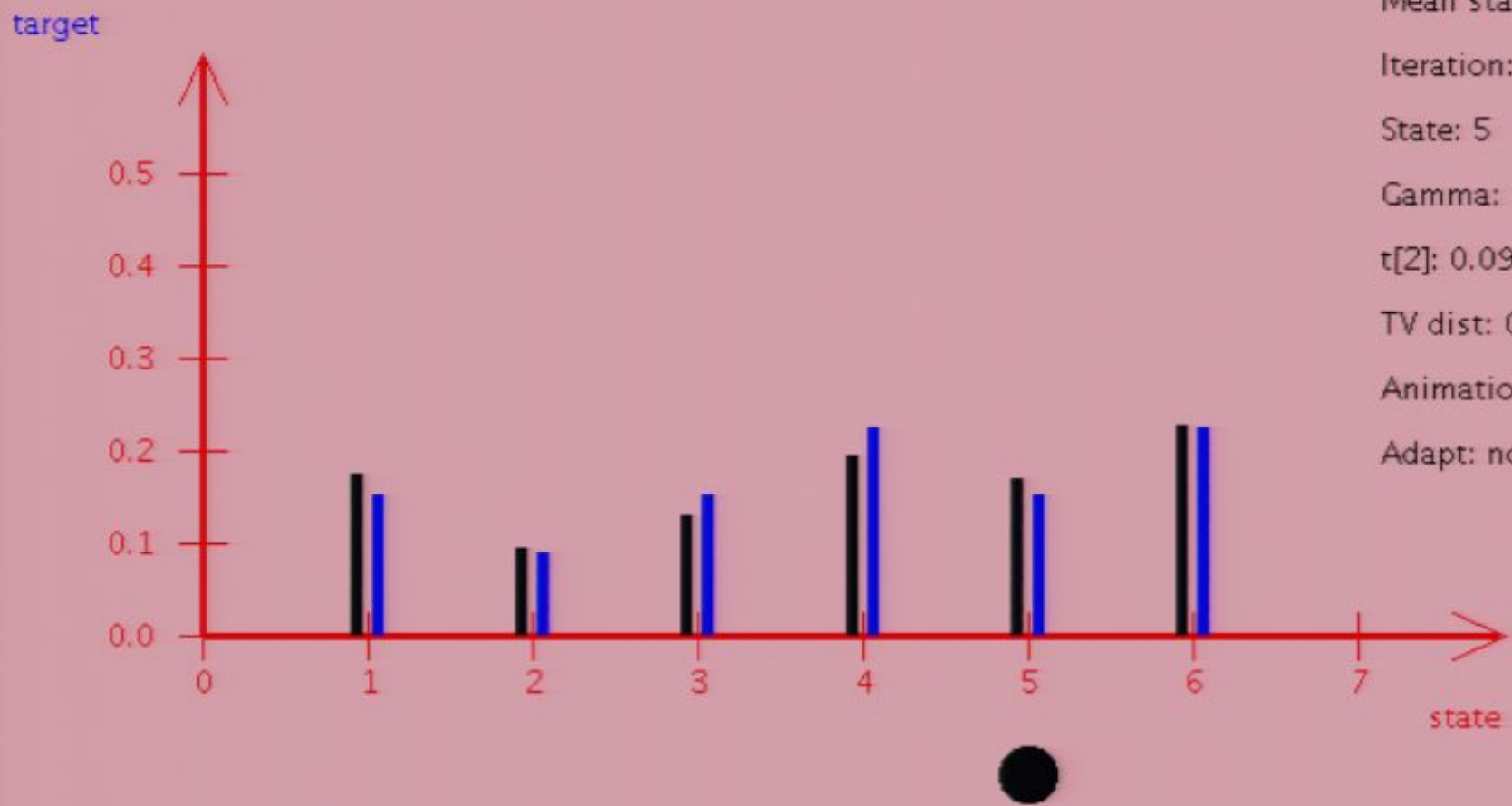
target



Mean state: 4.225  
Iteration: 195  
State: 2  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.093832  
Animation: 5  
Adapt: no

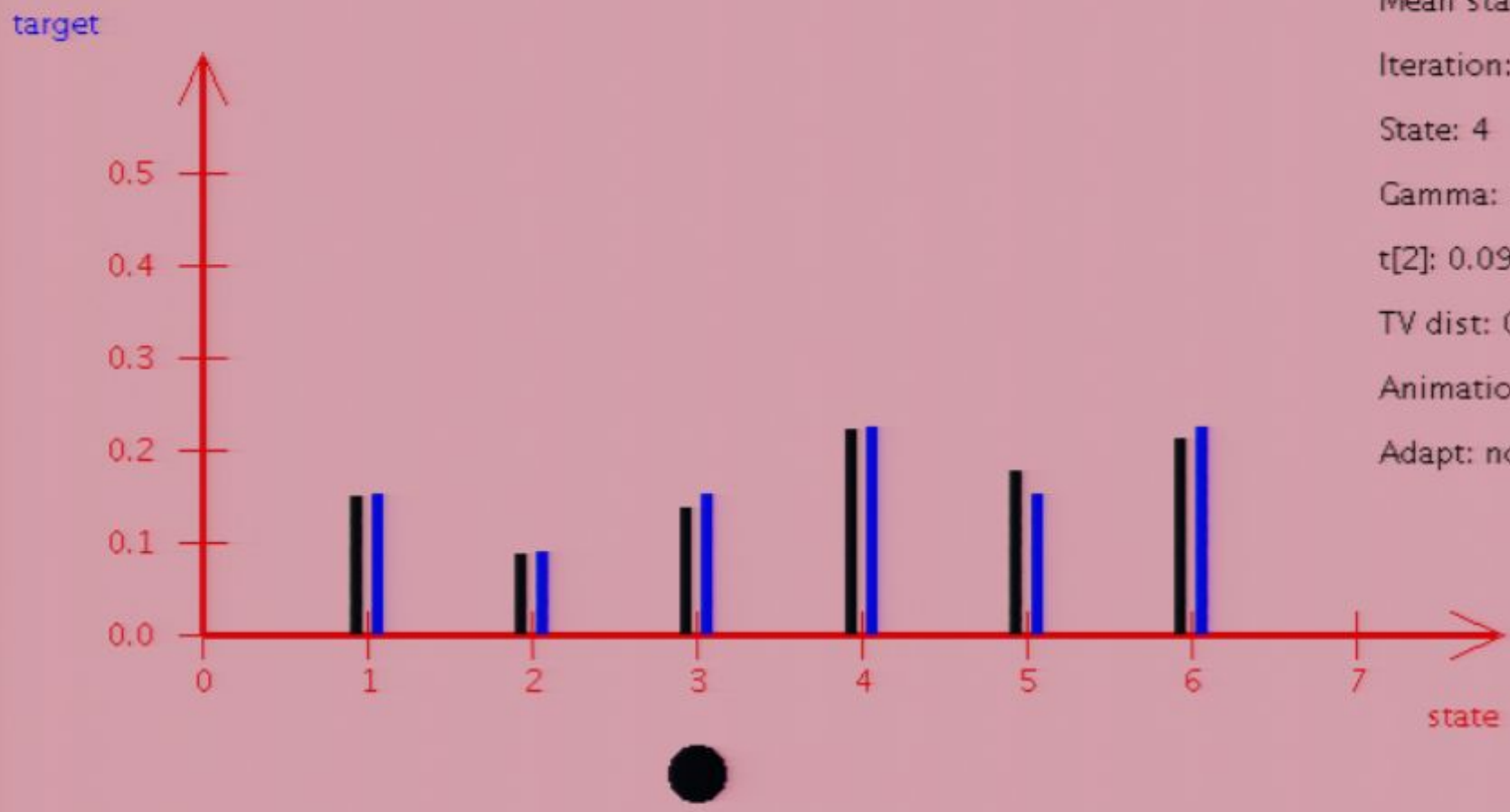


Applet started.



Mean state: 3.776  
Iteration: 250  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.050378  
Animation: 5  
Adapt: no

Applet started.

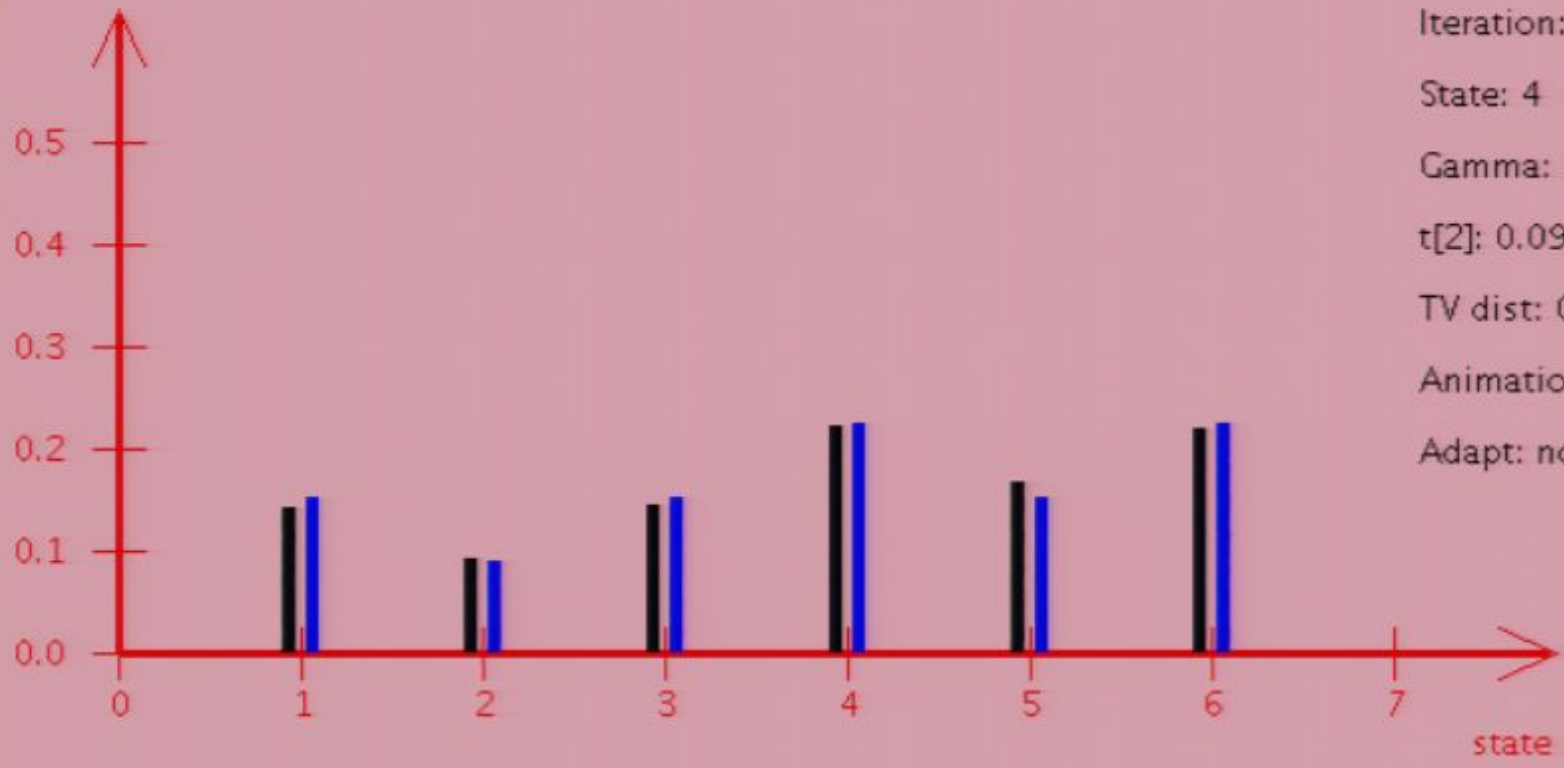


Mean state: 3.833  
Iteration: 289  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.026777  
Animation: 5  
Adapt: no

Applet started.



target

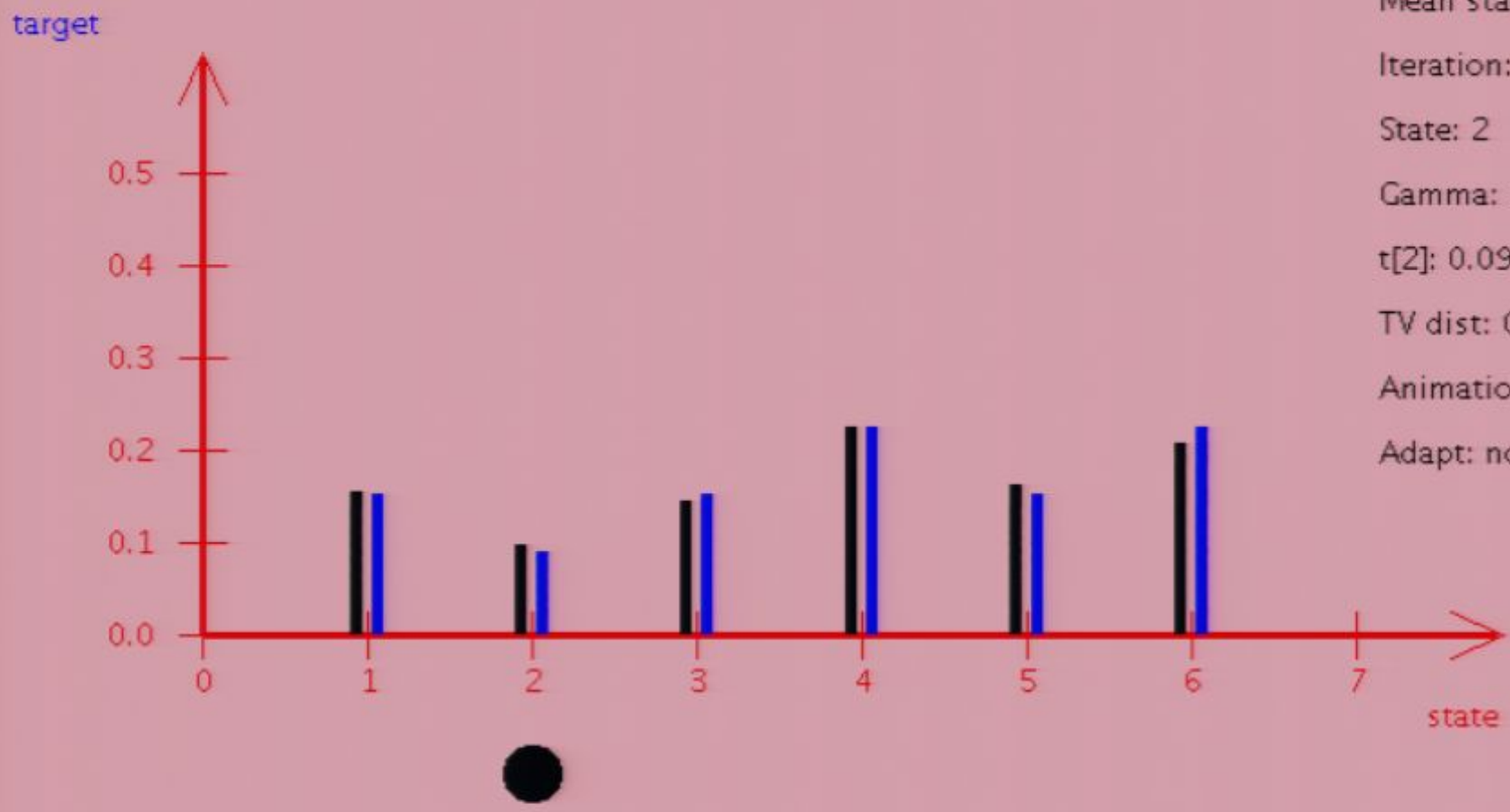


Mean state: 3.84  
Iteration: 339  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.019293  
Animation: 5  
Adapt: no



Applet started.

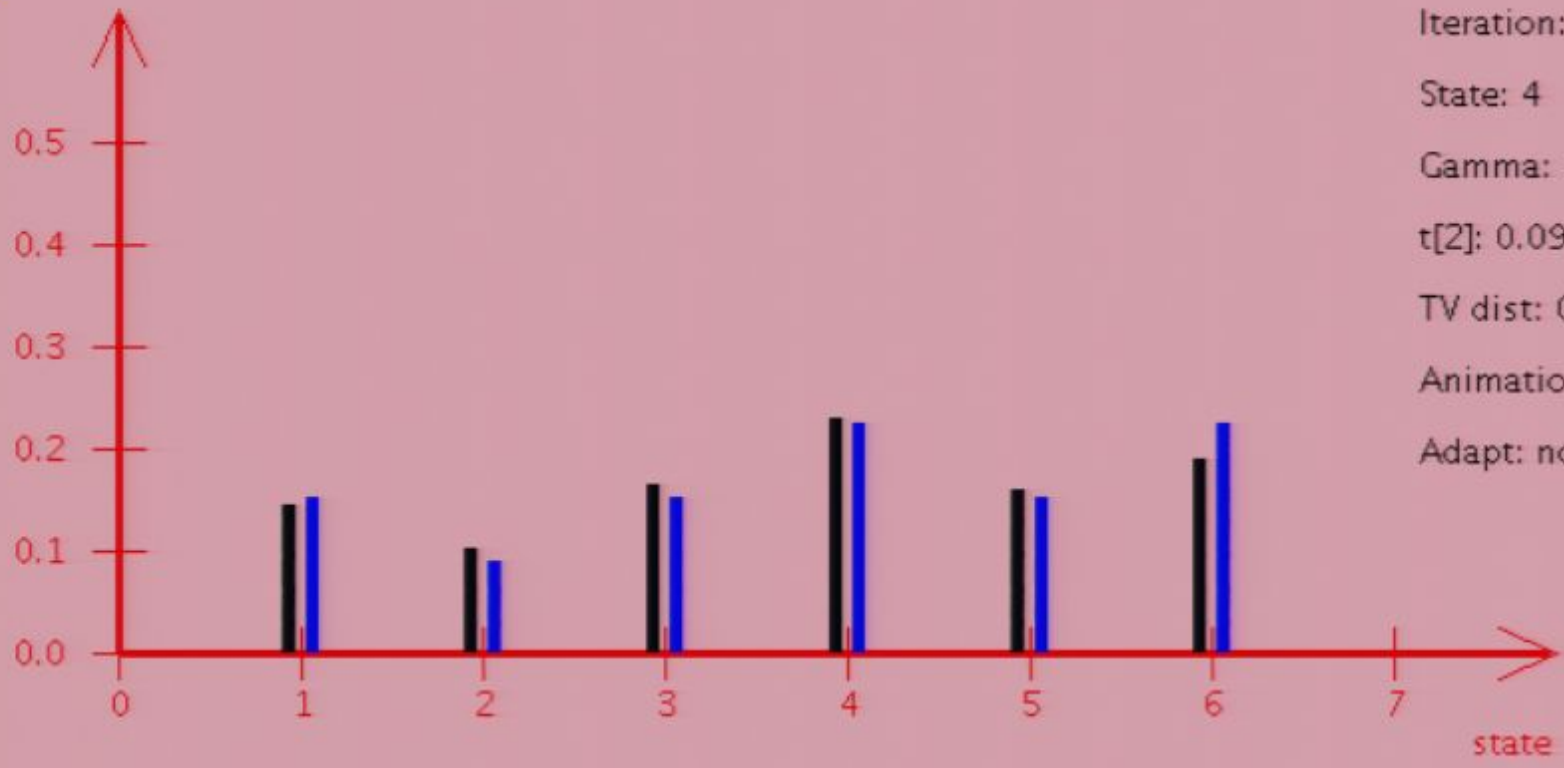




Mean state: 3.77  
Iteration: 374  
State: 2  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.022763  
Animation: 5  
Adapt: no

Applet started.

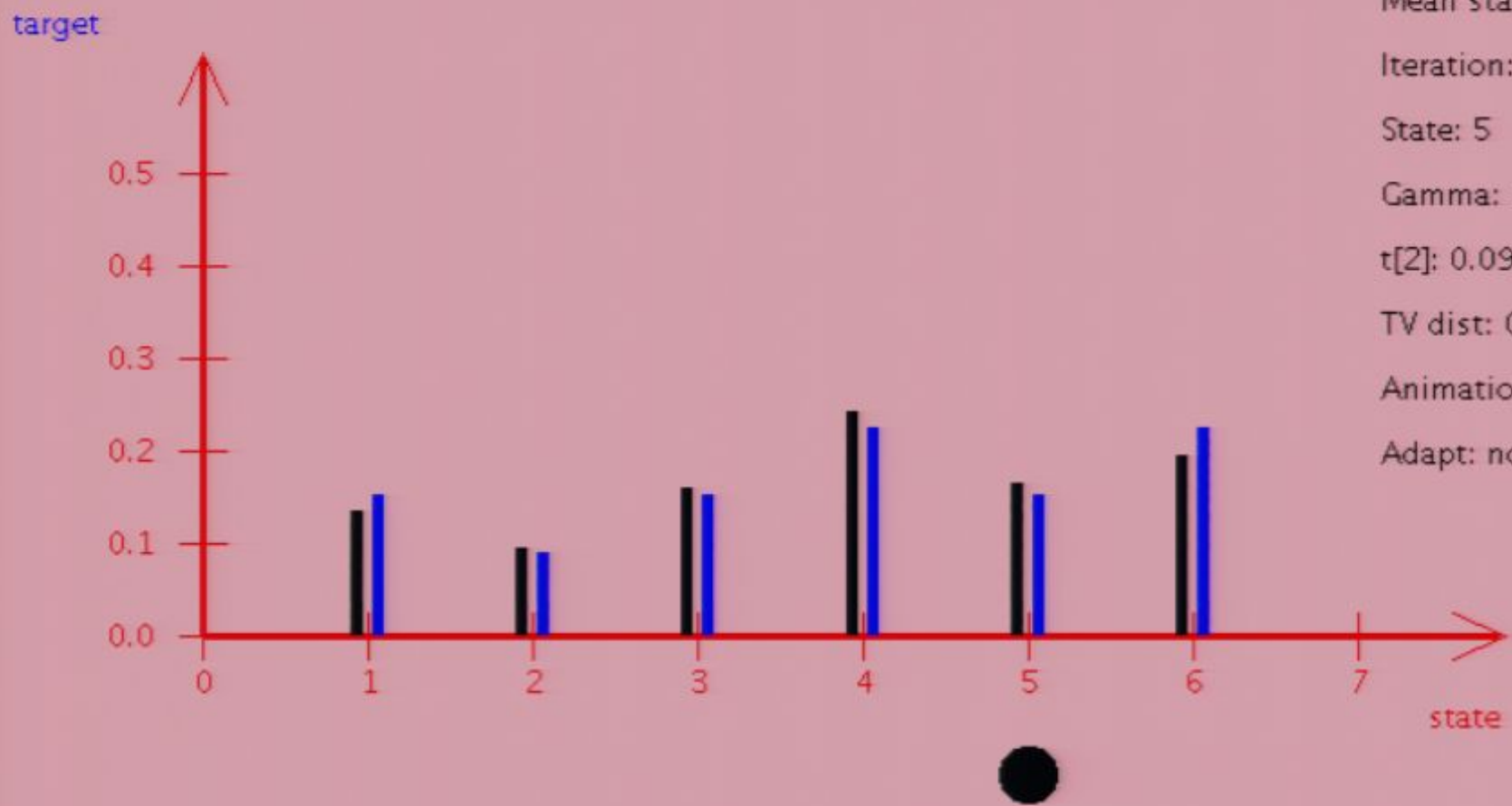
target



Mean state: 3.731  
Iteration: 409  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.04097  
Animation: 5  
Adapt: no

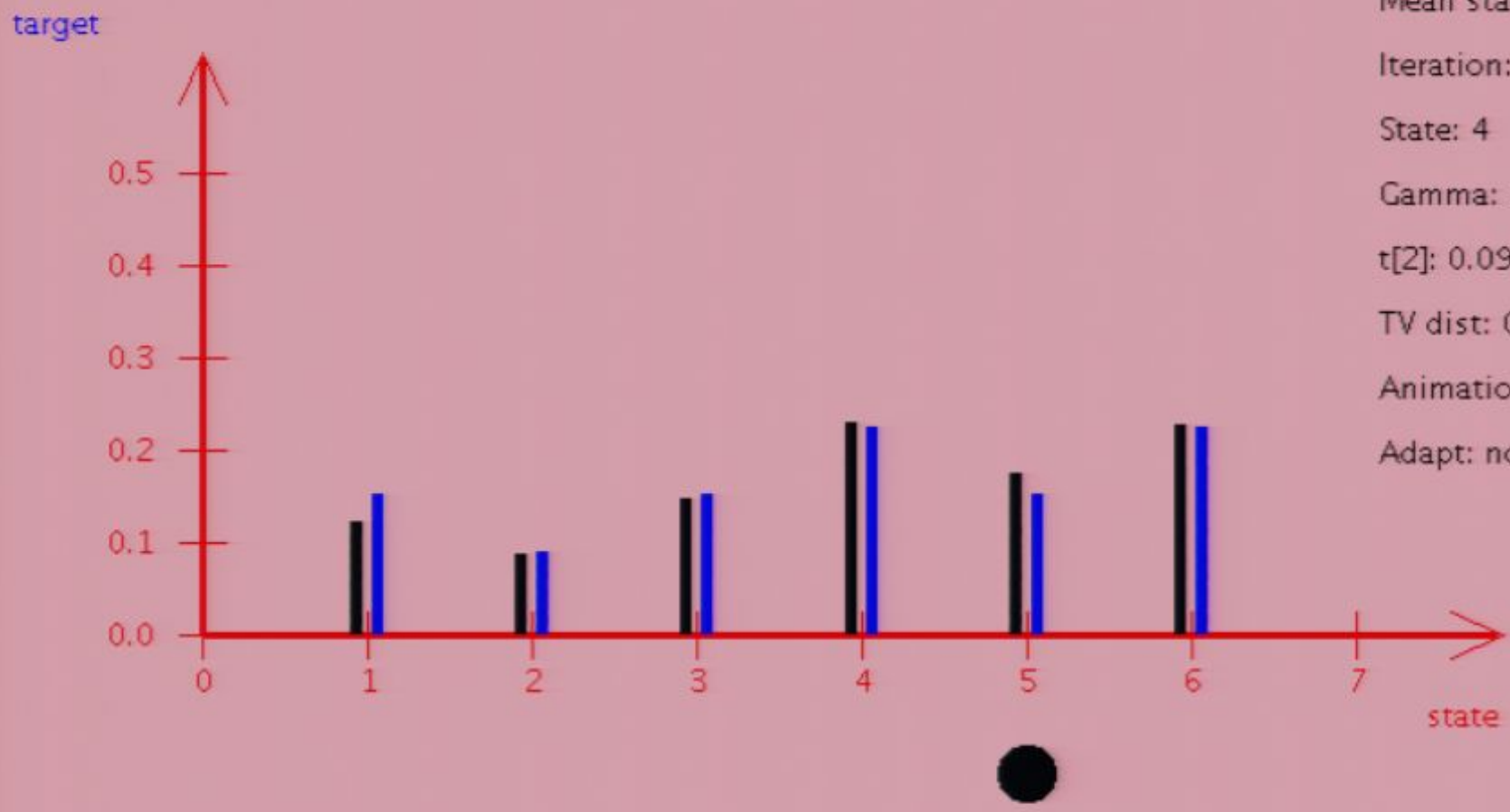


Applet started.



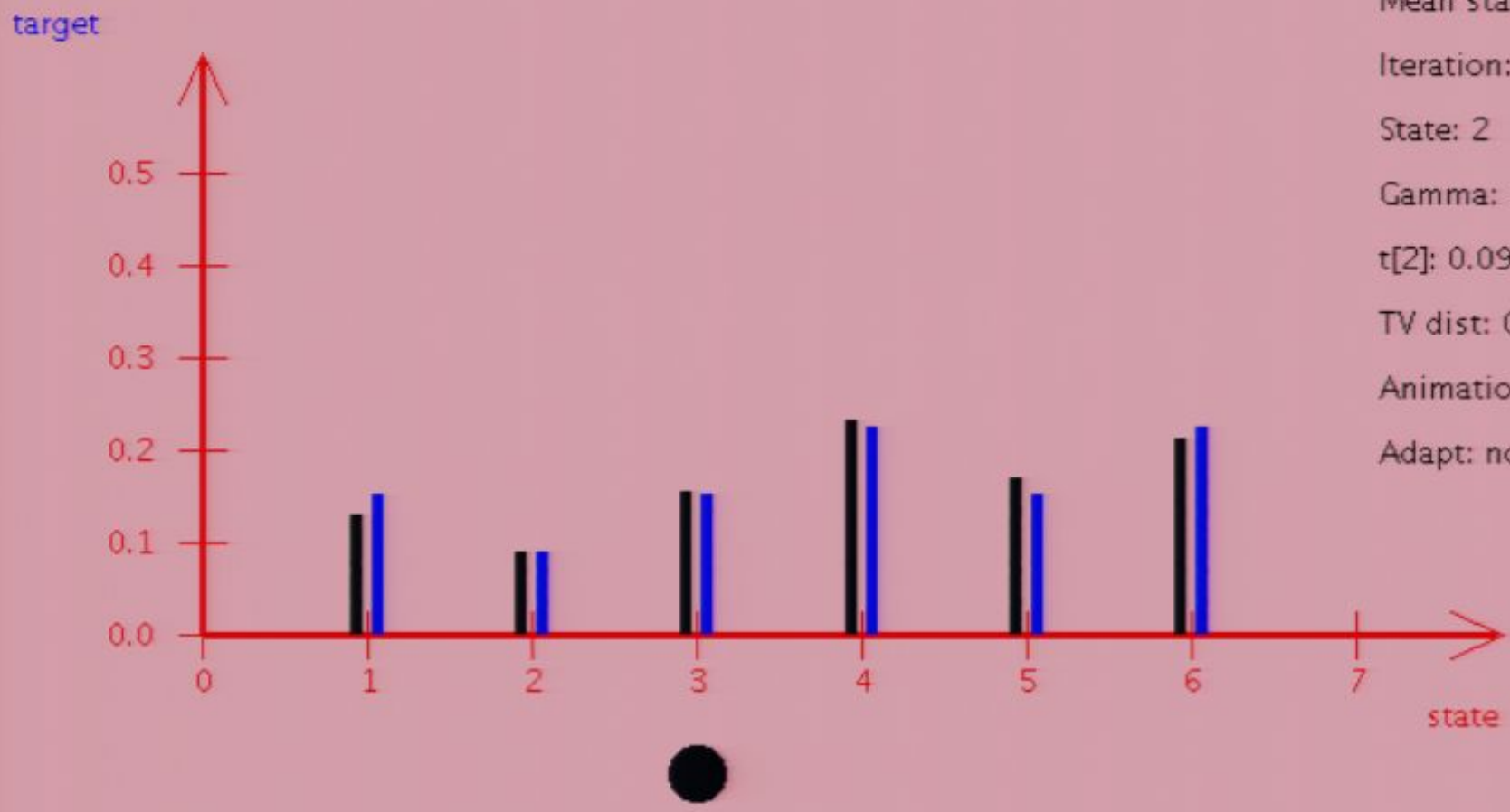
Mean state: 3.797  
Iteration: 444  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.047297  
Animation: 5  
Adapt: no

Applet started.



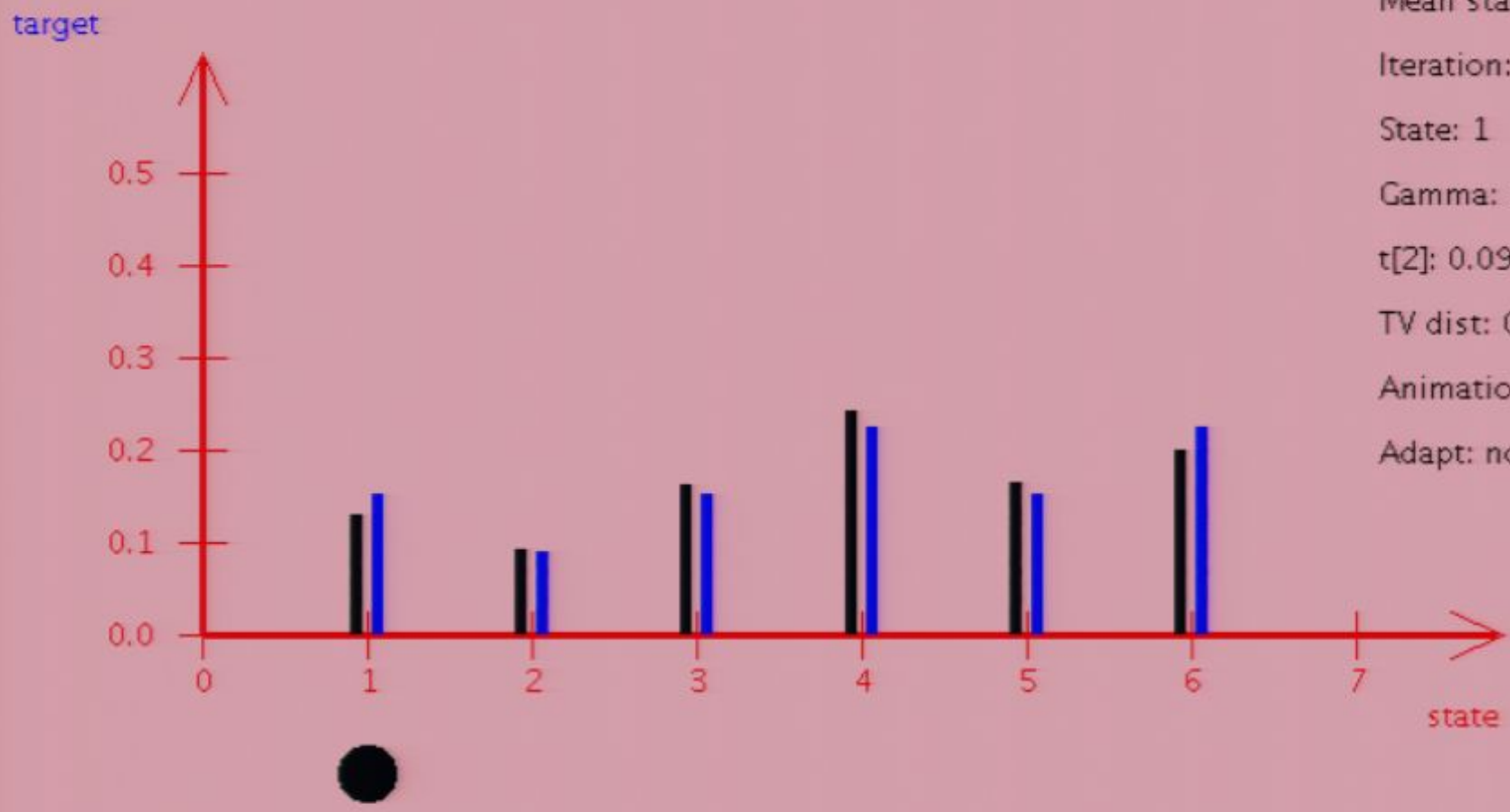
Mean state: 3.935  
Iteration: 483  
State: 4  
Gamma: 1  
t[2]: 0.09009009009009009  
TV dist: 0.034077  
Animation: 5  
Adapt: no

Applet started.



Mean state: 3.864  
Iteration: 523  
State: 2  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.032298  
Animation: 5  
Adapt: no

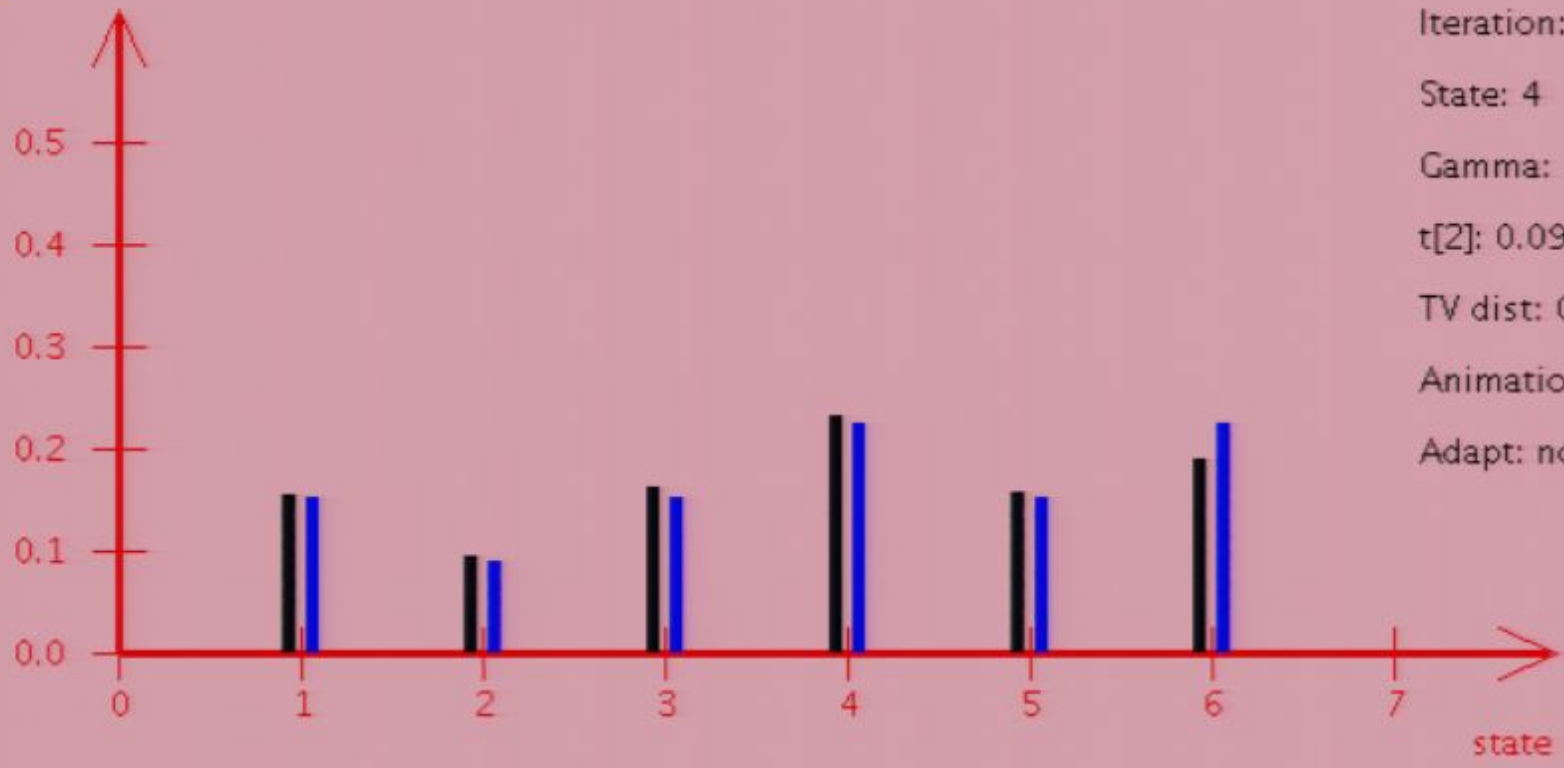
Applet started.



Mean state: 3.826  
Iteration: 558  
State: 1  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.04743  
Animation: 5  
Adapt: no

Applet started.

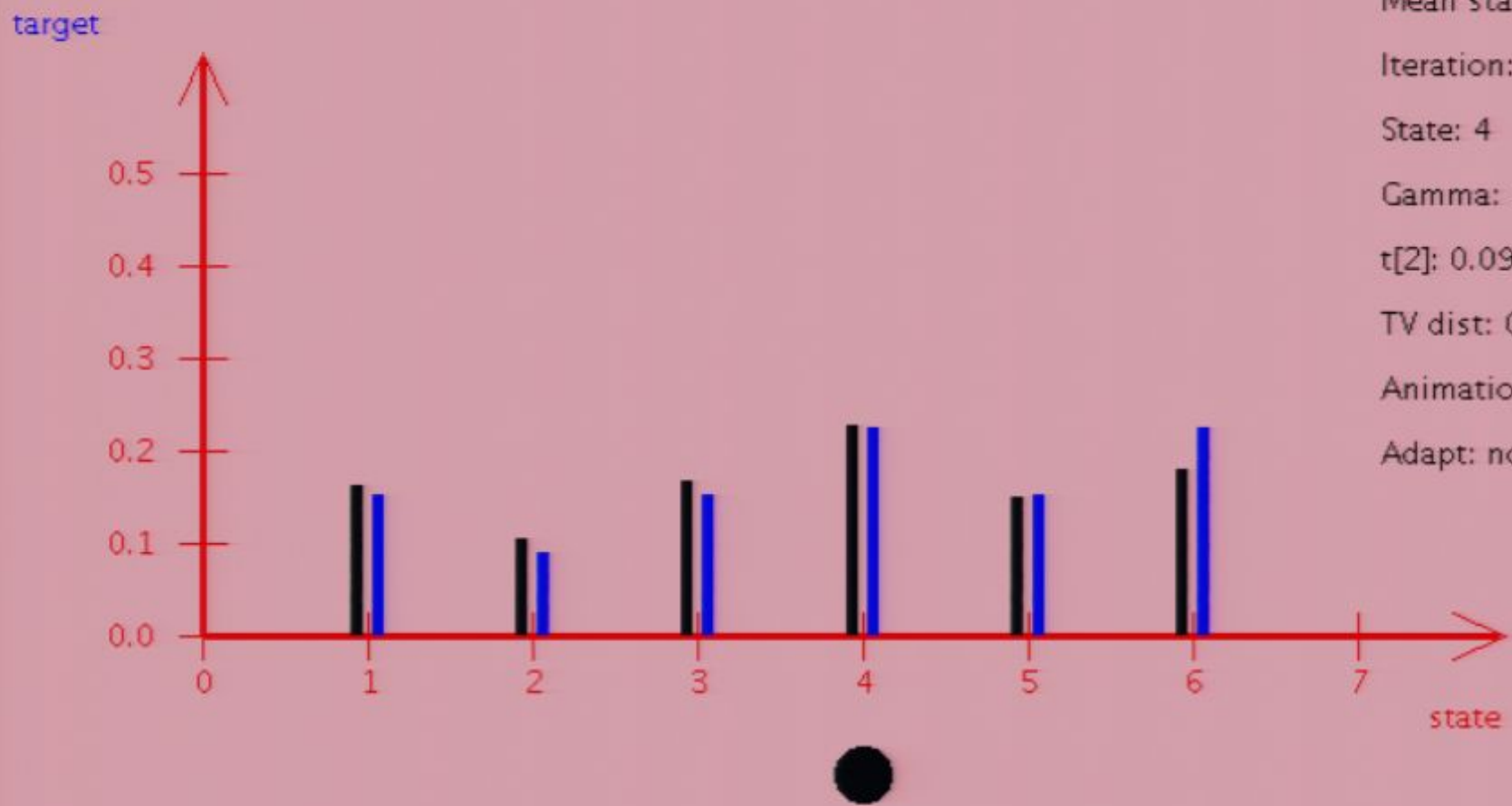
target



Mean state: 3.712  
Iteration: 588  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.034749  
Animation: 5  
Adapt: no

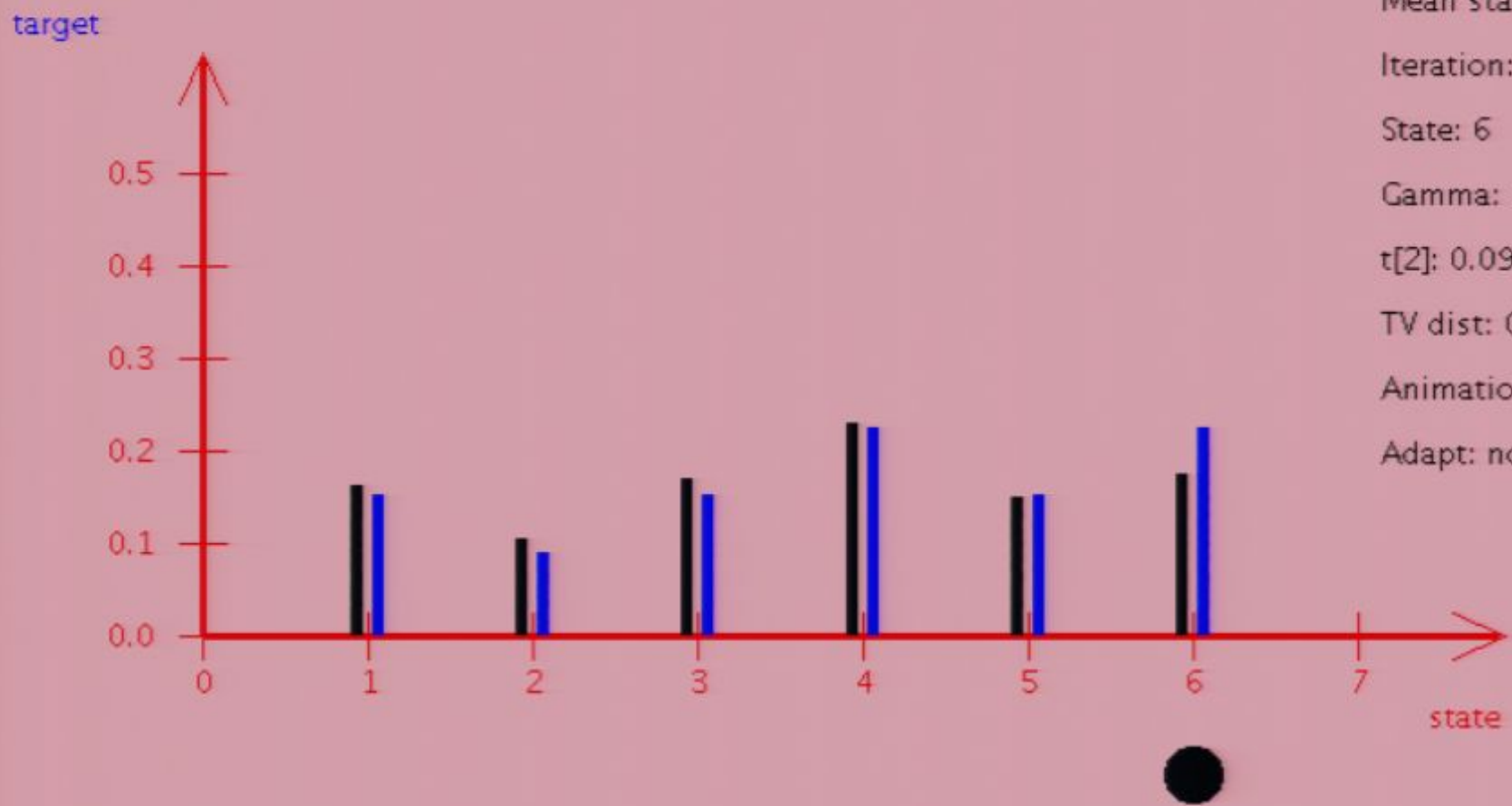
Applet started.





Mean state: 3.64  
Iteration: 618  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.046663  
Animation: 5  
Adapt: no

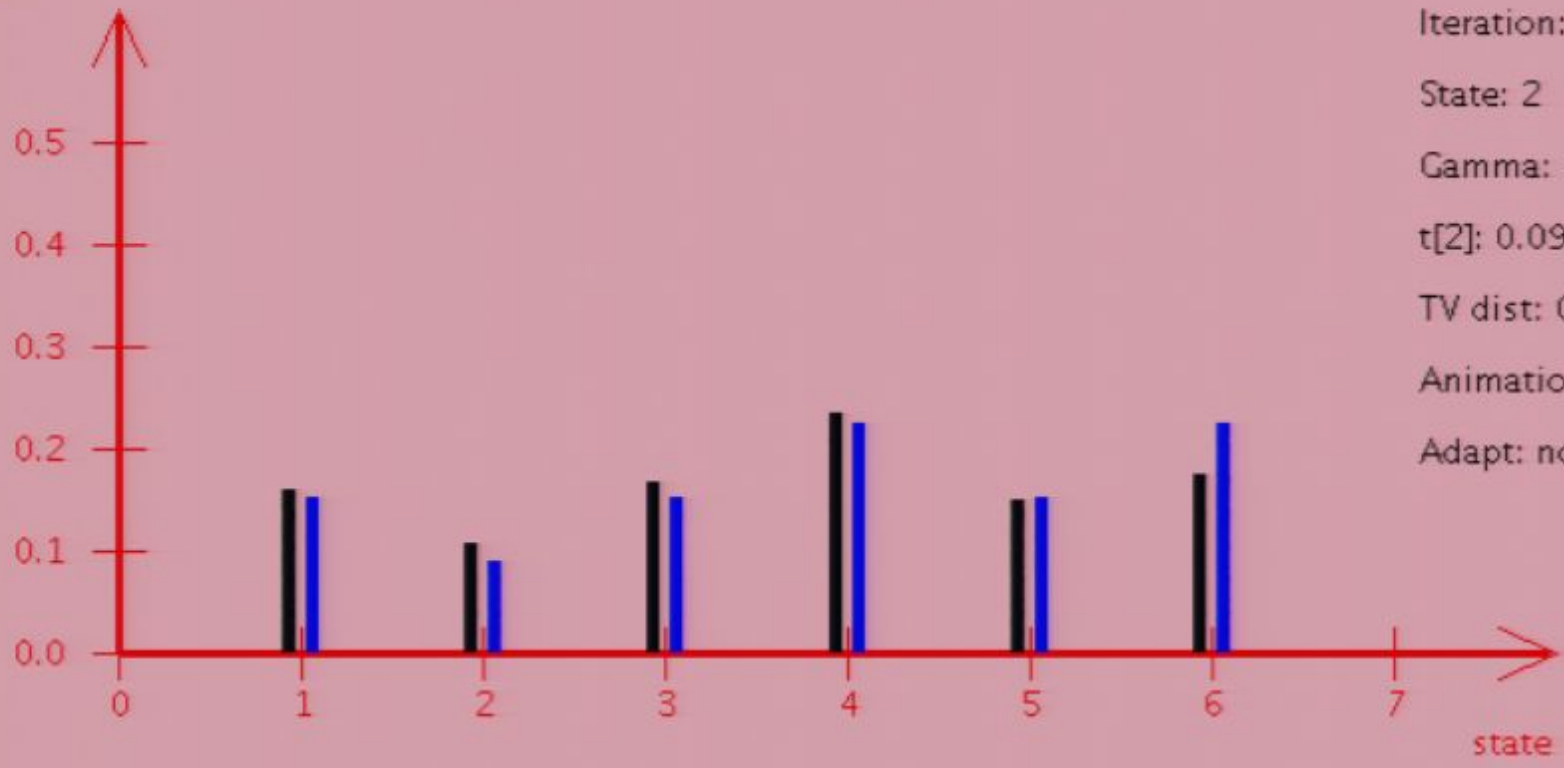
Applet started.



Mean state: 3.632  
Iteration: 643  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.050229  
Animation: 5  
Adapt: no

Applet started.

target

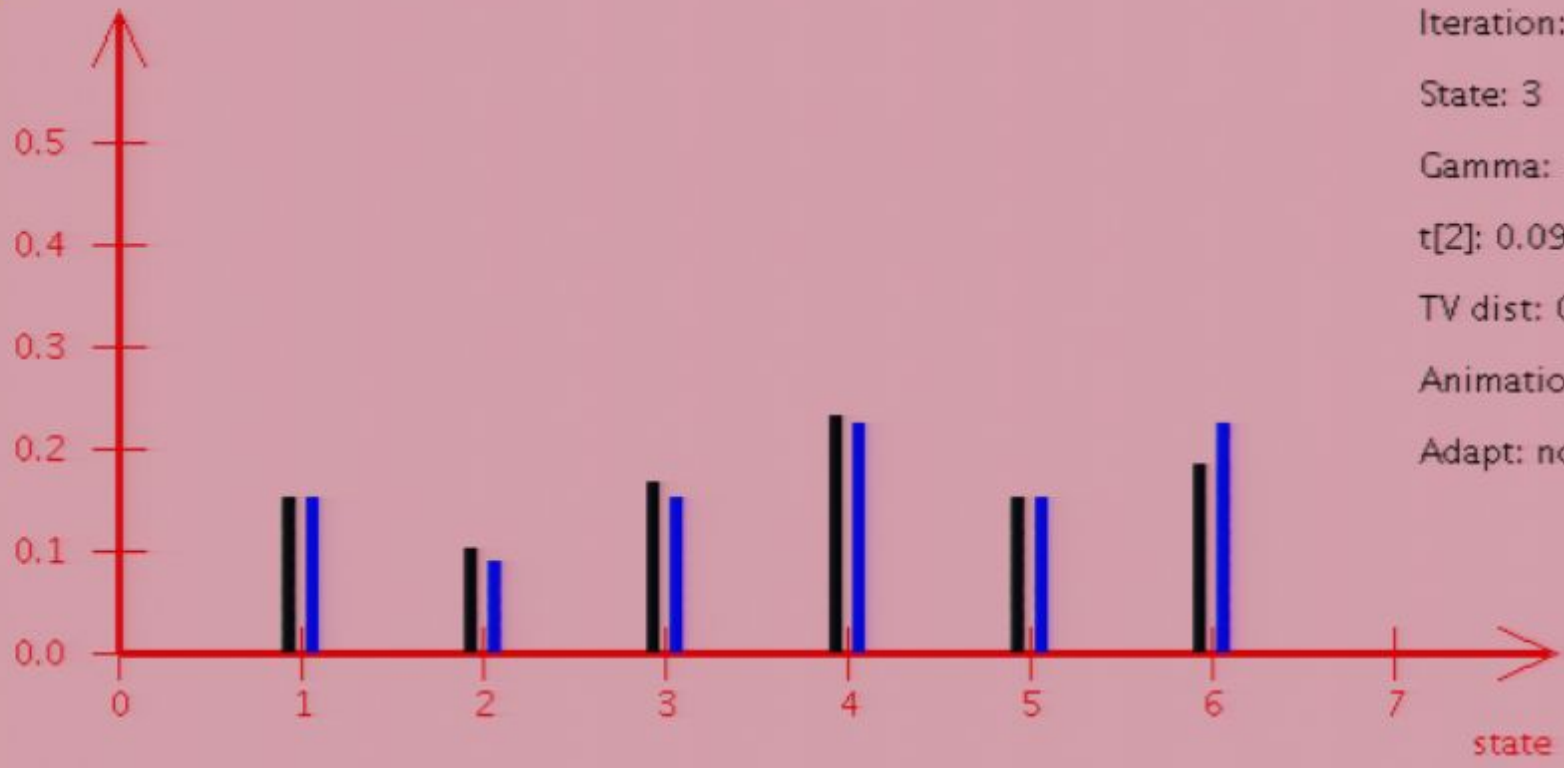


Mean state: 3.635  
Iteration: 672  
State: 2  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.050997  
Animation: 5  
Adapt: no



Applet started.

target

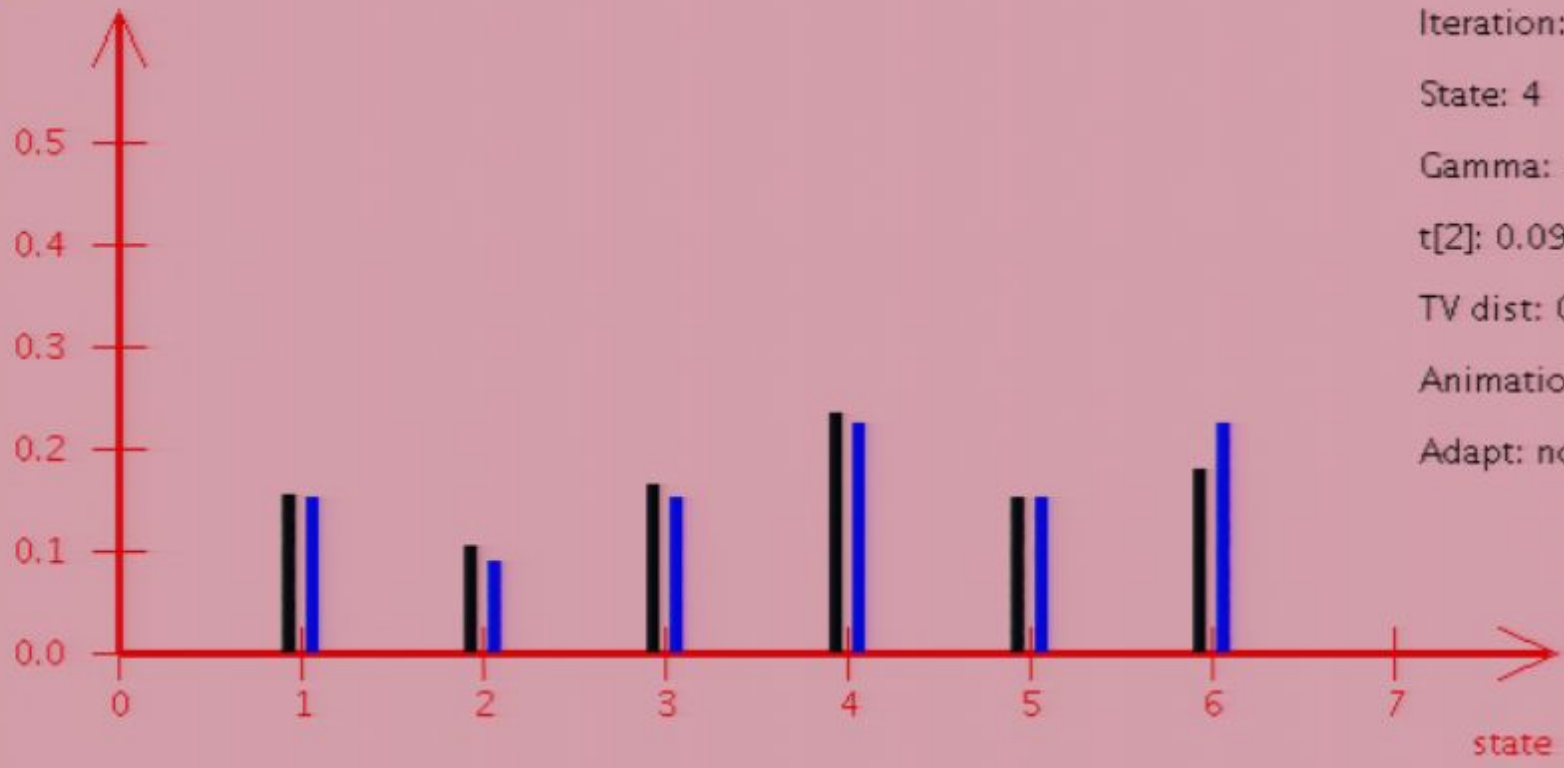


Mean state: 3.685  
Iteration: 707  
State: 3  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.040725  
Animation: 5  
Adapt: no



Applet started.

target

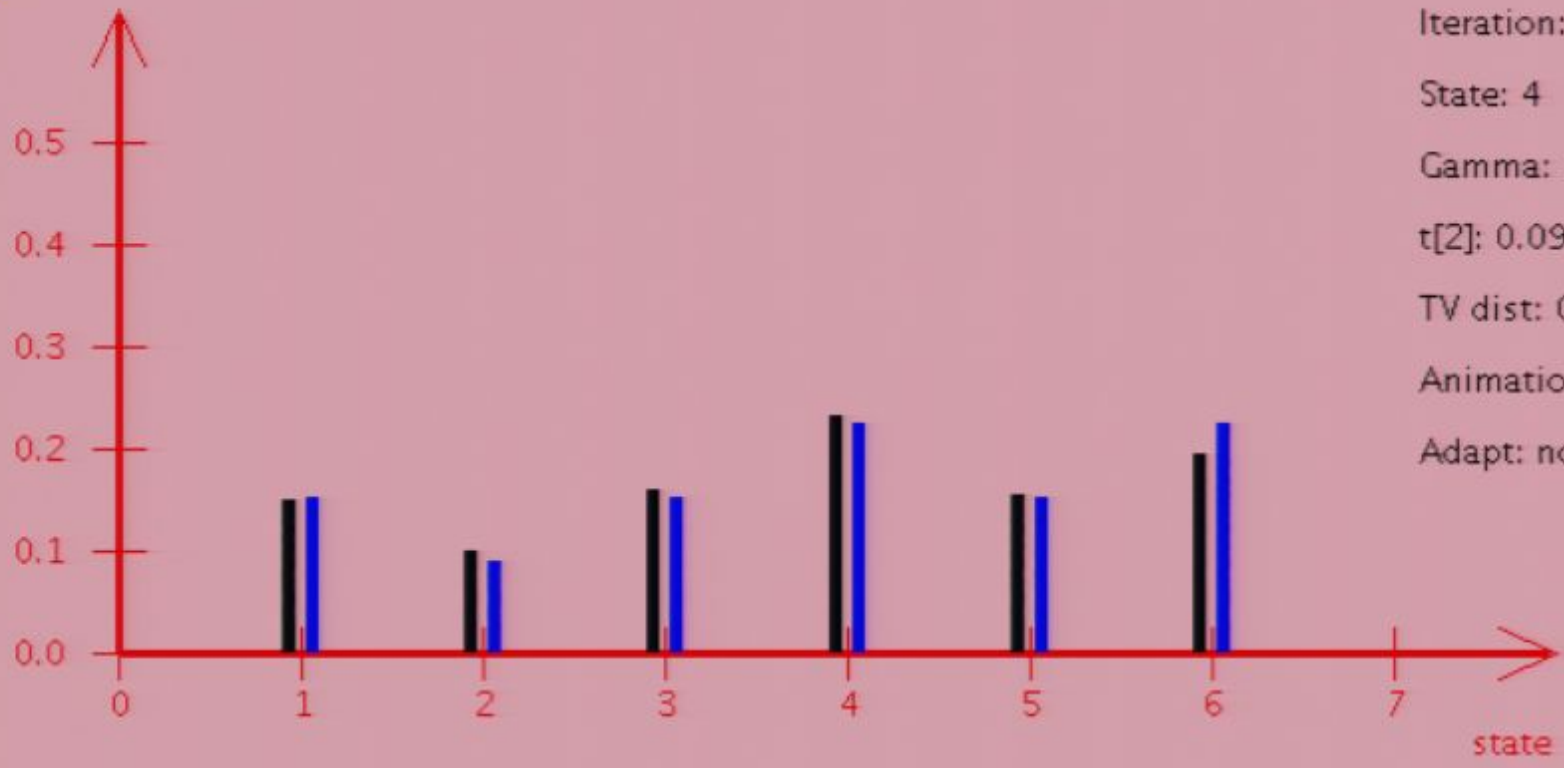


Mean state: 3.669  
Iteration: 747  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.043706  
Animation: 5  
Adapt: no



Applet started.

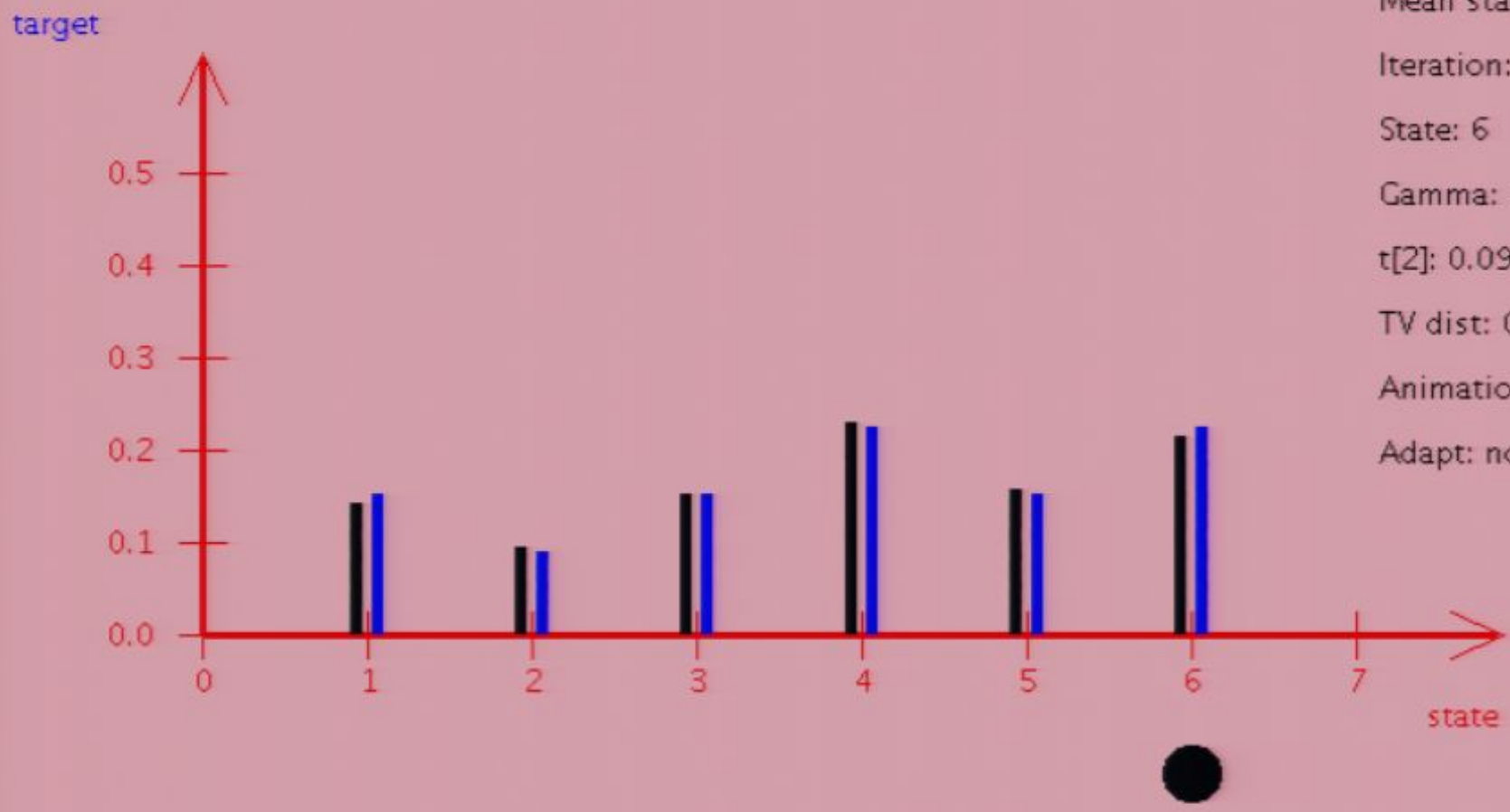
target



Mean state: 3.727  
Iteration: 772  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.031228  
Animation: 5  
Adapt: no



Applet started.

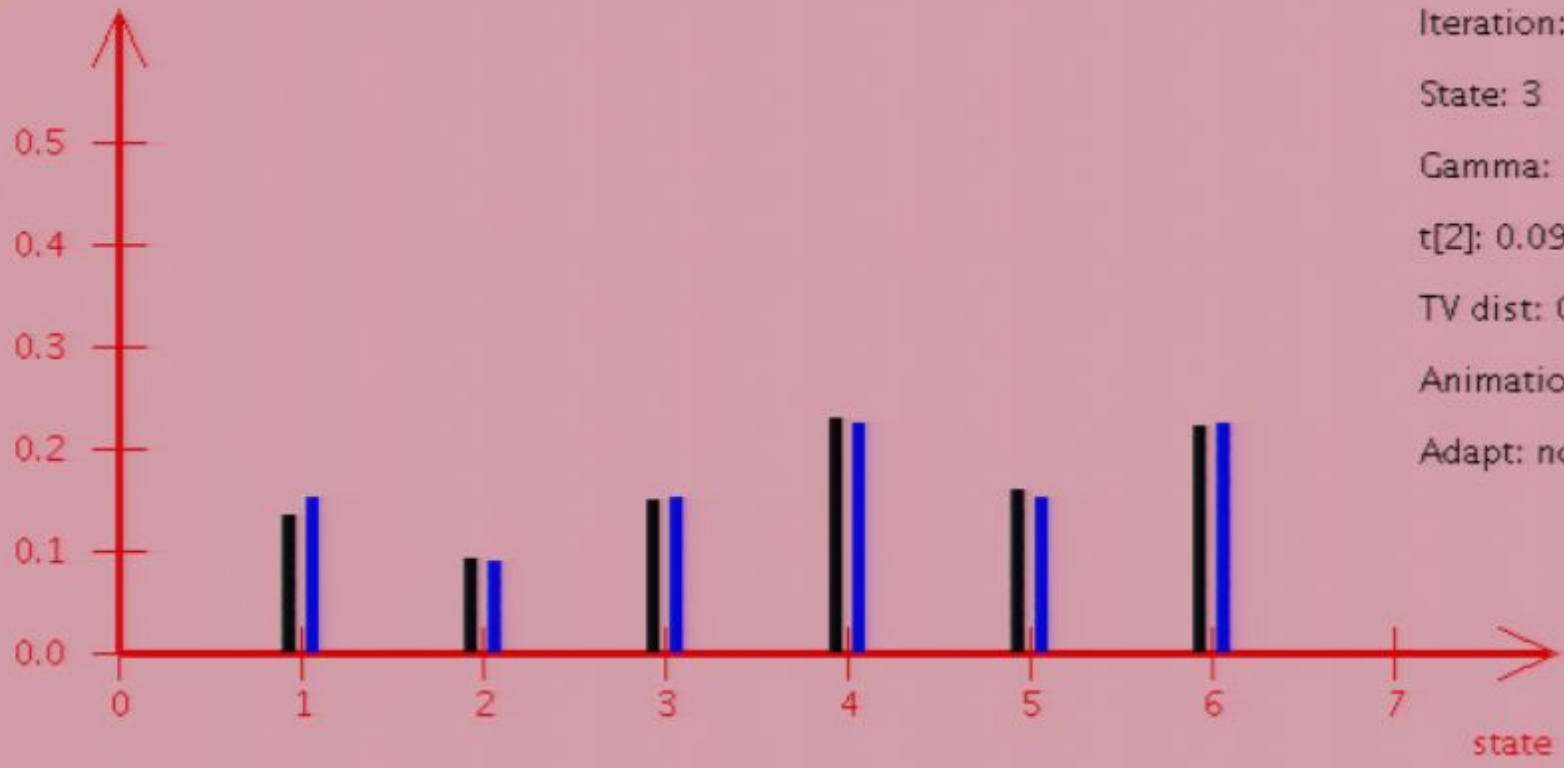


Mean state: 3.807  
Iteration: 812  
State: 6  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.018772  
Animation: 5  
Adapt: no

Applet started.



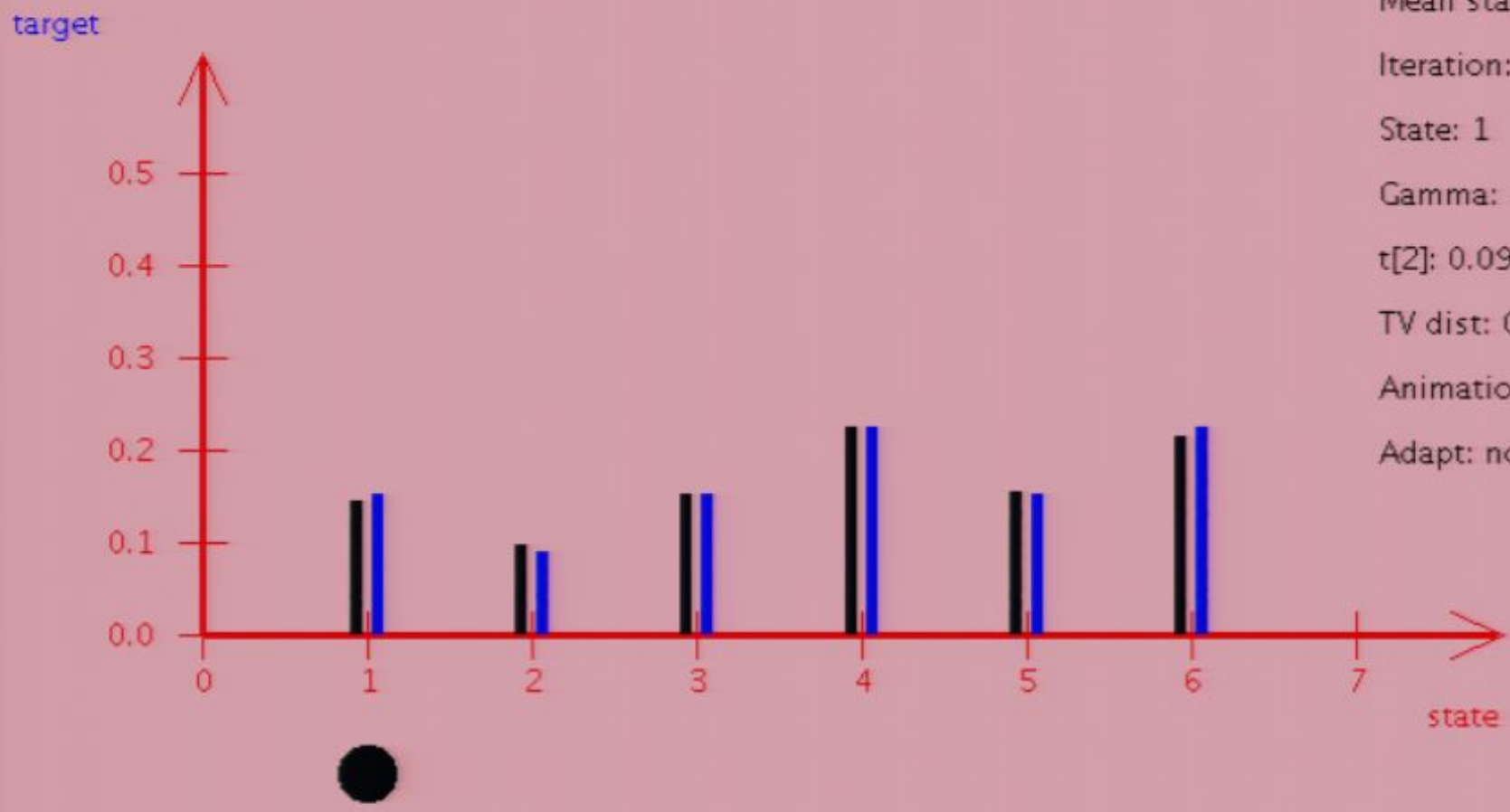
target



Mean state: 3.859  
Iteration: 852  
State: 3  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.01862  
Animation: 5  
Adapt: no



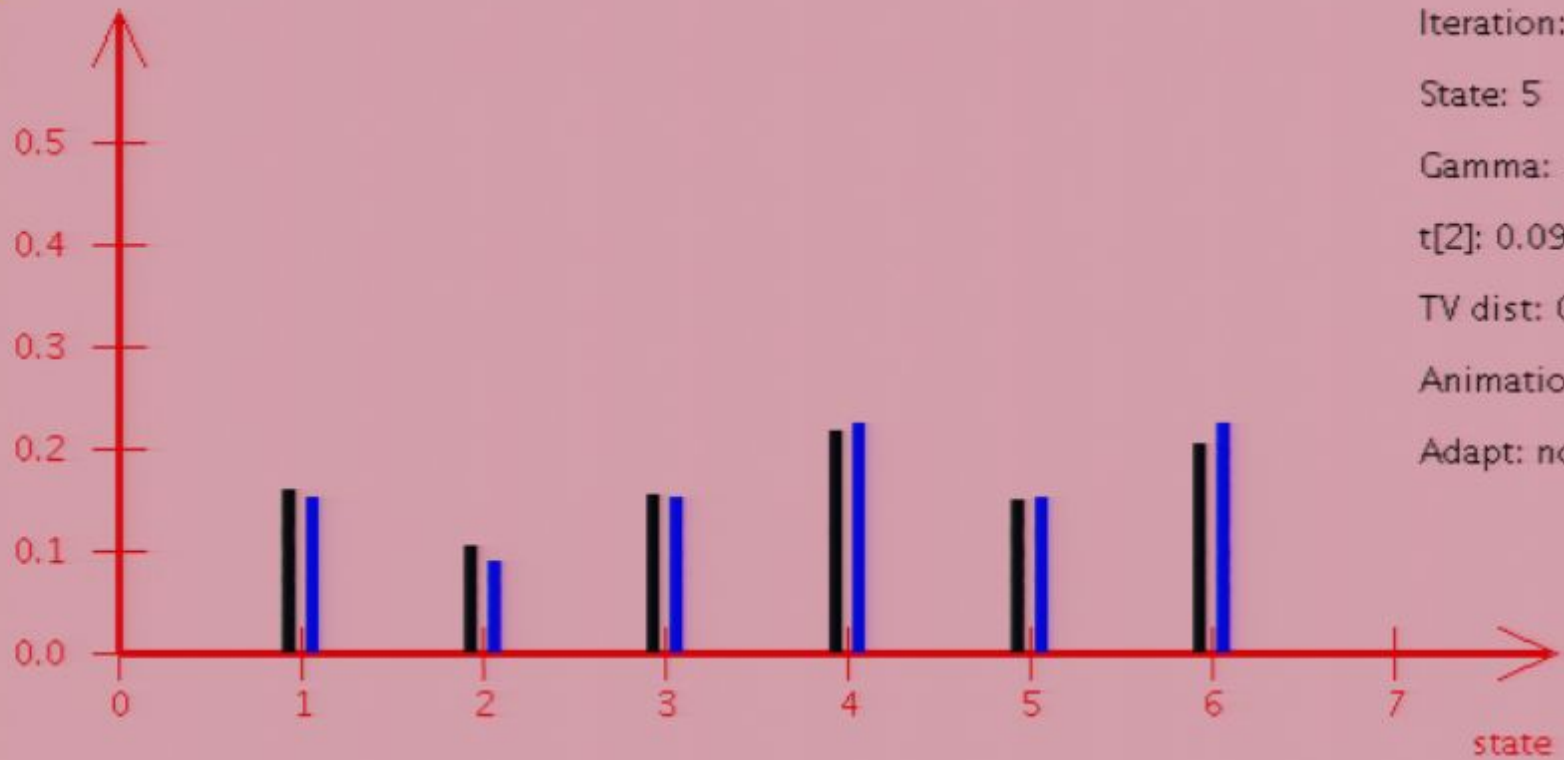
Applet started.



Mean state: 3.796  
Iteration: 881  
State: 1  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.014432  
Animation: 5  
Adapt: no

Applet started.

target

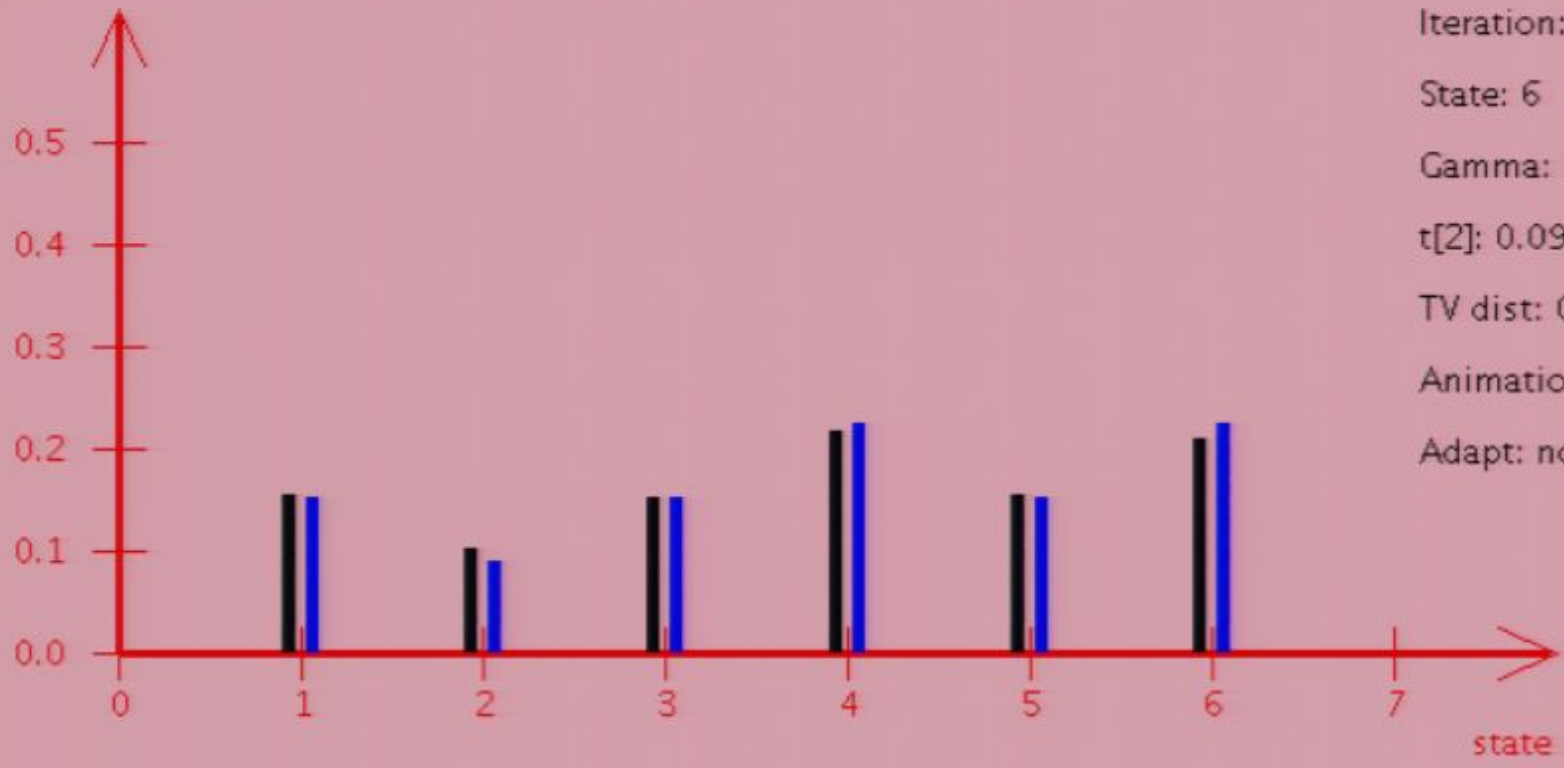


Mean state: 3.703  
Iteration: 931  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.028952  
Animation: 5  
Adapt: no



Applet started.

target

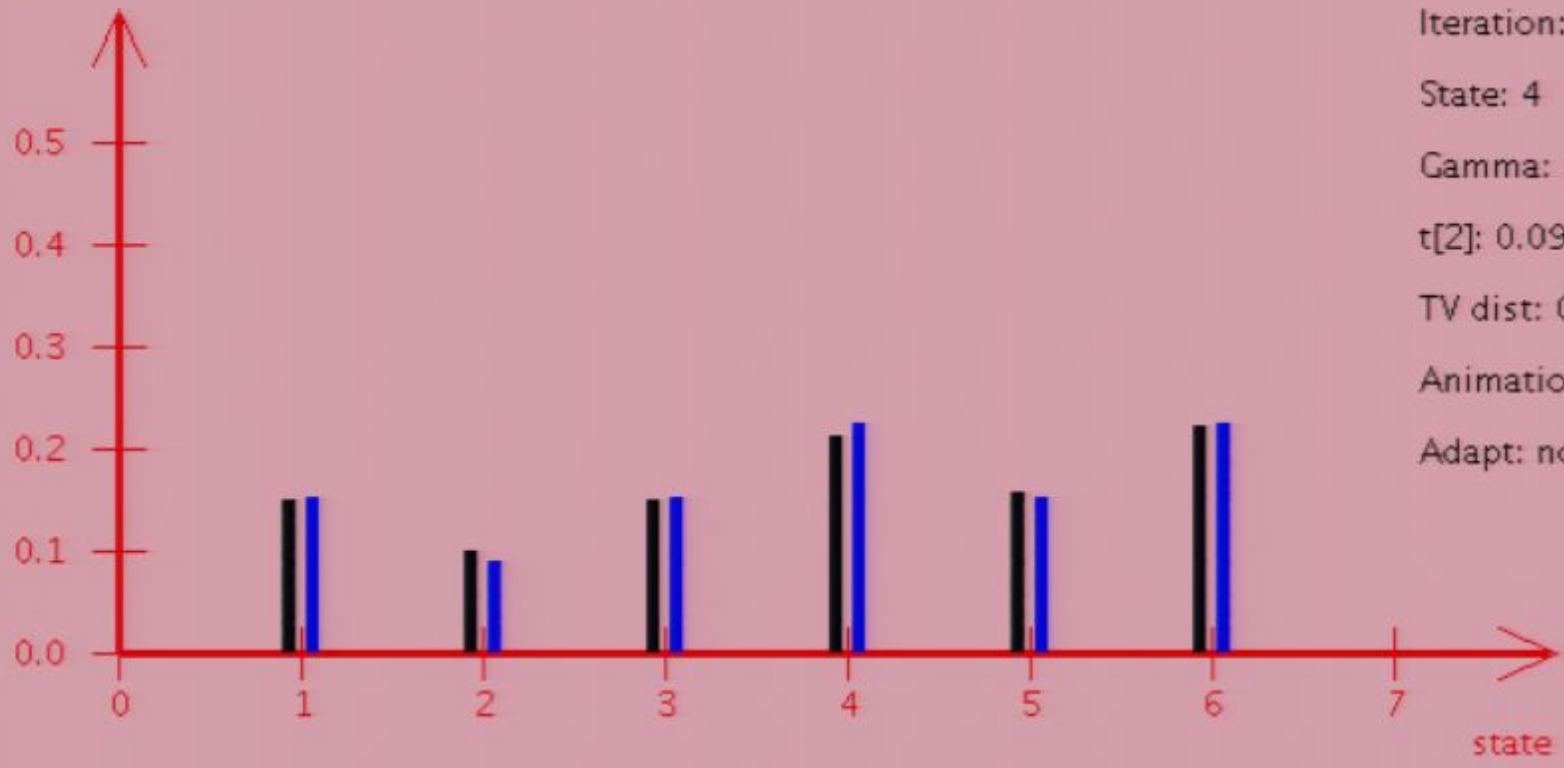


Mean state: 3.75  
Iteration: 971  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.019966  
Animation: 5  
Adapt: no



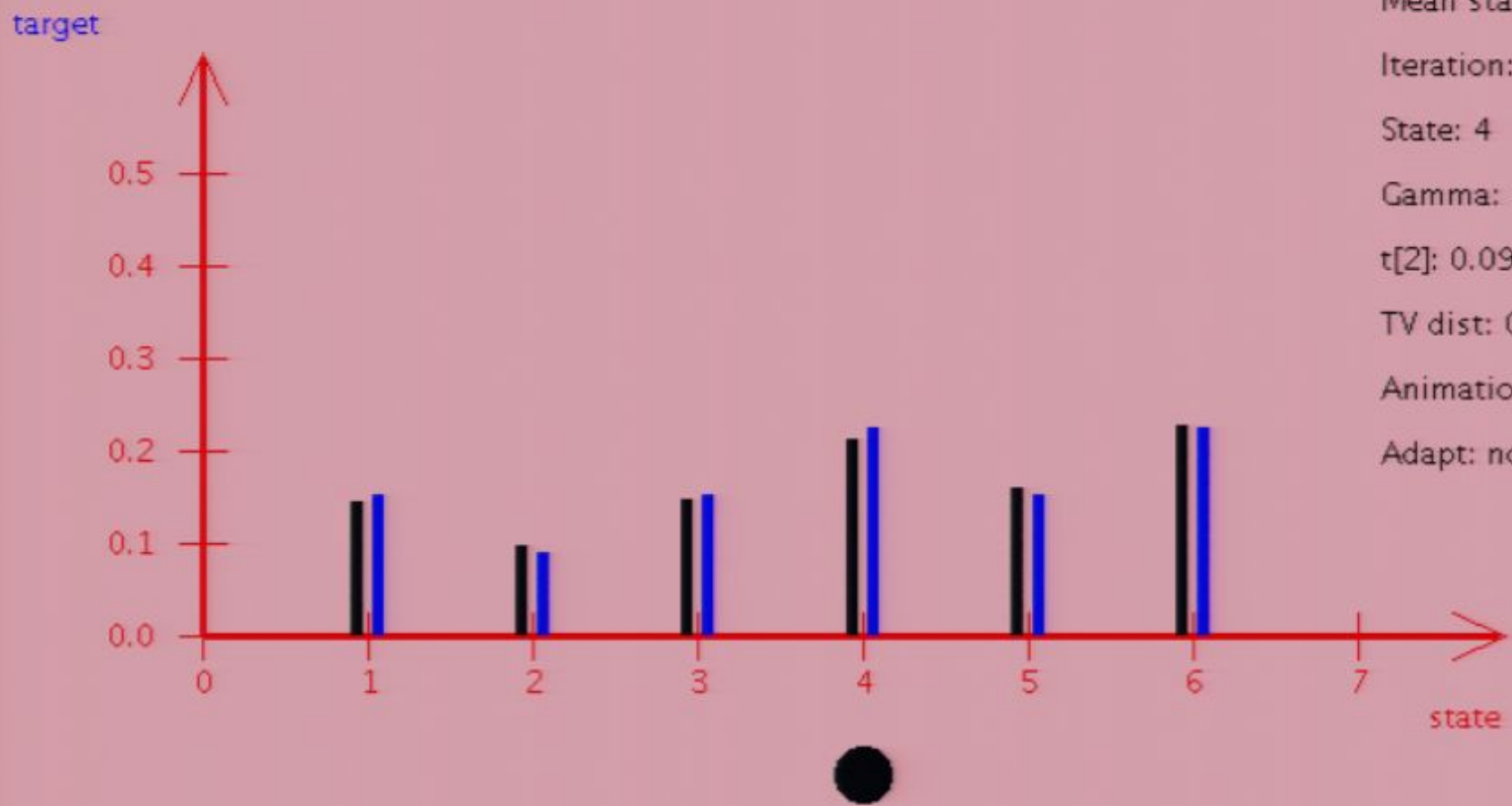
Applet started.

target



Mean state: 3.796  
Iteration: 996  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.016796  
Animation: 5  
Adapt: no

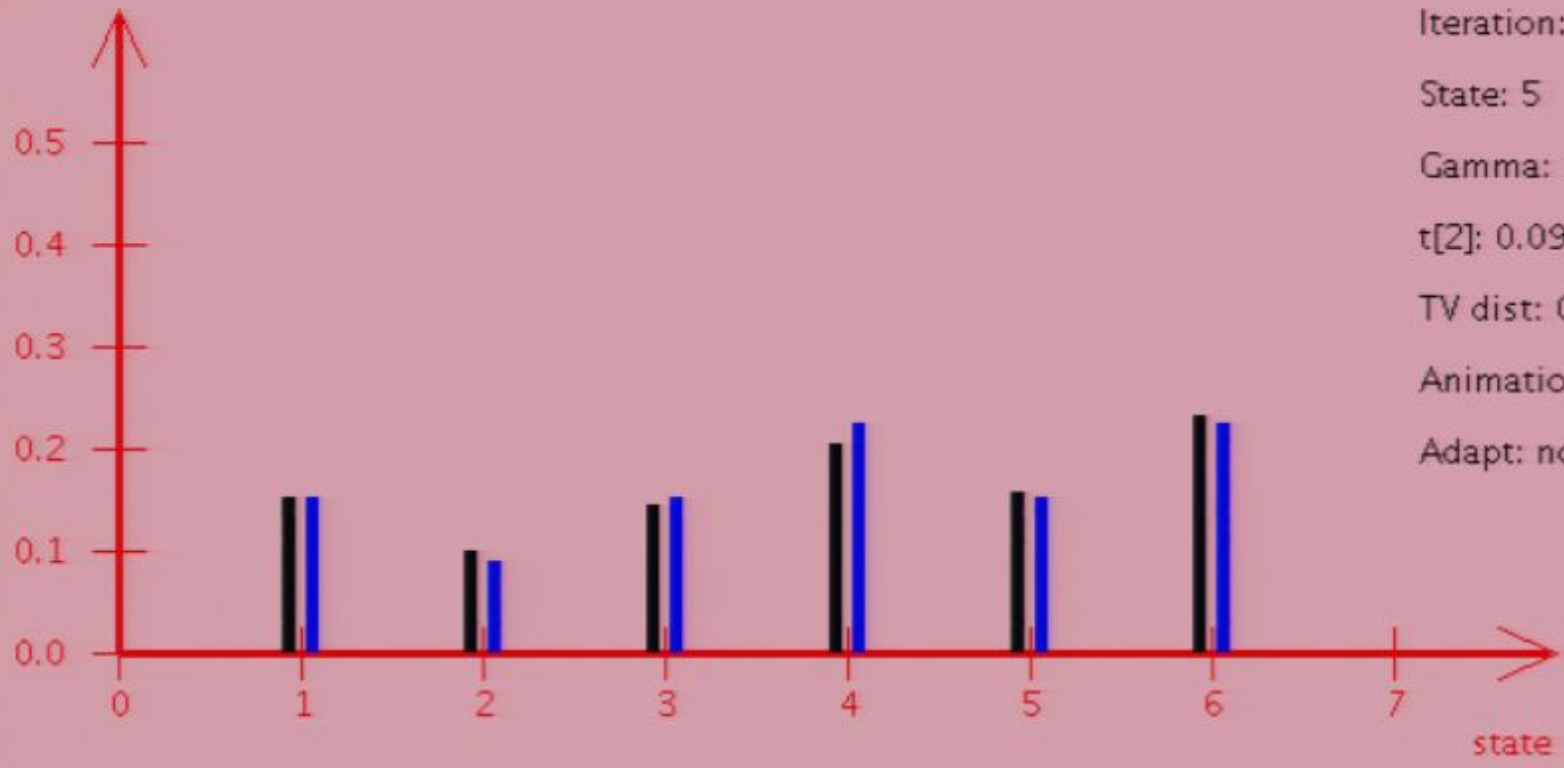
Applet started.



Mean state: 3.834  
Iteration: 1031  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.021347  
Animation: 5  
Adapt: no

Applet started.

target



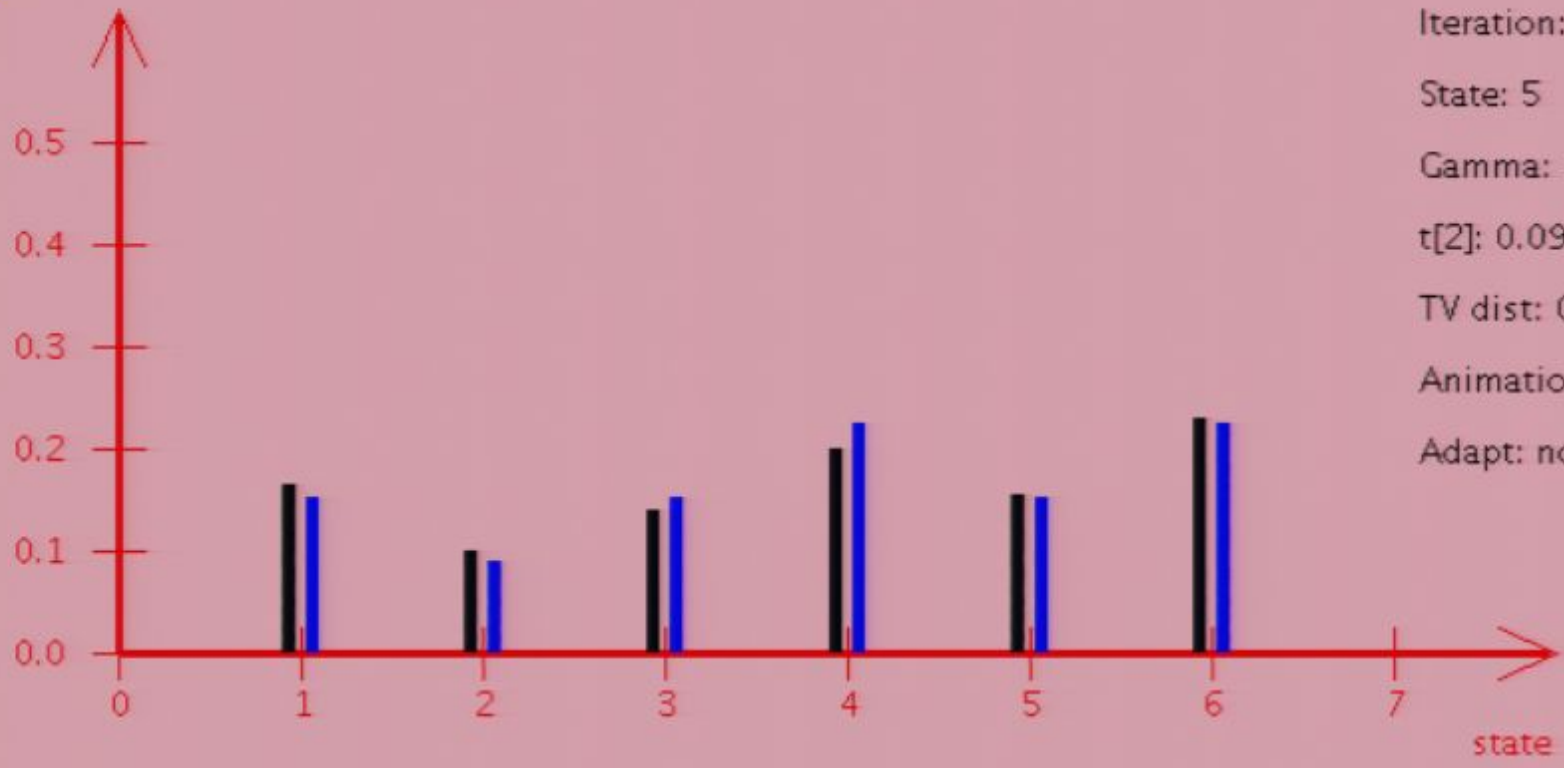
Mean state: 3.817  
Iteration: 1081  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.026852  
Animation: 5  
Adapt: no



Applet started.



target

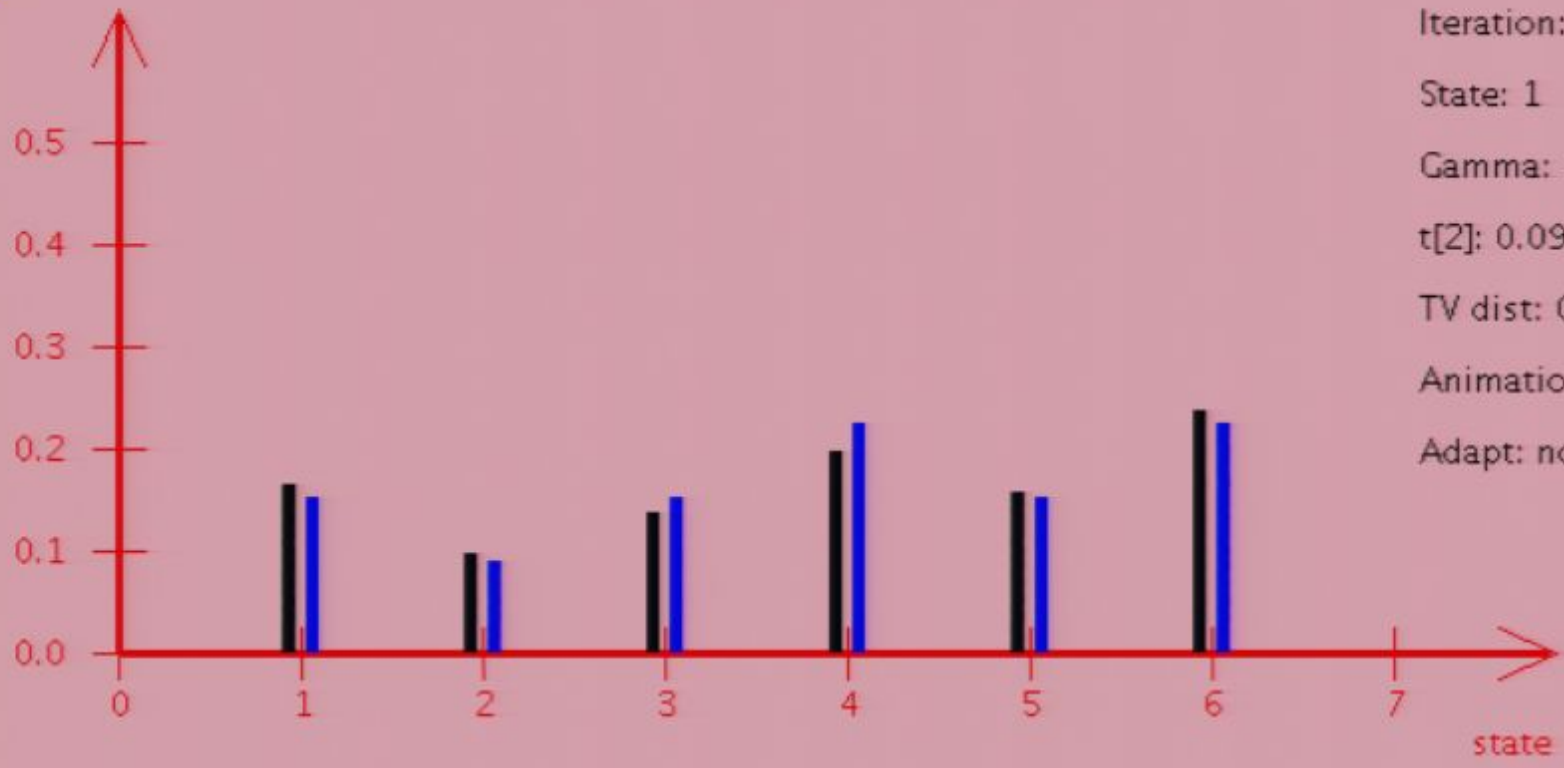


Mean state: 3.777  
Iteration: 1125  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.035267  
Animation: 5  
Adapt: no



Applet started.

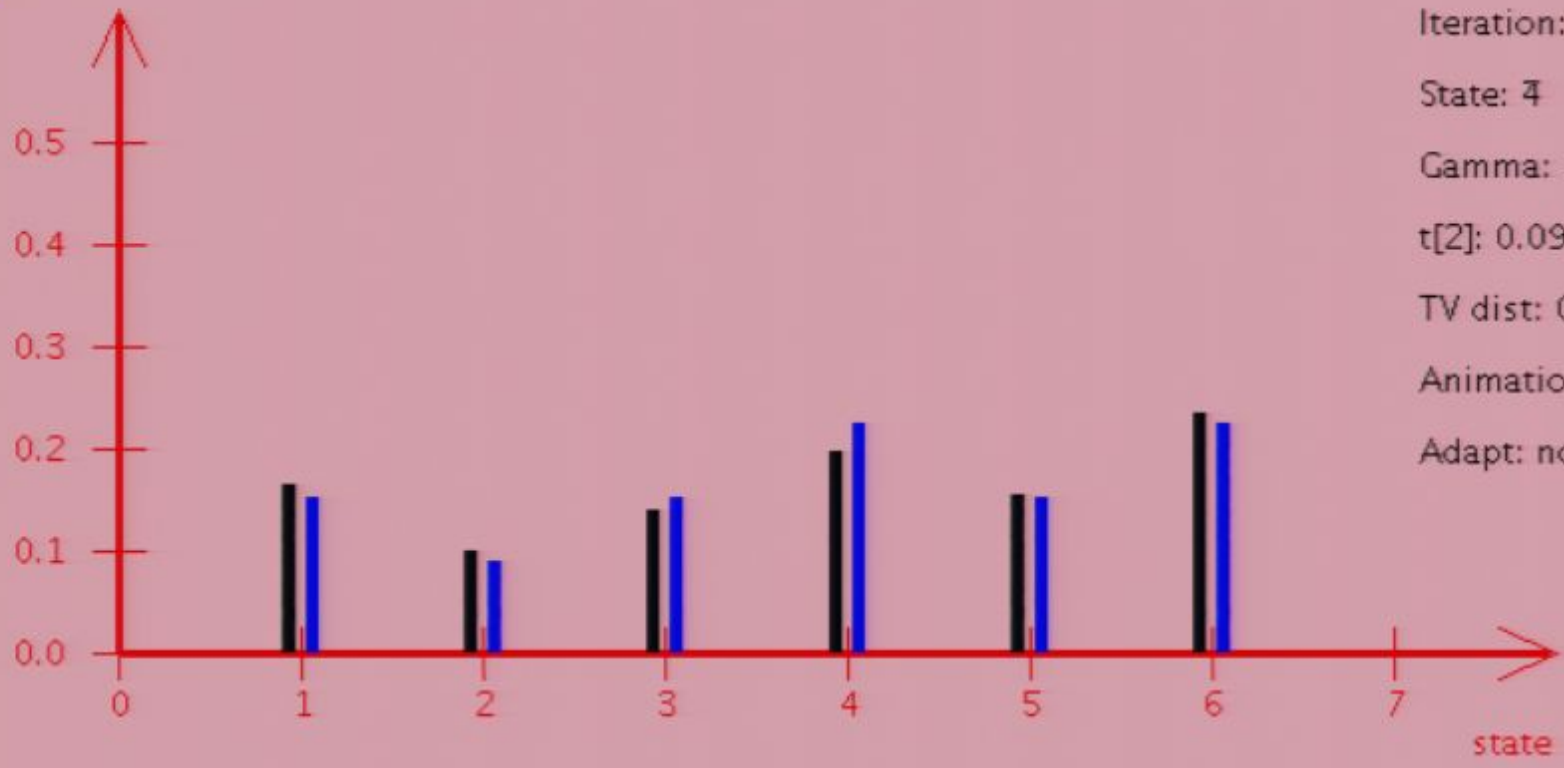
target



Mean state: 3.798  
Iteration: 1170  
State: 1  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.041059  
Animation: 5  
Adapt: no

Applet started.

target

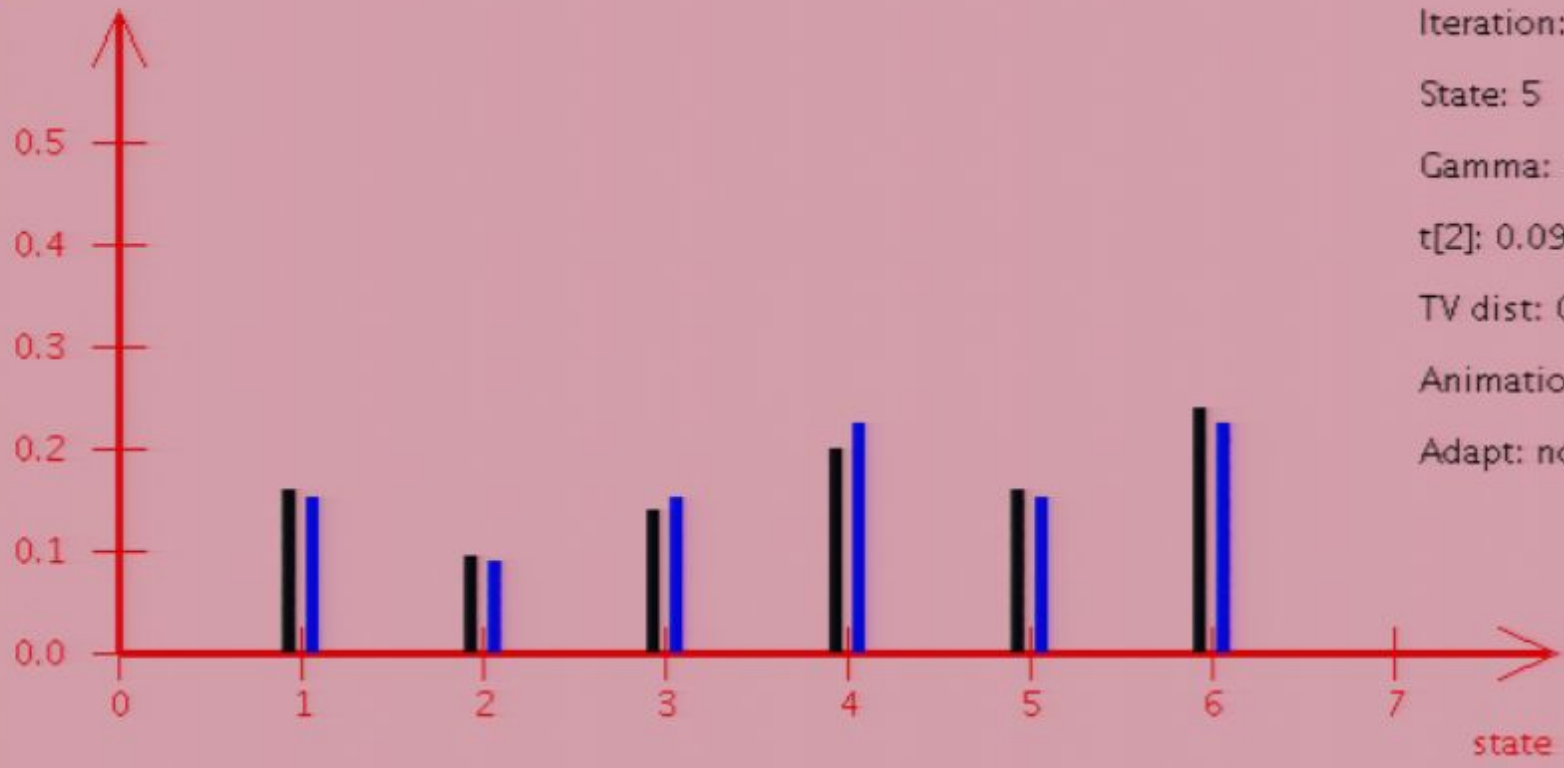


Mean state: 3.787  
Iteration: 1210  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.038163  
Animation: 5  
Adapt: no



Applet started.

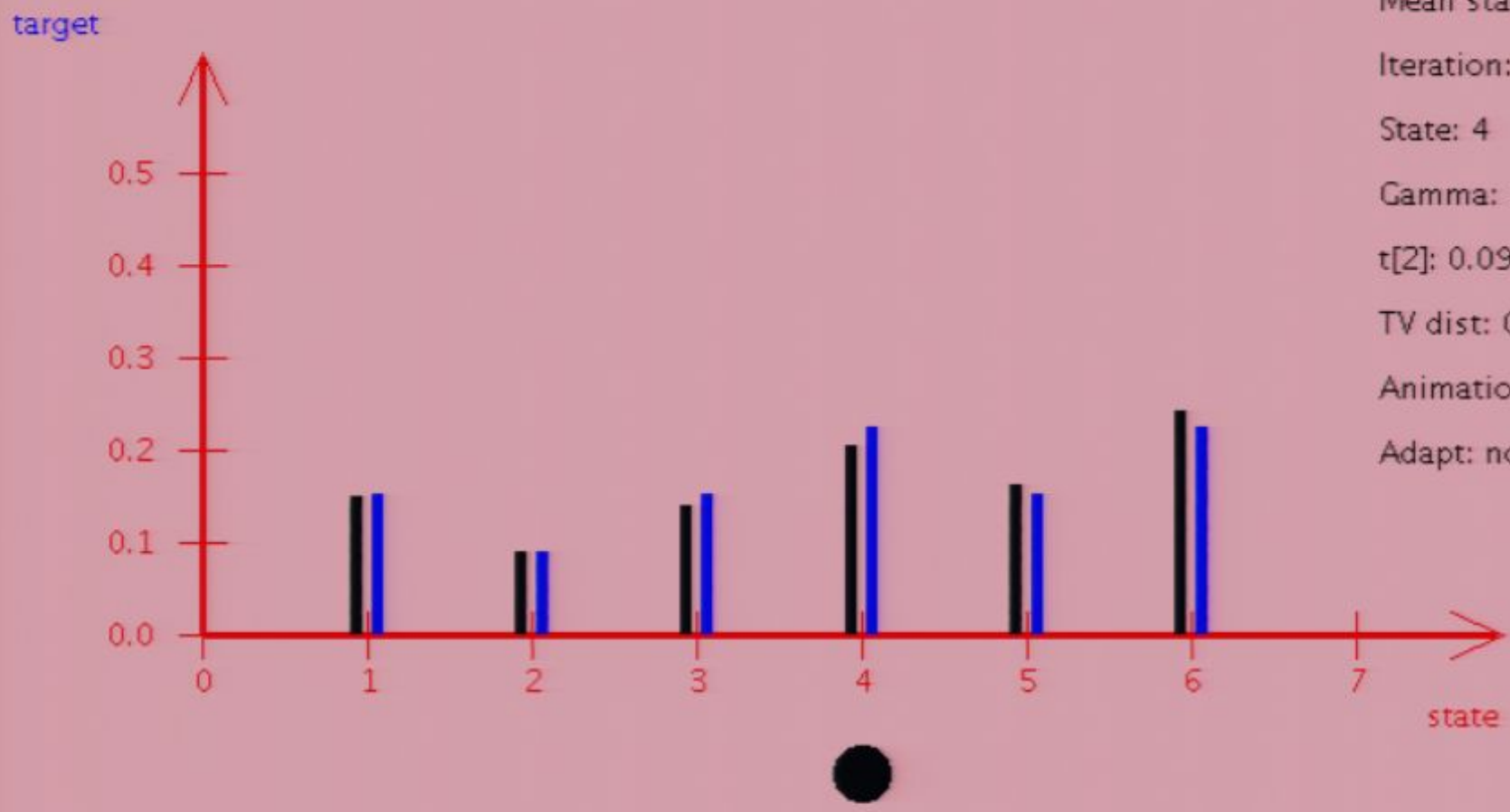
target



Mean state: 3.828  
Iteration: 1255  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.038139  
Animation: 5  
Adapt: no



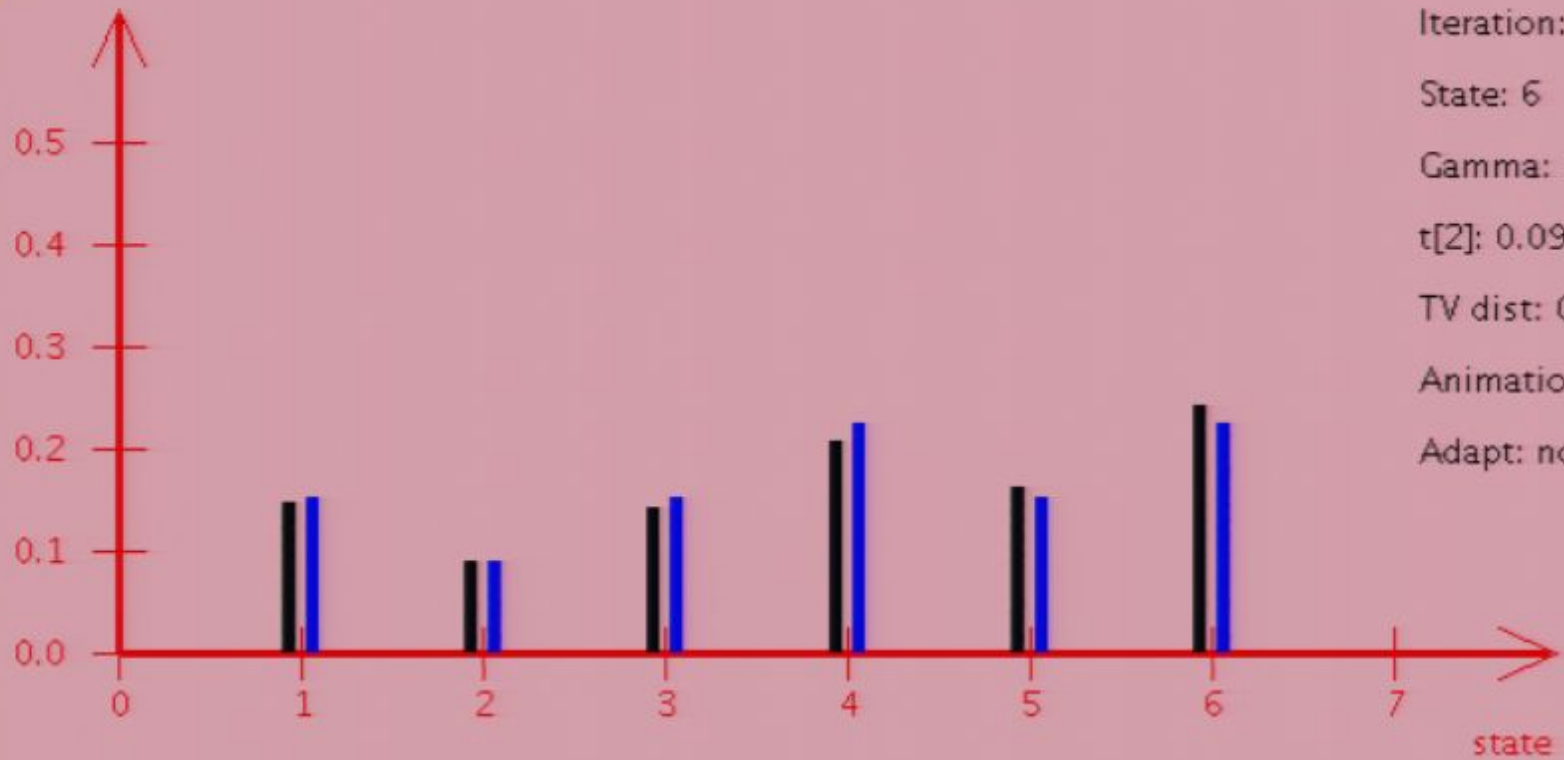
Applet started.



Mean state: 3.868  
Iteration: 1320  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.031531  
Animation: 5  
Adapt: no

Applet started.

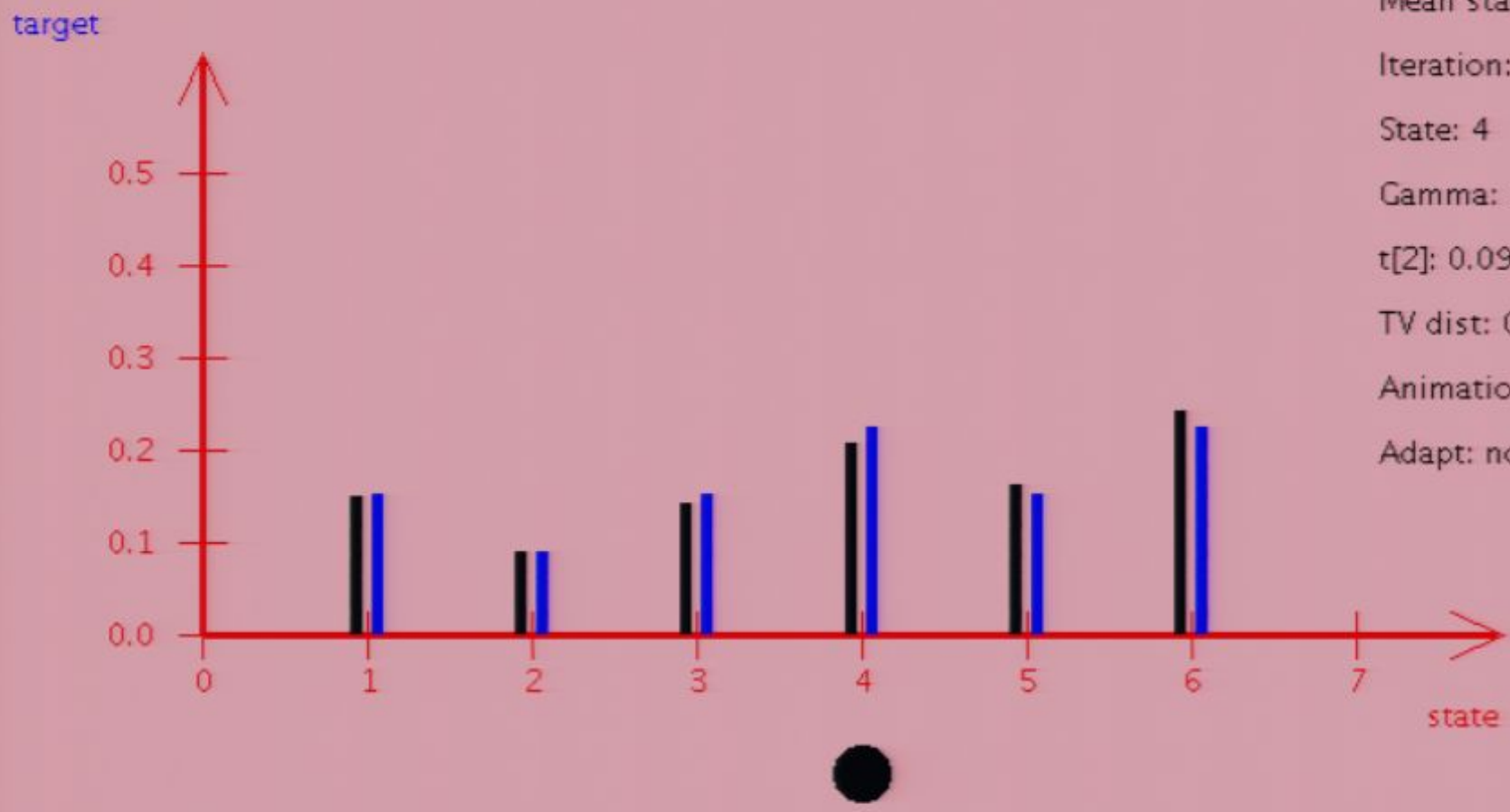
target



Mean state: 3.878  
Iteration: 1355  
State: 6  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.031162  
Animation: 5  
Adapt: no



Applet started.

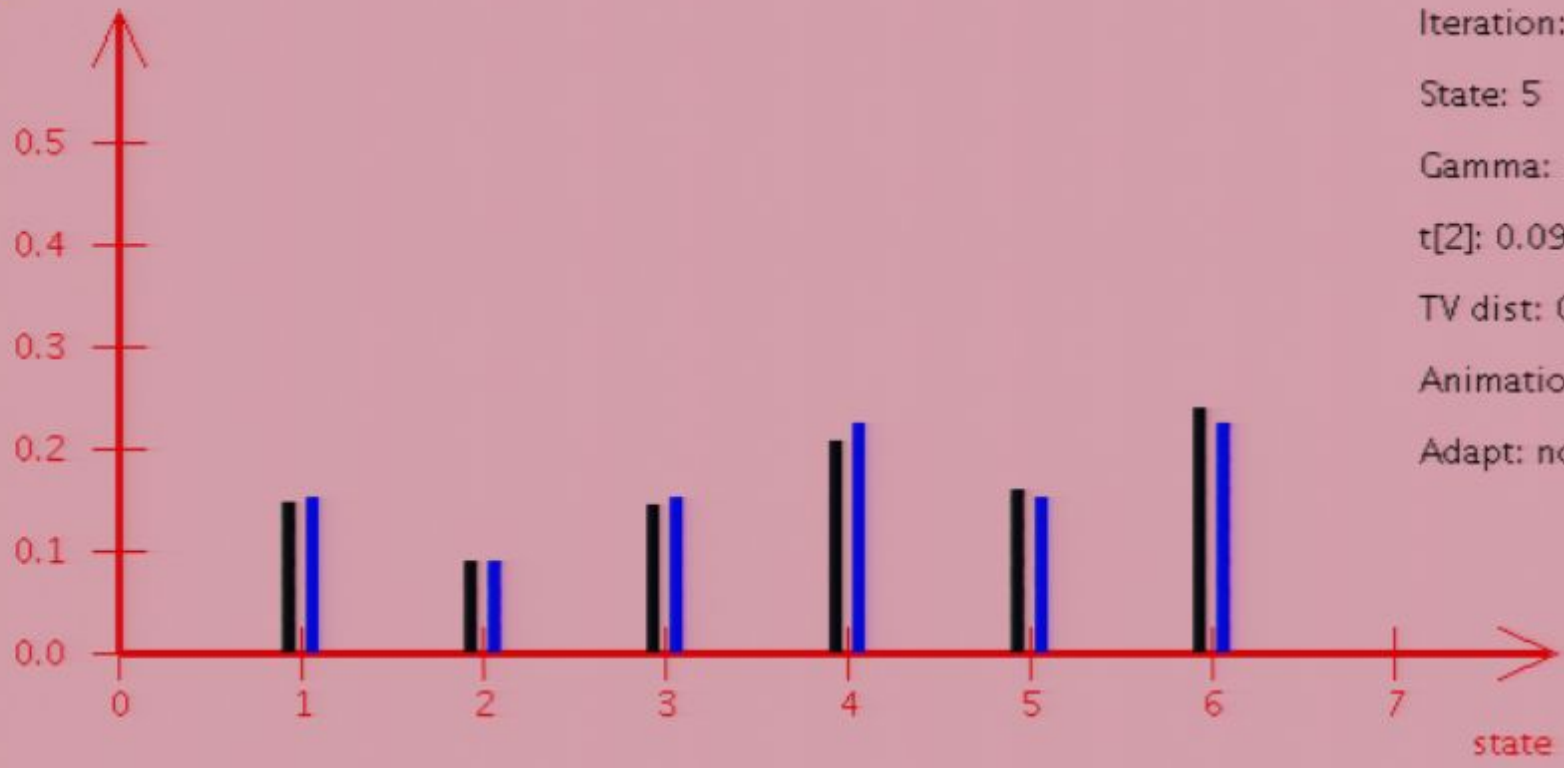


Mean state: 3.871  
Iteration: 1385  
State: 4  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.029004  
Animation: 5  
Adapt: no

Applet started.



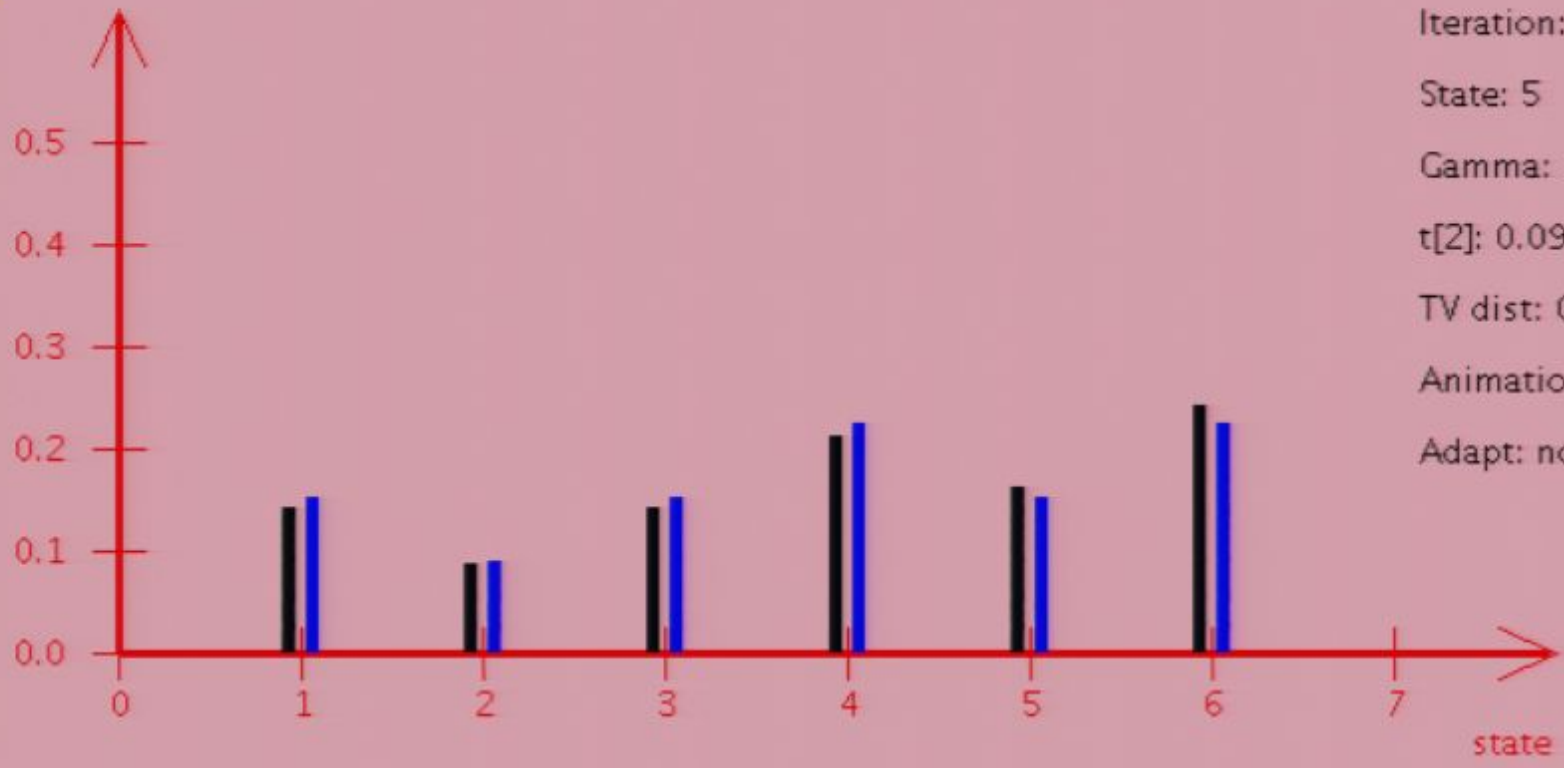
target



Mean state: 3.87  
Iteration: 1465  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.027777  
Animation: 5  
Adapt: no

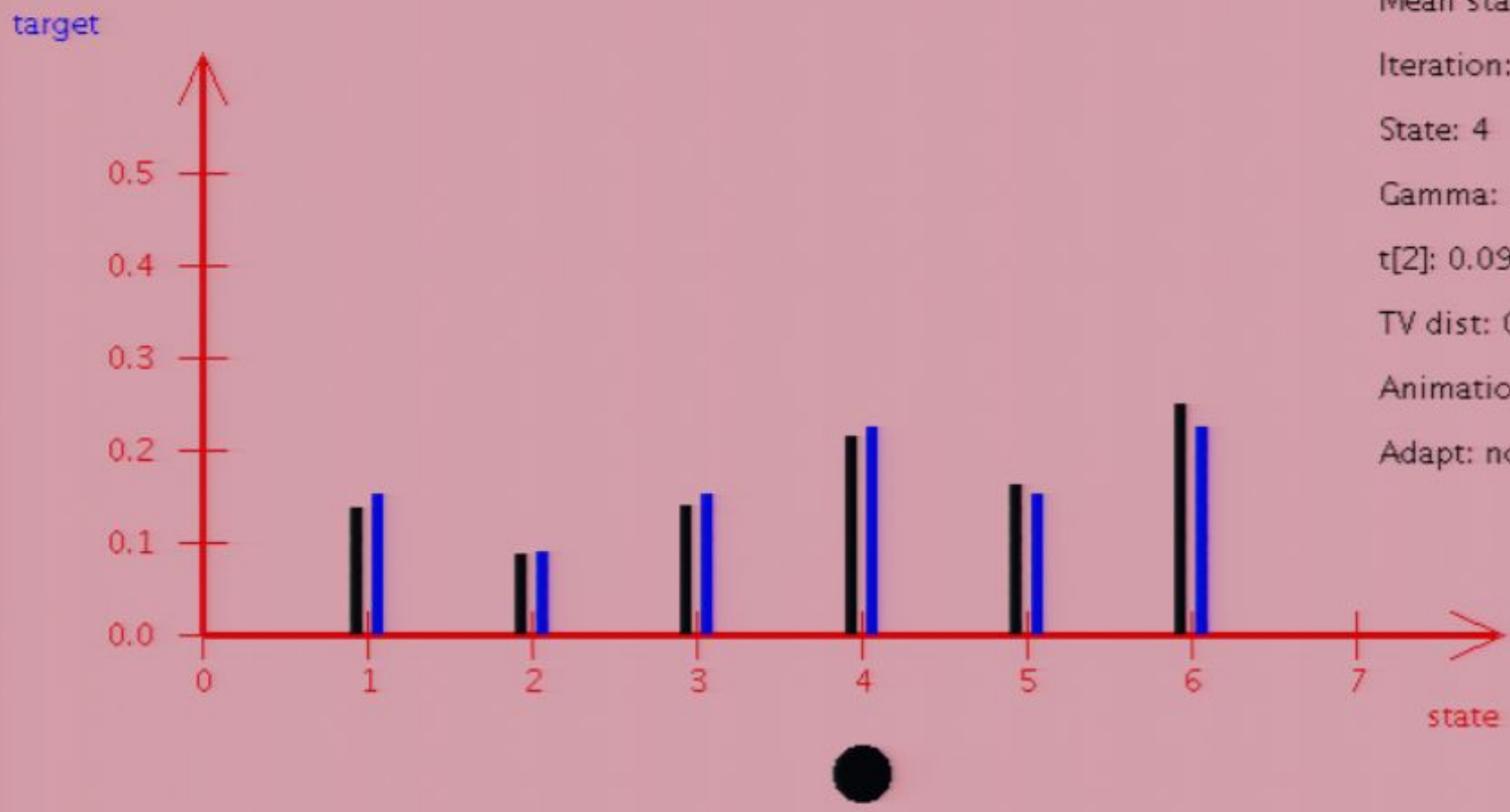
Applet started.

target



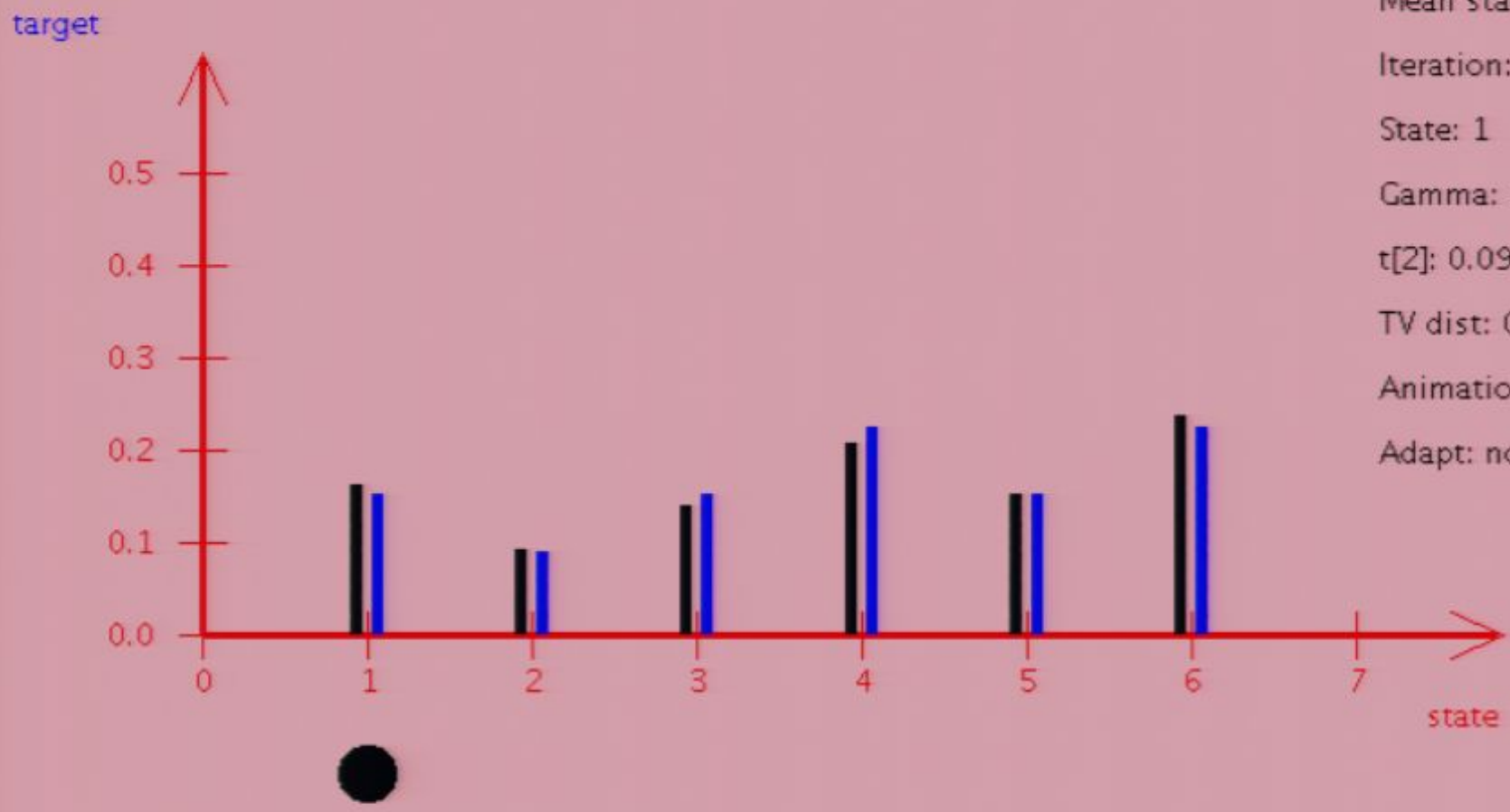
Mean state: 3.897  
Iteration: 1525  
State: 5  
Gamma: 1  
 $\tau[2]$ : 0.09009009009009009  
TV dist: 0.030146  
Animation: 5  
Adapt: no

Applet started.



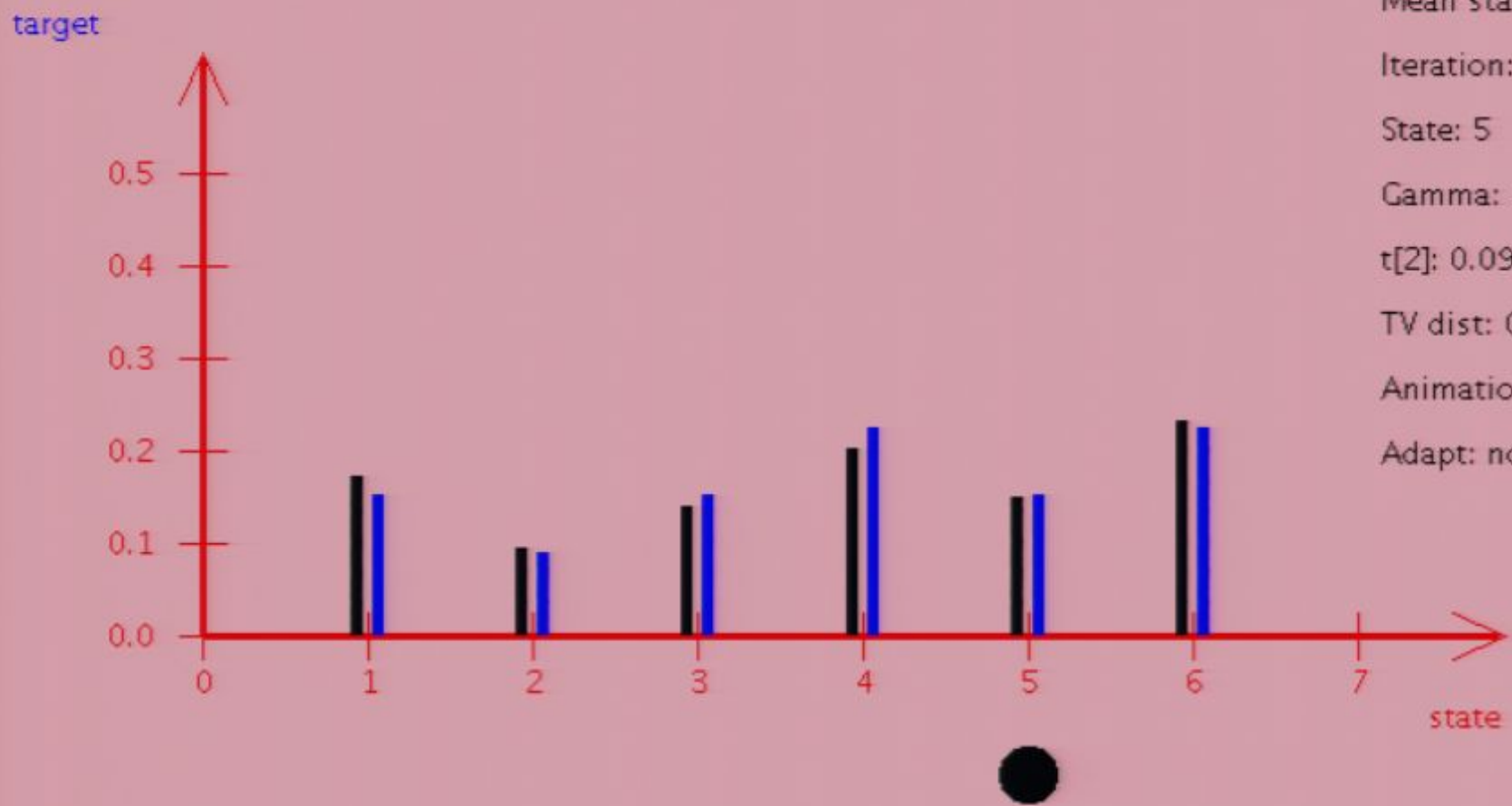
Mean state: 3.93  
Iteration: 1590  
State: 4  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.036087  
Animation: 5  
Adapt: no

Applet started.



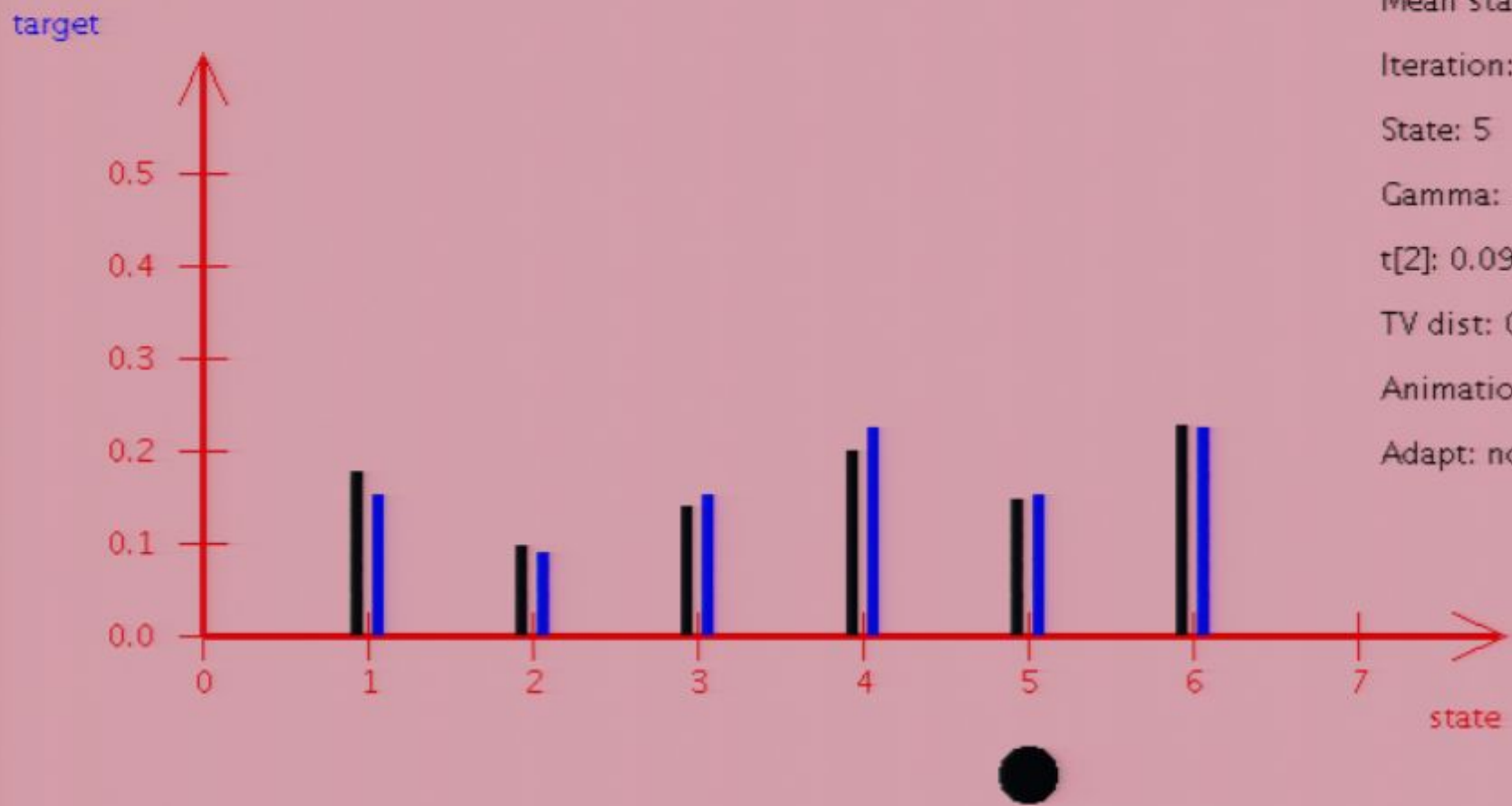
Mean state: 3.813  
Iteration: 1769  
State: 1  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.027332  
Animation: 5  
Adapt: no

Applet started.



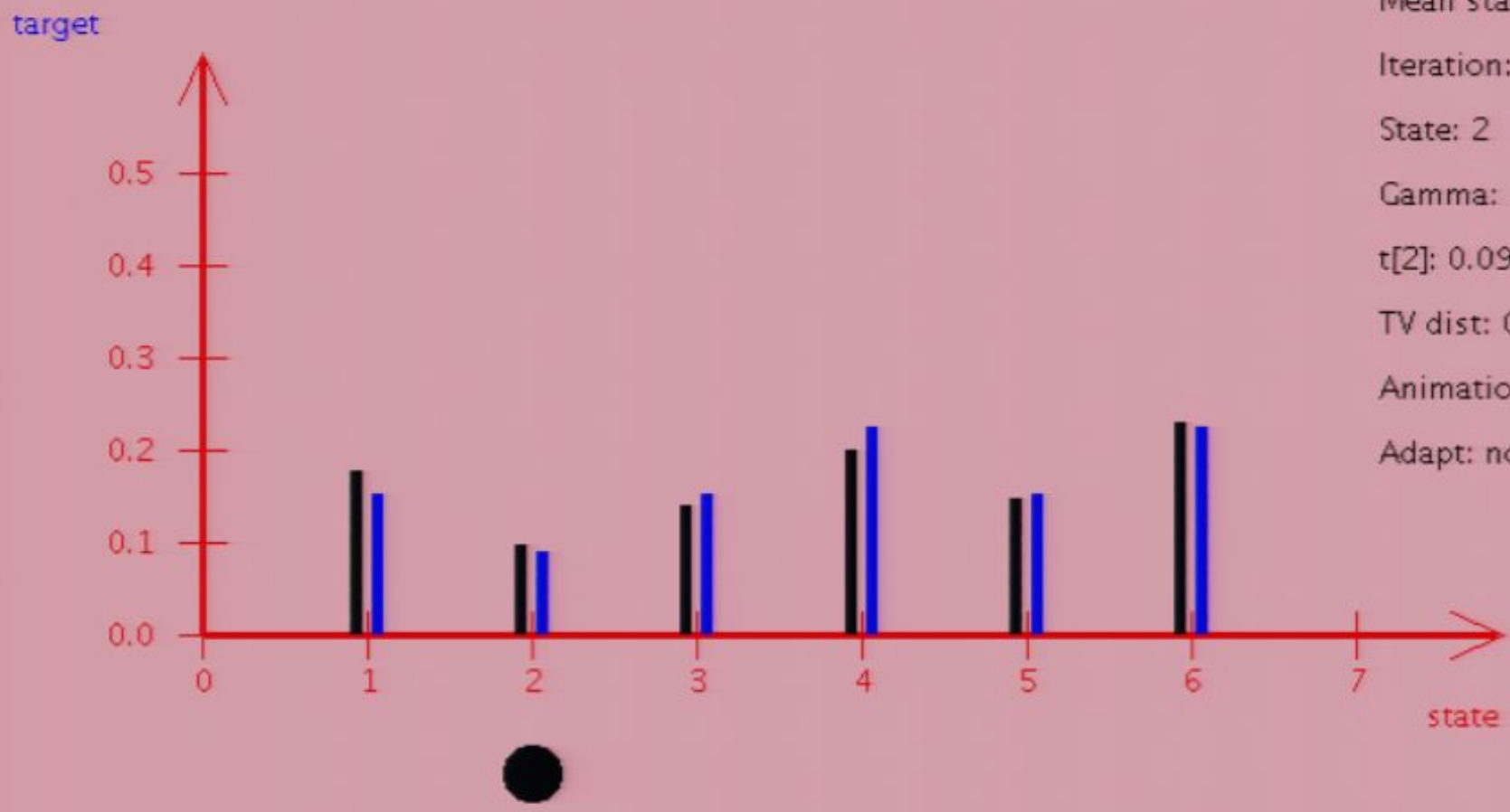
Mean state: 3.761  
Iteration: 1814  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.033736  
Animation: 5  
Adapt: no

Applet started.



Mean state: 3.728  
Iteration: 1884  
State: 5  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.039493  
Animation: 5  
Adapt: no

Applet started.



Mean state: 3.742  
Iteration: 1919  
State: 2  
Gamma: 1  
 $t[2]$ : 0.09009009009009009  
TV dist: 0.04065  
Animation: 5  
Adapt: no

Applet started.



## Monte Carlo computer algorithms

Applied to complicated models / computations.

Analogy: Average altitude of a mountain range.

Explore randomly to conduct a “mini-poll” of altitudes.  
Then take average.

“Markov chain Monte Carlo”

[APPLET]

## Coincidences: surprising or not?

Running into someone you know.

Party with 40 people: pair with same birthday?

## Conclusion

Randomness is everywhere – can't avoid it.

## Conclusion

Randomness is everywhere – can't avoid it.

Instead, use “probability perspective” to worry less, make wiser decisions, and better understand the world.

## Conclusion

Randomness is everywhere – can't avoid it.

Instead, use “probability perspective” to worry less, make wiser decisions, and better understand the world.

Randomness can also be very useful, both in everyday life and for scientific computation.

More info:

- Book: “Struck by Lightning” (no equations!)
- Web site: [probability.ca](http://probability.ca)

(11/11)