Today

- Terminal and shell
- Counter controlled repetition
- Combining conditions and counters
- Data generating process

Working in the terminal

- Shell (e.g. bash, or zsh on Mac)
    - command line interface (CLI) to the operating system (OS)

    Which do I have?
    echo $SHELL

    - interpreter program

- Terminal
    - application where the shell runs

- Console in VSCode and RStudio
    - like a terminal but only for R or Python
    - doesn't interact with the OS

bash

- Bourne Again Shell
  - open source implementation of Bourne's sh (unix 1970s)
  - commands to do stuff in the operating system (file management etc)
  - demo, incl git

while repetition structure

- Counter controlled repetition

counter

```
i = 0
```
number of repetitions

```
while i < n
    expression_1
    expression_2
    ...
    i = i + 1
```
increment the counter

Exercise: while, counter control

```
i = 0
while i < n
      ... expressions
      i = i + 1
```

counter

n repetitions

increment counter

Exercise: counter controlled repetition
A population starts with 2 individuals. Each generation, it doubles in size.
What is the population size after 20 generations?
Use the while structure. The algorithm should finish by printing the
answer. You can't use an exponentiation operator.
Pseudocode first, then flowchart   ...   then Python.

Both counters & conditions

- How many generations does it take to exceed 10,000?

Both counters & conditions

- Stop if population size > 1e9 (1 billion)
- or
- generation > 100