

Title: PSI 2019/2020 - Computational Physics - Lecture 2

Speakers: Erik Schnetter

Collection: PSI 2019/2020 - Computational Physics

Date: January 15, 2020 - 12:30 PM


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Revise.jl

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Default
Default

```
Last login: Thu Jan 16 11:51:49 on ttys015
eschnetter@Redshift:~ (12:44:43)
$ ssh symmetry
*****
Welcome to Symmetry, Perimeter's HPC system
Contact <help@perimeterinstitute.ca> if you have questions,
or if you want to report an issue.
*****

Note: You are currently using one of the management nodes of this sytem.
Do not run large jobs here; use Slurm to request compute nodes instead.

This system uses modules: Use "module avail" to list available modules,
and e.g. "module load slurm" to load a module.

* Overheard at KubeCon: "microk8s.status just blew my mind".

https://microk8s.io/docs/commands#microk8s.status
Last login: Thu Jan 16 12:40:40 2020 from 10.10.7.6
eschnetter@mnn001:~ (12:44:58)
$ cd src/jl
eschnetter@mnn001:~/src/jl (12:46:05)
$ module load julia
eschnetter@mnn001:~/src/jl (12:46:27)
$ julia

Documentation: https://docs.julialang.org
Type "?" for help, "j?" for Pkg help.
Version 1.3.1 (2019-12-30)

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
Particles/Project.toml
Particles/src/Particles.jl
(v1.3) pkg>
```

```

iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Minibuf Help
Welcome to GNU Emacs, one component of the GNU/Linux operating system.

Get help          C-h (Hold down CTRL and press h)
Emacs manual     C-h r    Browse manuals   C-h i
Emacs tutorial   C-h t    Undo changes     C-x u
Buy manuals      C-h RET  Exit Emacs       C-x C-c
Activate menubar M-

(`C-' means use the CTRL key. `M-' means use the Meta (or Alt) key.
If you have no Meta key, you may instead type ESC followed by the character.)
Useful tasks:
Visit New File     Open Home Directory
Customize Startup  Open *scratch* buffer

GNU Emacs 24.5.1 (x86_64-pc-linux-gnu, GTK+ Version 3.18.9)
of 2017-09-20 on lcy01-07, modified by Debian
Copyright (C) 2015 Free Software Foundation, Inc.

GNU Emacs comes with ABSOLUTELY NO WARRANTY; type C-h C-w for full details.
Emacs is Free Software--Free as in Freedom--so you can redistribute copies
of Emacs and modify it; type C-h C-c to see the conditions.
Type C-h C-o for information on getting the latest version.

If an Emacs session crashed recently, type Meta-x recover-session RET
to recover the files you were editing.

-UUU:%%--F1 *GNU Emacs* All L1 (Fundamental) -----
Find file: ~/src/jl/Particles/

```



Jupyter



Sublime Text



Tools



```

Default
Last login: Thu Jan 16 11:51:49 on ttys015
eschnett@Redshift:~ (12:44:43)
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Last login: Thu Jan 16 12:40:40 2020 from 10.10.7.6
eschnett@mn001:~ (12:44:58)
$ cd src/jl
eschnett@mn001:~/src/jl (12:46:05)
$ module load julia
eschnett@mn001:~/src/jl (12:46:27)
$ julia

          _   _   _
         / \ / \ / \
        |   |   |   |
        |___|___|___|
        |   |   |   |
        / \ / \ / \

Documentation: https://docs.julialang.org
Type "?" for help, "?>" for Pkg help.

Version 1.3.1 (2019-12-30)

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
  Particles/Project.toml
  Particles/src/Particles.jl

(v1.3) pkg>

```

```
iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Operate Mark Regexp Immediate Subdir Help
/home/eschnetter/src/jl/Particles:
total used in directory 16 available 1936938592
drwxr-xr-x  3 eschnetter users  152 Jan 16 12:47 .
drwxr-xr-x 12 eschnetter users 8192 Jan 16 12:47 ..
-rw-r--r--  1 eschnetter users  134 Jan 16 12:47 Project.toml
drwxr-xr-x  2 eschnetter users  152 Jan 16 12:47 src
```

-UUU:%%--F1 Particles All L5 (Dired by name) -----

```
ig.org
20-01-13
Last login: Thu Jan 16 11:51:49 on ttys015
eschnet@Redshift:~ (12:44:43)
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eschnet@mn001:~ (12:44:58)
$ cd src/jl
eschnet@mn001:~/src/jl (12:46:05)
$ module load julia
eschnet@mn001:~/src/jl (12:46:27)
$ julia
Documentation: https://docs.julialang.org
Type "?" for help, "!" for Pkg help.
Version 1.3.1 (2019-12-30)
Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
  Particles/Project.toml
  Particles/src/Particles.jl
(v1.3) pkg> 
```



```

File Edit Options Buffers Tools Help
name = "Particles"
uuid = "833a647f-29b6-4ad5-b846-a6391cfc5c97"
authors = ["Erik Schnetter <schnetter@gmail.com>"]
version = "0.1.0"

Last login: Thu Jan 16 11:51:49 on ttys015
eschnett@Redshift:~ (12:44:43)
$ ssh symmetry
*****
Welcome to Symmetry, Perimeter's HPC system
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eschnetter@mn001:~ (12:44:58)
$ cd src/jl
eschnetter@mn001:~/src/jl (12:46:05)
$ module load julia
eschnetter@mn001:~/src/jl (12:46:27)
$ julia

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
  Particles/Project.toml
  Particles/src/Particles.jl
(v1.3) pkg>
  
```


The image shows a terminal window with the following content:

```

File Edit Options Buffers Tools Operate Mark Regexp Immediate Subdir Help
/home/eschnetter/src/jl/Particles/src:
total used in directory 8 available 1936938592
drwxr-xr-x 2 eschnetter users 152 Jan 16 12:47 .
drwxr-xr-x 3 eschnetter users 152 Jan 16 12:47 ..
-rw-r--r-- 1 eschnetter users 64 Jan 16 12:47 Particles.jl

```

The terminal session continues with:

```

Last login: Thu Jan 16 11:51:49 on ttys015
eschnetter@Redshift:~ (12:44:43)
$ ssh symmetry
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eschnetter@mn001:~ (12:44:58)
$ cd src/jl
eschnetter@mn001:~/src/jl (12:46:05)
$ module load julia
eschnetter@mn001:~/src/jl (12:46:27)
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Version 1.3.1 (2019-12-30)
[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
Particles/Project.toml
Particles/src/Particles.jl
(v1.3) pkg>

```

At the bottom of the terminal, there is a status bar: `-UUU:%%--F1 src All L5 (Dired by name) -----`

```

File Edit Options Buffers Tools Help
module Particles

greet() = print("Hello World!")

end # module

Last login: Thu Jan 16 11:51:49 on ttys015
eschnet@Redshift:~ (12:44:43)
$ ssh symmetry
*****
Welcome to Symmetry, Perimeter's HPC system
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Last login: Thu Jan 16 12:40:40 2020 from 10.10.7.6
eschnet@mn001:~ (12:44:58)
$ cd src/jl
eschnet@mn001:~/src/jl (12:46:05)
$ module load julia
eschnet@mn001:~/src/jl (12:46:27)
$ julia

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
  Particles/Project.toml
  Particles/src/Particles.jl
(v1.3) pkg>

-UU-:----F1 Particles.jl All L1 (Fundamental) -----

```

```
iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Help
module Particles

struct Particles
  posx::Float64
  posy::Float64
  mass::Float64
end
end # module

-UU-:----F1 Particles.jl All L8 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl
```

```
ig.org
20-01-13
Last login: Thu Jan 16 11:51:49 on ttys015
eschnetter@Redshift:~ (12:44:43)
$ ssh symmetry
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Welcome to Symmetry, Perimeter's HPC system
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[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
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@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
  Particles/Project.toml
  Particles/src/Particles.jl
(v1.3) pkg> ]

as CI, Discourse, workshops.
```



```

File Edit Options Buffers Tools Help
module Particles

struct Particles
    posx::Float64
    posy::Float64
    mass::Float64
end
end # module

eschnetter@mn001:~ (12:44:58)
$ cd src/jl
eschnetter@mn001:~/src/jl (12:46:05)
$ module load julia
eschnetter@mn001:~/src/jl (12:46:27)
$ julia

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(v1.3) pkg> generate Particles
Generating project Particles:
  Particles/Project.toml
  Particles/src/Particles.jl

julia>
eschnetter@mn001:~/src/jl (12:55:14)
$ cd Particles/
eschnetter@mn001:~/src/jl/Particles (12:55:18)
$ julia

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
ERROR: ArgumentError: Package Particles not found in current path:
- Run `import Pkg; Pkg.add("Particles")` to install the Particles package.

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887

julia>

```

-----UU-:----F1 Particles.jl All L8 (Fundamental)-----
Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl


```

File Edit Options Buffers Tools Help
module Particles

struct Particles
    posx::Float64
    posy::Float64
    mass::Float64
end
end # module

julia>
Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia>
eschnetter@mn001:~/src/jl/Particles (12:55:54)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.

Version 1.3.1 (2019-12-30)

Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
ERROR: LoadError: invalid redefinition of constant Particles
Stacktrace:
 [1] top-level scope at /home/eschnetter/src/jl/Particles/src/Particles.jl:3
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] top-level scope at none:2
 [6] eval at ./boot.jl:330 [inlined]
 [7] eval(::Expr) at ./client.jl:425
 [8] top-level scope at ./none:3
in expression starting at /home/eschnetter/src/jl/Particles/src/Particles.jl:3
ERROR: Failed to precompile Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97] to
/home/eschnetter/.julia/compiled/v1.3/Particles/wDMzZ_jl2bb.ji.
Stacktrace:
 [1] error(::String) at ./error.jl:33
 [2] compilecache(::Base.PkgId, ::String) at ./loading.jl:1283
 [3] _require(::Base.PkgId) at ./loading.jl:1024
 [4] require(::Base.PkgId) at ./loading.jl:922
 [5] require(::Module, ::Symbol) at ./loading.jl:917

julia>
eschnetter@mn001:~/src/jl/Particles (12:56:13)
$ cl
  
```

The screenshot shows a macOS desktop with three windows open:

- Code Editor (Left):** A window titled "Default" showing the source code for a Julia module named "Particles". The code defines a struct with three fields: `posx::Float64`, `posy::Float64`, and `mass::Float64`. The code is as follows:

```
module Particles
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end
end # module
```
- JupyterLab Interface (Middle):** A window titled "jupyter.org" showing the JupyterLab logo and the text "Jupyter kernel". Below it, the Sublime Text logo is visible.
- Terminal Window (Right):** A window titled "Default" showing the execution of the Julia code. The prompt is `eschnetter@mn001:~/src/jl/Particles (12:56:14)`. The user enters `$ julia --project=@.`. The terminal output shows the Julia logo, documentation links (`Documentation: https://docs.julialang.org`), and version information (`Version 1.3.1 (2019-12-30)`). There are two warnings: `Warning: Could not load Revise.` and `Warning: Could not load Rebugger.`. The prompt returns to `julia>`.

At the bottom of the code editor window, a status bar shows: `--UU-:----F1 Particles.jl All L3 (Fundamental) -----` and a message: `Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl`.

The screenshot shows a terminal window with the following content:

```
File Edit Options Buffers Tools Help
module Particles

export Particle[]
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end

end # module
```

The terminal output shows the following REPL session:

```
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> Particle(0, 0, 1)
ERROR: UndefVarError: Particle not defined
Stacktrace:
 [1] top-level scope at REPL[1]:1

julia> using Particles

julia> Particle(0, 0, 1)
ERROR: UndefVarError: Particle not defined
Stacktrace:
 [1] top-level scope at REPL[3]:1

julia>
eschnetter@mn001:~/src/jl/Particles (12:58:40)
$ julia --project=@.
```

The bottom status bar of the terminal shows: `--UU--:---F1 Particles.jl All L3 (Fundamental) -----` and `Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl`.

The image shows a terminal window with the following content:

```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end

export merge
function merge(p::Particle, q::Particle)
    Particle((p.mass * p.posx + q.mass * q.posx) / (p.mass + q.mass),
             (p.mass * p.posy + q.mass * q.posy) / (p.mass + q.mass),
             p.mass + q.mass)
end

end # module

```

The terminal output shows the following REPL session:

```

julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> Particle(0, 0, 1)
ERROR: UndefVarError: Particle not defined
Stacktrace:
 [1] top-level scope at REPL[1]:1

julia> using Particles

julia> Particle(0, 0, 1)
ERROR: UndefVarError: Particle not defined
Stacktrace:
 [1] top-level scope at REPL[3]:1

julia>
eschnetter@mn001:~/src/jl/Particles (12:58:40)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[ Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> p = Particle(0, 0, 1)
Particle{0.0, 0.0, 1.0}

julia>

```

At the bottom of the terminal, a status bar indicates: `--UU:----F1 Particles.jl All L10 (Fundamental) -----` and a message: `Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl`


```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end

export pmerge
function pmerge(p::Particle, q::Particle)
    Particle((p.mass * p.posx + q.mass * q.posx) / (p.mass + q.mass),
            (p.mass * p.posy + q.mass * q.posy) / (p.mass + q.mass),
            p.mass + q.mass)
end

end # module

```

```

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
^[[A
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
ERROR: UndefVarError: pmerge not defined
Stacktrace:
 [1] top-level scope at REPL[4]:1

julia>
eschnetter@mn001:~/src/jl/Particles (13:12:28)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
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[Warning: Could not load Revise.
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[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)

julia>

```

-UU-:----F1 Particles.jl All L11 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl

```
iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end

export pmerge
function pmerge(p::Particle, q::Particle)
    M = p.mass + q.mass
    Particle((p.mass * p.posx + q.mass * q.posx) / M,
            (p.mass * p.posy + q.mass * q.posy) / M,
            M)
end
end # module

-UU-:----F1 Particles.jl All L17 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl
```

```
Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
^[A
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)
julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)
julia> pmerge(p, q)
ERROR: UndefVarError: pmerge not defined
Stacktrace:
 [1] top-level scope at REPL[4]:1
julia>
eschnetter@mn001:~/src/jl/Particles (13:12:28)
$ julia --project=@.
Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)
Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)
julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)
julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)
julia> []
```

File Edit Options Buffers Tools Operate Mark Regexp Immediate Subdir Help

```

/home/eschnetter/src/jl/Particles:
total used in directory 16 available 1936929728
drwxr-xr-x  3 eschnetter users  152 Jan 16 12:47 .
drwxr-xr-x 12 eschnetter users 8192 Jan 16 12:47 ..
-rw-r--r--  1 eschnetter users  134 Jan 16 12:47 Project.toml
drwxr-xr-x  2 eschnetter users  152 Jan 16 13:13 src

```

```

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
^[[A
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)
julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)
julia> pmerge(p, q)
ERROR: UndefVarError: pmerge not defined
Stacktrace:
 [1] top-level scope at REPL[4]:1
julia>
eschnetter@mn001:~/src/jl/Particles (13:12:28)
$ julia --project=@.

```

Documentation: <https://docs.julialang.org>
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

```

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)
julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)
julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)
julia>

```

UUU:%--F1 Particles All L6 (Dired by name)

The image shows a macOS desktop environment. At the top, the system menu bar displays the time as 13:20 on Thursday, January 16, and the user name as Erik Schnetter. The desktop background is a blue gradient. On the right side, there is a vertical dock containing various application icons, including TextEdit, Safari, and several PDF files.

Two terminal windows are open. The left window, titled 'Default', shows the following Julia REPL session:

```
File Edit Options Buffers Tools Help
using Particles
p.mass + q.mass),julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
```

The right window, also titled 'Default', shows a similar session but with an error:

```

[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[ Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
^[[A
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
ERROR: UndefVarError: pmerge not defined
Stacktrace:
 [1] top-level scope at REPL[4]:1

julia>
eschnetter@mn001:~/src/jl/Particles (13:12:28)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[ Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)

julia> 
```

In the center of the screen, there is a vertical sidebar with several application icons and labels: 'Jupyter IDEs', 'Jupyter', 'SublimeT', 'Tools', and 'Revise'. The 'Revise' icon is highlighted in green.

At the bottom of the left terminal window, a status bar shows: `-UUU:**--f1 runtests.jl All L9 (Fundamental) -----`


```
iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Minibuf Help
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)

-UUU:---F1 runtests.jl All L3 (Fundamental) -----
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)

-UUU:---F1 runtests.jl All L3 (Fundamental) -----
Find file: ~/src/jl/Particles/test/.
```

```
Default
Default
Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
^[[A
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
ERROR: UndefVarError: pmerge not defined
Stacktrace:
 [1] top-level scope at REPL[4]:1

julia>
eschnetter@mn001:~/src/jl/Particles (13:12:28)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)

julia> 
```

```
iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Operate Mark Regexp Immediate Subdir Help
/home/eschnetter/src/jl/Particles:
total used in directory 16 available 1936929216
drwxr-xr-x  4 eschnetter users  152 Jan 16 13:20 .
drwxr-xr-x 12 eschnetter users 8192 Jan 16 12:47 ..
-rw-r--r--  1 eschnetter users  134 Jan 16 12:47 Project.toml
drwxr-xr-x  2 eschnetter users  152 Jan 16 13:13 src
drwxr-xr-x  2 eschnetter users  152 Jan 16 13:21 test

-UUU:%%--F1 Particles      All L7      (Dired by name) -----
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)

-UUU:----F1 runtests.jl    All L3      (Fundamental) -----
```

```
ig.org
20-01-13
[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[ Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]
^[[A
julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
ERROR: UndefVarError: pmerge not defined
Stacktrace:
 [1] top-level scope at REPL[4]:1

julia>
eschnetter@mn001:~/src/jl/Particles (13:12:28)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[ Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)

julia> ]
```

```
iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Operate Mark Regexp Immediate Subdir Help
/home/eschnetter/src/jl/Particles:
total used in directory 16 available 1936929216
drwxr-xr-x  4 eschnetter users  152 Jan 16 13:20 .
drwxr-xr-x 12 eschnetter users  8192 Jan 16 12:47 ..
-rw-r--r--  1 eschnetter users   134 Jan 16 12:47 Project.toml
drwxr-xr-x  2 eschnetter users   152 Jan 16 13:13 src
drwxr-xr-x  2 eschnetter users   152 Jan 16 13:21 test

-UUU:%--F1 Particles      All L7      (Dired by name) -----
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)

-UUU:----F1 runtests.jl   All L3      (Fundamental) -----
```

```
g.org
20-01-13
Particle(0.0, 0.0, 1.0)
julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)
julia> pmerge(p, q)
ERROR: UndefVarError: pmerge not defined
Stacktrace:
 [1] top-level scope at REPL[4]:1
julia>
eschnetter@mn001:~/src/jl/Particles (13:12:28)
$ julia --project=@.
Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)
[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)

julia>
eschnetter@mn001:~/src/jl/Particles (13:21:48)
$ ls -l
total 8
-rw-r--r--  1 eschnetter users  134 Jan 16 12:47 Project.toml
drwxr-xr-x  2 eschnetter users  152 Jan 16 13:13 src
eschnetter@mn001:~/src/jl/Particles (13:21:51)
$ mkdir test
mkdir: cannot create directory 'test': File exists
eschnetter@mn001:~/src/jl/Particles (13:21:57)
$ █
```


The screenshot shows a terminal window with the following content:

```

File Edit Options Buffers Tools Help
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@show r
[]

julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)

julia>
eschnetter@mn001:~/src/jl/Particles (13:21:48)
$ ls -l
total 8
-rw-r--r-- 1 eschnetter users 134 Jan 16 12:47 Project.toml
drwxr-xr-x 2 eschnetter users 152 Jan 16 13:13 src
drwxr-xr-x 2 eschnetter users 152 Jan 16 13:21 test
eschnetter@mn001:~/src/jl/Particles (13:21:51)
$ mkdir test
mkdir: cannot create directory 'test': File exists
eschnetter@mn001:~/src/jl/Particles (13:21:57)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[ Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(Particles) pkg> test
Updating registry at ~/.julia/registries/General
Updating git-repo https://github.com/JuliaRegistries/General.git
Resolving package versions...
Updating ~/src/jl/Particles/Project.toml
[no changes]
Testing Particles
Resolving package versions...
[ Info: No changes
r = Particle(0.6666666666666666, 0.6666666666666666, 3.0)
Testing Particles tests passed

(Particles) pkg>

```

At the bottom of the terminal, there is a status bar:

```

-UUU:---F1 runtests.jl All L8 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

The screenshot shows a terminal window with the following content:

```

File Edit Options Buffers Tools Help
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

```

Below the code, there is a status bar: `-UUU:---F1 runtests.jl All L9 (Fundamental) -----` and a message: `Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl`

The right side of the terminal shows the Julia REPL output:

```

julia> using Particles
[ Info: Precompiling Particles [833a647f-29b6-4ad5-b846-a6391cfc5c97]

julia> p = Particle(0, 0, 1)
Particle(0.0, 0.0, 1.0)

julia> q = Particle(1, 1, 2)
Particle(1.0, 1.0, 2.0)

julia> pmerge(p, q)
Particle(0.6666666666666666, 0.6666666666666666, 3.0)

julia>
eschnetter@mn001:~/src/jl/Particles (13:21:48)
$ ls -l
total 8
-rw-r--r-- 1 eschnetter users 134 Jan 16 12:47 Project.toml
drwxr-xr-x 2 eschnetter users 152 Jan 16 13:13 src
drwxr-xr-x 2 eschnetter users 152 Jan 16 13:21 test
eschnetter@mn001:~/src/jl/Particles (13:21:51)
$ mkdir test
mkdir: cannot create directory 'test': File exists
eschnetter@mn001:~/src/jl/Particles (13:21:57)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[ Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
[ Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30
(Particles) pkg> test
Updating registry at ~/.julia/registries/General
Updating git-repo https://github.com/JuliaRegistries/General.git
Resolving package versions...
Updating ~/src/jl/Particles/Project.toml
[no changes]
Testing Particles
Resolving package versions...
[ Info: No changes
r = Particle(0.6666666666666666, 0.6666666666666666, 3.0)
Testing Particles tests passed

(Particles) pkg> te

```

The screenshot shows a terminal window with two panes. The left pane contains the following Julia code:

```
File Edit Options Buffers Tools Help
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

```

The right pane shows the Julia REPL output:

```
eschnetter@mn001:~/src/jl/Particles (13:21:57)
$ julia --project=@.

Documentation: https://docs.julialang.org
Type "?" for help, "]" for Pkg help.
Version 1.3.1 (2019-12-30)

[Warning: Could not load Revise.
@ Main ~/.julia/config/startup.jl:24
Warning: Could not load Rebugger.
@ Main ~/.julia/config/startup.jl:30]
(Particles) pkg> test
Updating registry at `~/.julia/registries/General`
Updating git-repo `https://github.com/JuliaRegistries/General.git`
Resolving package versions...
Updating `~/src/jl/Particles/Project.toml`
[no changes]
Testing Particles
Resolving package versions...
[ Info: No changes
r = Particle(0.6666666666666666, 0.6666666666666666, 3.0)
Testing Particles tests passed

(Particles) pkg> test
Updating registry at `~/.julia/registries/General`
Updating git-repo `https://github.com/JuliaRegistries/General.git`
Resolving package versions...
Updating `~/src/jl/Particles/Project.toml`
[no changes]
Testing Particles
Resolving package versions...
[ Info: No changes
ERROR: LoadError: ArgumentError: Package Test not found in current path:
- Run `import Pkg; Pkg.add("Test")` to install the Test package.

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] include(::String) at ./client.jl:424
 [6] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:1
ERROR: Package Particles errored during testing

(Particles) pkg>

```

At the bottom of the terminal, a status bar shows: `-UUU:---F1 runtests.jl All L9 (Fundamental) -----` and a message: `Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl`

The screenshot displays a JupyterLab environment on a macOS desktop. The interface is split into several panes:

- Left Pane (Code Editor):** Contains Julia code for testing a package:


```
File Edit Options Buffers Tools Help
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

```
- Right Pane (Terminal):** Shows the output of the test command:


```
(Particles) pkg> test
Updating registry at `~/src/jl/Particles/Project.toml`
[no changes]
Testing Particles
Resolving package versions...
[ Info: No changes
r = Particle(0.6666666666666666, 0.6666666666666666, 3.0)
Testing Particles tests passed

(Particles) pkg> test
Updating registry at `~/src/jl/Particles/Project.toml`
[no changes]
Testing Particles
Resolving package versions...
[ Info: No changes
ERROR: LoadError: ArgumentError: Package Test not found in current path:
- Run `import Pkg; Pkg.add("Test")` to install the Test package.

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] include(::String) at ./client.jl:424
 [6] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:1
ERROR: Package Particles errored during testing

(Particles) pkg> add Test
Resolving package versions...
Updating `~/src/jl/Particles/Project.toml`
 [8dfd614] + Test
Updating `~/src/jl/Particles/Manifest.toml`
 [2a0f44e3] + Base64
 [8ba89e20] + Distributed
 [b77e0a4c] + InteractiveUtils
 [56ddb016] + Logging
 [d6f4376e] + Markdown
 [9a3f8284] + Random
 [9e88b42a] + Serialization
 [6462fe0b] + Sockets
 [8dfd614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...

```
- Bottom Status Bar:** Shows the current file and line:


```
-UUU:---F1 runtests.jl All L9 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

```

File Edit Options Buffers Tools Help
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 4)

```

Jupyter
 Sublime Text
 Revis.jl

```

Updating `~/src/jl/Particles/Project.toml`
[no changes]
Testing Particles
Resolving package versions...
[ Info: No changes
ERROR: LoadError: ArgumentError: Package Test not found in current path:
- Run `import Pkg; Pkg.add("Test")` to install the Test package.

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] include(::String) at ./client.jl:424
 [6] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:1
ERROR: Package Particles errored during testing

(Particles) pkg> add Test
Resolving package versions...
Updating `~/src/jl/Particles/Project.toml`
 [8dfd614] + Test
Updating `~/src/jl/Particles/Manifest.toml`
 [2a0f44e3] + Base64
 [8ba89e20] + Distributed
 [b77e0a4c] + InteractiveUtils
 [56ddb016] + Logging
 [d6f4376e] + Markdown
 [9a3f8284] + Random
 [9e88b42a] + Serialization
 [6462fe0b] + Sockets
 [8dfd614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
Expression: r == Particle(2 / 3, 2 / 3, 4)
Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
ERROR: Package Particles errored during testing

(Particles) pkg>

```

-UUU:---F1 runtests.jl All L9 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

File Edit Options Buffers Tools Minibuf Help
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
    p1 = Particle(rand(), rand(), rand())
    p2 = Particle(rand(), rand(), rand())
    p3 = pmerge(p1, p2)
    # calculate CoM
end

-UUU:**--F1 runtests.jl All L12 (Fundamental) -----
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
    p1 = Particle(rand(), rand(), rand())
    p2 = Particle(rand(), rand(), rand())
    p3 = pmerge(p1, p2)
    # calculate CoM
end

-UUU:**--F1 runtests.jl All L12 (Fundamental) -----
Find file: ~/src/jl/Particles/test/./src/

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] include(::String) at ./client.jl:424
 [6] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:1
ERROR: Package Particles errored during testing

(Particles) pkg> add Test
Resolving package versions...
Updating ~/src/jl/Particles/Project.toml
 [8dfd614] + Test
Updating ~/src/jl/Particles/Manifest.toml
 [2a0f44e3] + Base64
 [8ba89e20] + Distributed
 [b77e0a4c] + InteractiveUtils
 [56ddb016] + Logging
 [d6f4376e] + Markdown
 [9a3f8284] + Random
 [9e88b42a] + Serialization
 [6462fe0b] + Sockets
 [8dfd614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
 Expression: r == Particle(2 / 3, 2 / 3, 4)
 Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

julia> rand()
0.39396751213825043

julia>

```



```

iTerm2 Shell Edit View Session Scripts Profiles Toolbelt Window Help
Default
Default
File Edit Options Buffers Tools Help
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
    p1 = Particle(rand(), rand(), rand())
    p2 = Particle(rand(), rand(), rand())
    p3 = pmerge(p1, p2)
    # calculate CoM
end

-UUU:**--F1 runtests.jl All L12 (Fundamental) -----

```

```

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] include(::String) at ./client.jl:424
 [6] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:1
ERROR: Package Particles errored during testing

(Particles) pkg> add Test
Resolving package versions...
Updating ~/src/jl/Particles/Project.toml
 [8dfed614] + Test
Updating ~/src/jl/Particles/Manifest.toml
 [2a0f44e3] + Base64
 [8ba89e20] + Distributed
 [b77e0a4c] + InteractiveUtils
 [56ddb016] + Logging
 [d6f4376e] + Markdown
 [9a3f8284] + Random
 [9e88b42a] + Serialization
 [6462fe0b] + Sockets
 [8dfed614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
 Expression: r == Particle(2 / 3, 2 / 3, 4)
 Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

julia> rand()
0.39396751213825043

julia> 

```

```

File Edit Options Buffers Tools Help
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
    p1 = Particle(rand(), rand(), rand())
    p2 = Particle(rand(), rand(), rand())
    p3 = pmerge(p1, p2)
    # test CoM
    @test p1.mass * p2.xpos + p2.mass * p2.xpos == p3.mass * p3.xpos
    @test p1.mass * p2.ypos + p2.mass * p2.ypos == p3.mass * p3.ypos
    # test total mass
    @test p1.mass + p2.mass == p3.mass
end

```

```

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] include(::String) at ./client.jl:424
 [6] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:1
ERROR: Package Particles errored during testing

(Particles) pkg> add Test
Resolving package versions...
Updating ~/src/jl/Particles/Project.toml
 [8dfd614] + Test
Updating ~/src/jl/Particles/Manifest.toml
 [2a0f44e3] + Base64
 [8ba89e20] + Distributed
 [b77e0a4c] + InteractiveUtils
 [56ddb016] + Logging
 [d6f4376e] + Markdown
 [9a3f8284] + Random
 [9e88b42a] + Serialization
 [6462fe0b] + Sockets
 [8dfd614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
 Expression: r == Particle(2 / 3, 2 / 3, 4)
 Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

julia> rand()
0.39396751213825043

julia>

```

---UUU:---F1 runtests.jl All L23 (Fundamental)-----
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end

export pmerge
function pmerge(p::Particle, q::Particle)
    M = p.mass + q.mass
    Particle((p.mass * p.posx + q.mass * q.posx) / M,
             (p.mass * p.posy + q.mass * q.posy) / M,
             M)
end
end # module

-UU-:---F1 Particles.jl All L1 (Fundamental) -----
r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
    p1 = Particle(rand(), rand(), rand())
    p2 = Particle(rand(), rand(), rand())
    p3 = pmerge(p1, p2)
    # test CoM
    @test p1.mass * p2.posx + p2.mass * p2.posx == p3.mass * p3.posx
    @test p1.mass * p2.posy + p2.mass * p2.posy == p3.mass * p3.posy
    # test total mass
    @test p1.mass + p2.mass == p3.mass
end

-UUU-:---F1 runtests.jl Bot L18 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

```

Stacktrace:
 [1] require(::Module, ::Symbol) at ./loading.jl:887
 [2] include at ./boot.jl:328 [inlined]
 [3] include_relative(::Module, ::String) at ./loading.jl:1105
 [4] include(::Module, ::String) at ./Base.jl:31
 [5] include(::String) at ./client.jl:424
 [6] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:1
ERROR: Package Particles errored during testing

(Particles) pkg> add Test
Resolving package versions...
Updating ~/src/jl/Particles/Project.toml
 [8dfd614] + Test
Updating ~/src/jl/Particles/Manifest.toml
 [2a0f44e3] + Base64
 [8ba89e20] + Distributed
 [b77e0a4c] + InteractiveUtils
 [56ddb016] + Logging
 [d6f4376e] + Markdown
 [9a3f8284] + Random
 [9e88b42a] + Serialization
 [6462fe0b] + Sockets
 [8dfd614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
Expression: r == Particle(2 / 3, 2 / 3, 4)
Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

julia> rand()
0.39396751213825043

(Particles) pkg> test

```



```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end

export pmerge
function pmerge(p::Particle, q::Particle)
    M = p.mass + q.mass
    Particle((p.mass * p.posx + q.mass * q.posx) / M,
             (p.mass * p.posy + q.mass * q.posy) / M,
             M)
end
end # module

-UU-:---F1 Particles.jl All L1 (Fundamental) -----
r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
    p1 = Particle(rand(), rand(), rand())
    p2 = Particle(rand(), rand(), rand())
    p3 = pmerge(p1, p2)
    # test CoM
    @test p1.mass * p2.posx + p2.mass * p2.posx == p3.mass * p3.posx
    @test p1.mass * p2.posy + p2.mass * p2.posy == p3.mass * p3.posy
    # test total mass
    @test p1.mass + p2.mass == p3.mass
end

-UUU:---F1 runtests.jl Bot L18 (Fundamental) -----
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

(Particles) pkg> add Test
Resolving package versions...
Updating ~/src/jl/Particles/Project.toml
[8dfed614] + Test
Updating ~/src/jl/Particles/Manifest.toml
[2a0f44e3] + Base64
[8ba89e20] + Distributed
[b77e0a4c] + InteractiveUtils
[56ddb016] + Logging
[d6f4376e] + Markdown
[9a3f8284] + Random
[9e88b42a] + Serialization
[6462fe0b] + Sockets
[8dfed614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
Expression: r == Particle(2 / 3, 2 / 3, 4)
Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

julia> rand()
0.39396751213825043

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:18
Expression: p1.mass * p2.posx + p2.mass * p2.posx == p3.mass * p3.posx
Evaluated: 0.48895917275575834 == 0.4562241486208015
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:13
ERROR: Package Particles errored during testing

(Particles) pkg>

```

```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle
    posx::Float64
    posy::Float64
    mass::Float64
end

export pmerge
function pmerge(p::Particle, q::Particle)
    M = p.mass + q.mass
    Particle((p.mass * p.posx + q.mass * q.posx) / M,
            (p.mass * p.posy + q.mass * q.posy) / M,
            M)
end
end # module

-UU-:---F1 Particles.jl All L1 (Fundamental) ---
r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
    p1 = Particle(rand(), rand(), rand())
    p2 = Particle(rand(), rand(), rand())
    p3 = pmerge(p1, p2)
    # test CoM
    @test p1.mass * p1.posx + p2.mass * p2.posx == p3.mass * p3.posx
    @test p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy
    # test total mass
    @test p1.mass + p2.mass == p3.mass
end

-UUU:---F1 runtests.jl Bot L19 (Fundamental) ---
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

```

[9a3f8284] + Random
[9e88b42a] + Serialization
[6462fe0b] + Sockets
[8dfed614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
Expression: r == Particle(2 / 3, 2 / 3, 4)
Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

julia> rand()
0.39396751213825043

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:18
Expression: p1.mass * p2.posx + p2.mass * p2.posx == p3.mass * p3.posx
Evaluated: 0.48895917275575834 == 0.4562241486208015
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:13
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:19
Expression: p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy
Evaluated: 0.34211094061699504 == 0.342110940616995
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:13
ERROR: Package Particles errored during testing

(Particles) pkg>

```



```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle{T}
    posx::T
    posy::T
    mass::T
end

export pmerge
function pmerge(p::Particle, q::Particle)
    M = p.mass + q.mass
    Particle((p.mass * p.posx + q.mass * q.posx) / M,
             (p.mass * p.posy + q.mass * q.posy) / M,
             M)
end
end # module

```

```

[9a3f8284] + Random
[9e88b42a] + Serialization
[6462fe0b] + Sockets
[8dfed614] + Test

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
Expression: r == Particle(2 / 3, 2 / 3, 4)
Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Testing Particles tests passed

julia> rand()
0.39396751213825043

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:18
Expression: p1.mass * p2.posx + p2.mass * p2.posx == p3.mass * p3.posx
Evaluated: 0.48895917275575834 == 0.4562241486208015
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:13
ERROR: Package Particles errored during testing

(Particles) pkg> test
Testing Particles
Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:19
Expression: p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy
Evaluated: 0.34211094061699504 == 0.342110940616995
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:13
ERROR: Package Particles errored during testing

(Particles) pkg> 

```

-UU-:----F1 Particles.jl All L7 (Fundamental) -----
 Wrote /home/eschnetter/src/jl/Particles/src/Particles.jl

The image shows a macOS desktop environment with three main windows:

- Terminal Window (Left):** Contains Julia code for a module named `Particles`. The code defines a `Particle` struct with fields `posx`, `posy`, and `mass`. It also defines a `pmerge` function that takes two `Particle` objects and returns a new one based on their masses and positions.
- Sidebar (Middle):** A vertical list of application icons including IDEs like Jupyter, Sublime Text, and tools like Revis.jl.
- REPL Window (Right):** Shows the Julia REPL output. It displays package versions for `Random`, `Serialization`, `Sockets`, and `Test`. Multiple test runs are shown, with some failing. The errors are:
 - `Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8` with the expression `r == Particle(2 / 3, 2 / 3, 4)` evaluating to `Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(0.6666666666666666, 0.6666666666666666, 4.0)`.
 - `Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:18` with the expression `p1.mass * p2.posx + p2.mass * p2.posx == p3.mass * p3.posx` evaluating to `0.48895917275575834 == 0.4562241486208015`.
 - `Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:13` with the expression `p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy` evaluating to `0.34211094061699504 == 0.342110940616995`.

The terminal window at the bottom shows the command `Write /home/eschnetter/src/jl/Particles/src/Particles.jl`.

```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle{T}
  posx::T
  posy::T
  mass::T
end

export pmerge
function pmerge(p::Particle{T}, q::Particle{T}) where {T}
  M = p.mass + q.mass
  Particle((p.mass * p.posx + q.mass * q.posx) / M,
           (p.mass * p.posy + q.mass * q.posy) / M,
           M)
end
end # module

-UUU:----F1 Particles.jl All L11 (Fundamental) -----
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
for n in 1:100
  p1 = Particle(rand(), rand(), rand())
  p2 = Particle(rand(), rand(), rand())
  p3 = pmerge(p1, p2)
  # test CoM
  @test p1.mass * p1.posx + p2.mass * p2.posx == p3.mass * p3.posx
  @test p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy
  # test total mass
  @test p1.mass + p2.mass == p3.mass
end

-UUU:----F1 runtests.jl All L14 (Fundamental) -----

```

and IDEs

Jupyter

Jupyter kernel

SublimeT

Sublime Text

Tools

Revis

Revis.jl

```

[9a3f8284] + Random
[9e88b42a] + Serialization
[6462fe0b] + Sockets
[8dfed614] + Test

(Particles) pkg> test
  Testing Particles
  Resolving package versions...
  Testing Particles tests passed

(Particles) pkg> test
  Testing Particles
  Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
Expression: r == Particle(2 / 3, 2 / 3, 4)
Evaluated: Particle(0.6666666666666666, 0.6666666666666666, 3.0) == Particle(
0.6666666666666666, 0.6666666666666666, 4.0)
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:8
ERROR: Package Particles errored during testing

(Particles) pkg> test
  Testing Particles
  Resolving package versions...
  Testing Particles tests passed

julia> rand()
0.39396751213825043

(Particles) pkg> test
  Testing Particles
  Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:18
Expression: p1.mass * p2.posx + p2.mass * p2.posx == p3.mass * p3.posx
Evaluated: 0.48895917275575834 == 0.4562241486208015
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:13
ERROR: Package Particles errored during testing

(Particles) pkg> test
  Testing Particles
  Resolving package versions...
Test Failed at /home/eschnetter/src/jl/Particles/test/runtests.jl:19
Expression: p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy
Evaluated: 0.34211094061699504 == 0.342110940616995
ERROR: LoadError: There was an error during testing
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:13
ERROR: Package Particles errored during testing

(Particles) pkg>

```



```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle{T}
    posx::T
    posy::T
    mass::T
end

export pmerge
function pmerge(p::Particle{T}, q::Particle{T}) where {T<:Number}
    M = p.mass + q.mass
    Particle((p.mass * p.posx + q.mass * q.posx) / M,
             (p.mass * p.posy + q.mass * q.posy) / M,
             M)
end
end # module

-UU-:---F1 Particles.jl All L11 (Fundamental)
using Test
using Particles

p = Particle(0, 0, 1)
q = Particle(1, 1, 2)

r = pmerge(p, q)
@test r == Particle(2/3, 2/3, 3)

# Property test for 100 random particle pairs
randrational() = rand(-100:100) // 100
for n in 1:100
    p1 = Particle(randrational(), randrational(), randrational())
    p2 = Particle(randrational(), randrational(), randrational())
    p3 = pmerge(p1, p2)
    # test CoM
    @test p1.mass * p1.posx + p2.mass * p2.posx == p3.mass * p3.posx
    @test p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy
    # test total mass
    @test p1.mass + p2.mass == p3.mass
end
-UUU:---F1 runtests.jl All L16 (Fundamental)
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

```

constant complexity is available, which is the case for Dict, Set
and BitSet. For more than a few calls, use rand(rng, collect(s))
instead, or either rand(rng, Dict(s)) or rand(rng, Set(s)) as
appropriate.

julia> rand(Float64)
0.18281462877297705

julia> rand(Float32)
0.50996923f0

julia> rand(Rational{BigInt})
ERROR: ArgumentError: Sampler for this object is not defined
Stacktrace:
 [1] Random.Sampler{::Type{Random.MersenneTwister}, ::Random.SamplerType{Rational{BigInt}}, ::Val{1}} at /home/eschnetter/src/julia/usr/share/julia/stdlib/v1.3/Random/src/Random.jl:145
 [2] Random.Sampler{::Random.MersenneTwister, ::Random.SamplerType{Rational{BigInt}}, ::Val{1}} at /home/eschnetter/src/julia/usr/share/julia/stdlib/v1.3/Random/src/Random.jl:139
 [3] rand{::Random.MersenneTwister, ::Random.SamplerType{Rational{BigInt}}} at /home/eschnetter/src/julia/usr/share/julia/stdlib/v1.3/Random/src/Random.jl:253
 [4] rand{::Random.MersenneTwister, ::Type{Rational{BigInt}}} at /home/eschnetter/src/julia/usr/share/julia/stdlib/v1.3/Random/src/Random.jl:256
 [5] rand{::Type{Rational{BigInt}}} at /home/eschnetter/src/julia/usr/share/julia/stdlib/v1.3/Random/src/Random.jl:259
 [6] top-level scope at REPL[9]:1

julia> rand(-100:100)
85

julia> rand(-100:100)
-87

julia> rand(-100:100)
50

julia> rand(-100:100) // 100
23//50

julia> rand(-100:100) // 100
-39//50

julia> rand(-100:100) // 100
47//50

julia> rand(-100:100) // 100
19//25

julia>

```



```

File Edit Options Buffers Tools Help
module Particles

export Particle
struct Particle{T}
    posx::T
    posy::T
    mass::T
end

export pmerge
function pmerge(p::Particle{T}, q::Particle{T}) where {T<:Number}
    M = p.mass + q.mass
    Particle((p.mass * p.posx + q.mass * q.posx) / M,
             (p.mass * p.posy + q.mass * q.posy) / M,
             M)
end
end # module

--UU:----F1 Particles.jl All L11 (Fundamental)
using Test
using Particles

p = Particle(0//1, 0//1, 1//1)
q = Particle(1//1, 1//1, 2//1)

r = pmerge(p, q)
test r == Particle(2//3, 2//3, 3//1)

# Property test for 100 random particle pairs
randrational() = rand(1:1000000) // 1000000
for n in 1:100
    p1 = Particle(randrational(), randrational(), randrational())
    p2 = Particle(randrational(), randrational(), randrational())
    p3 = pmerge(p1, p2)
    # test CoM
    @test p1.mass * p1.posx + p2.mass * p2.posx == p3.mass * p3.posx
    @test p1.mass * p1.posy + p2.mass * p2.posy == p3.mass * p3.posy
    # test total mass
    @test p1.mass + p2.mass == p3.mass
end
--UUU:----F1 runtests.jl All L8 (Fundamental)
Wrote /home/eschnetter/src/jl/Particles/test/runtests.jl

```

```

[3] rand(::Random.MersenneTwister, ::Random.SamplerType{Rational{BigInt}}) at /
/home/eschnetter/src/julia/usr/share/julia/stdlib/v1.3/Random/src/Random.jl:253
[4] rand(::Random.MersenneTwister, ::Type{Rational{BigInt}}) at /home/eschnette
r/src/julia/usr/share/julia/stdlib/v1.3/Random/src/Random.jl:256
[5] rand(::Type{Rational{BigInt}}) at /home/eschnetter/src/julia/usr/share/juli
a/stdlib/v1.3/Random/src/Random.jl:259
[6] top-level scope at REPL[9]:1

julia> rand(-100:100)
85
julia> rand(-100:100)
-87
julia> rand(-100:100)
50
julia> rand(-100:100) // 100
23//50
julia> rand(-100:100) // 100
-39//50
julia> rand(-100:100) // 100
47//50
julia> rand(-100:100) // 100
19//25

(Particles) pkg> test
Testing Particles
Resolving package versions...
ERROR: LoadError: MethodError: no method matching Particle{::Float64, ::Float64,
::Int64}
Closest candidates are:
  Particle{::T, ::T, ::T} where T at /home/eschnetter/src/jl/Particles/src/Parti
cles.jl:5
Stacktrace:
 [1] pmerge(::Particle{Int64}, ::Particle{Int64}) at /home/eschnetter/src/jl/Par
ticles/src/Particles.jl:13
 [2] top-level scope at /home/eschnetter/src/jl/Particles/test/runtests.jl:7
 [3] include at ./boot.jl:328 [inlined]
 [4] include_relative(::Module, ::String) at ./Loading.jl:1105
 [5] include(::Module, ::String) at ./Base.jl:31
 [6] include(::String) at ./client.jl:424
 [7] top-level scope at none:6
in expression starting at /home/eschnetter/src/jl/Particles/test/runtests.jl:7
ERROR: Package Particles errored during testing

(Particles) pkg> 

```