ENGG1811 Computing for Engineers

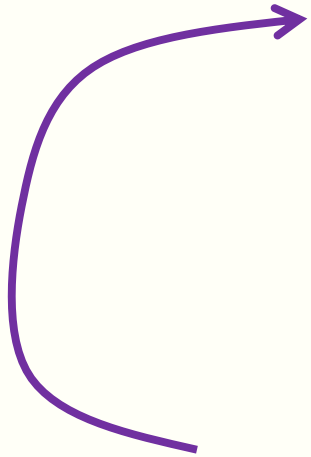
Day 2 Learning

Reducing repetition

- On the left: code to draw a square with edge length 2
- Code repeated 4 times. New trick: for

```
import draw

draw.start()

draw.move(2)
draw.turn(90)
draw.move(2)
draw.turn(90)
draw.move(2)
draw.turn(90)
draw.move(2)
draw.turn(90)
```

```
import draw

draw.start()

for i in range(4):
    draw.move(2)
    draw.turn(90)
```

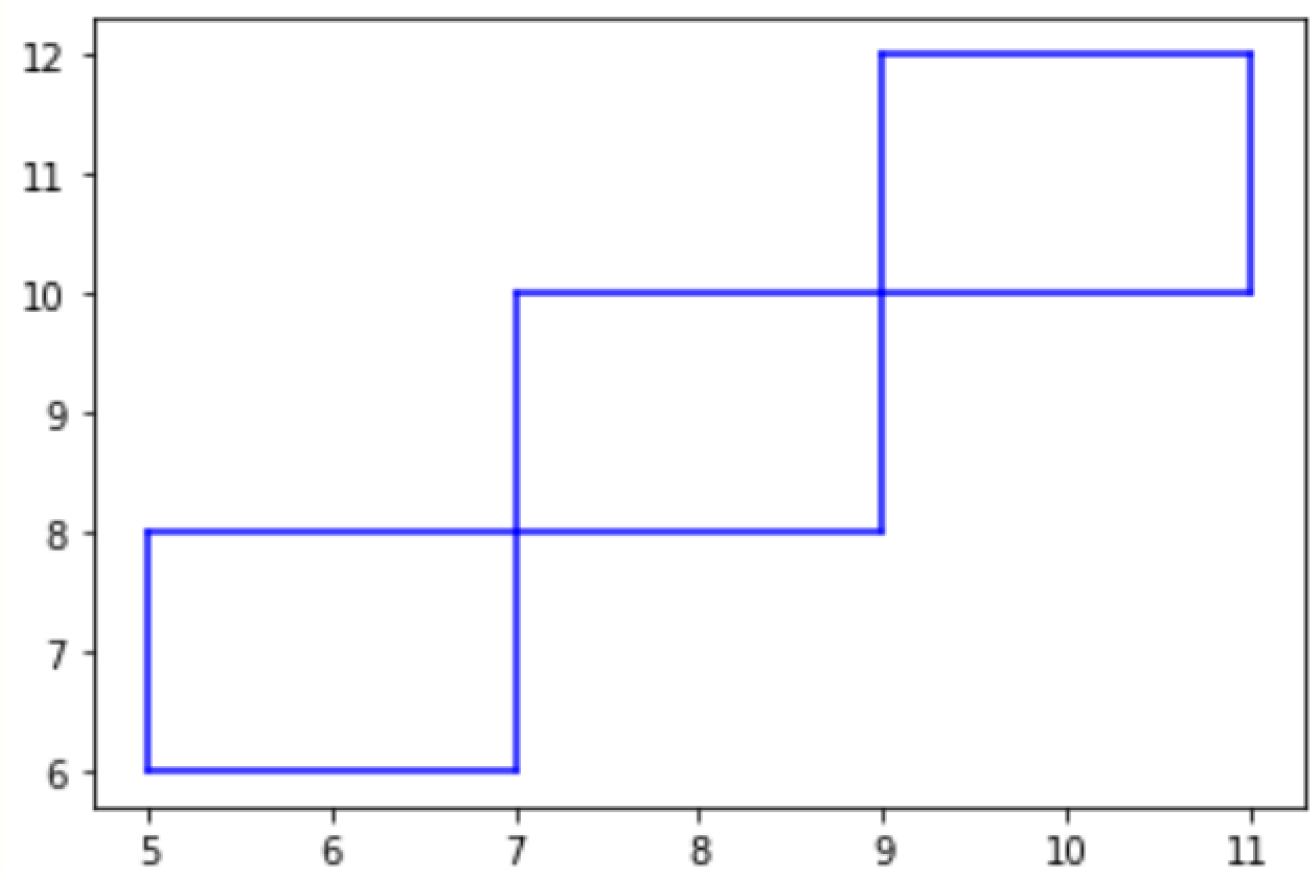


Repeat the indented code four times

Indentation e.g., tab

Drawing a staircase

- We will use a series of programs to show you how to draw this:



You can specify where to start drawing

- By default draw.start uses the origin as the starting point
- But, you can specify where you want to start

```
import draw

length = 2
angle = 90

draw.start(5,6)
for i in range(4):
    draw.move(length)
    draw.turn(angle)
```

File: sample_draw_a_stair_part_0.py

File: sample_draw_a_staircase_part_1.py

What is not nice about this code?

- The code can draw a staircase, but what is not so nice about it?

```
import draw

length = 2
angle = 90

draw.start(5,6)
for i in range(4):
    draw.move(length)
    draw.turn(angle)

draw.start(7,8)
for i in range(4):
    draw.move(length)
    draw.turn(angle)

draw.start(9,10)
for i in range(4):
    draw.move(length)
    draw.turn(angle)
```

Reducing the repetition

- Trick: adjust the starting point for each ”repeat”

File: sample_draw_a_staircase_part_2.py

```
import draw

length = 2
angle = 90

for j in range(3):
    # j will take turn to be 0, 1, 2
    draw.start(5 + j * 2, 6 + j * 2)
    for i in range(4):
        draw.move(length)
        draw.turn(angle)
```

- j takes turn to be 0, 1, 2

j	5 + j * 2	6 + j * 2
0	5	6
1	7	8
2	9	10

If you want to learn more

- The course website remains accessible https://webcms3.cse.unsw.edu.au/ENHS1811/00x0/
- What we did this week is inspired by the Turtle graphics which uses drawings to teach Python. There is an online book that teaches Python using the Turtle graphics: https://runestone.academy/ns/books/published/thinkcspy/index.html
  - The book is self-contained. You can type and run your code in at the browser. A sample lesson is here:
    - https://runestone.academy/ns/books/published/thinkcspy/PythonTurtle/OurFirstTurtleProgram.html