- Loops and conditionals in Julia...
- Programming the bisection method...

$$f(x) = x^2 - 2$$

$a = 0.0$, too small $b = 2.0$ too big

$c = \frac{a+b}{2}$ in the middle.

```
julia> 1/1000
0.001

julia> 1÷1000
0

julia> 3÷2
1

julia> 3/2
1.5
```

note Julia has two types of division

/ floating point

÷ integer...

Use ↑ up arrow to bring back history.

Can edit stuff in the REPL. Just type ← left arrow to enter the editor.

Insert lines with alt + enter

```
if y<0
        println("updating a")
        a=c
else
        println("updating b")
        b=c
end
```

Open

bisect.jl
~/sep21

```
1 f(x)=x^2-2
2 a=0.0
3 b=2.0
4 c=(a+b)/2
5 y=f(c)
6 if y<0
7     println("updating a")
8     a=c
9 else
10    println("updating b")
11    b=c
12 end
```

To save file, shortcut is ctrl + S.

do this before trying to run the code...

Open

bisect.jl
~/sep21

```
1  function bisect(a,b)
2      c=0
3      for i=1:10
4          c=(a+b)/2
5          y=f(c)
6          if y<0
7              println("updating a with",c)
8              a=c
9          else
10             println("updating b with",c)
11             b=c
12         end
13     end
14     return a,b
15 end
16
17 f(x)=x^2-2
18 bisect(0.0,2.0)
```

The final program is also available for download on our website.

```
julia> include("bisect.jl")
updating a with1.0
updating b with1.5
updating a with1.25
updating a with1.375
updating b with1.4375
updating a with1.40625
updating b with1.421875
updating a with1.4140625
updating b with1.41796875
updating b with1.416015625
(1.4140625, 1.416015625)

julia> sqrt(2)
1.4142135623730951
```

bounds on the error

$\sqrt{2}$ is in the interval ....