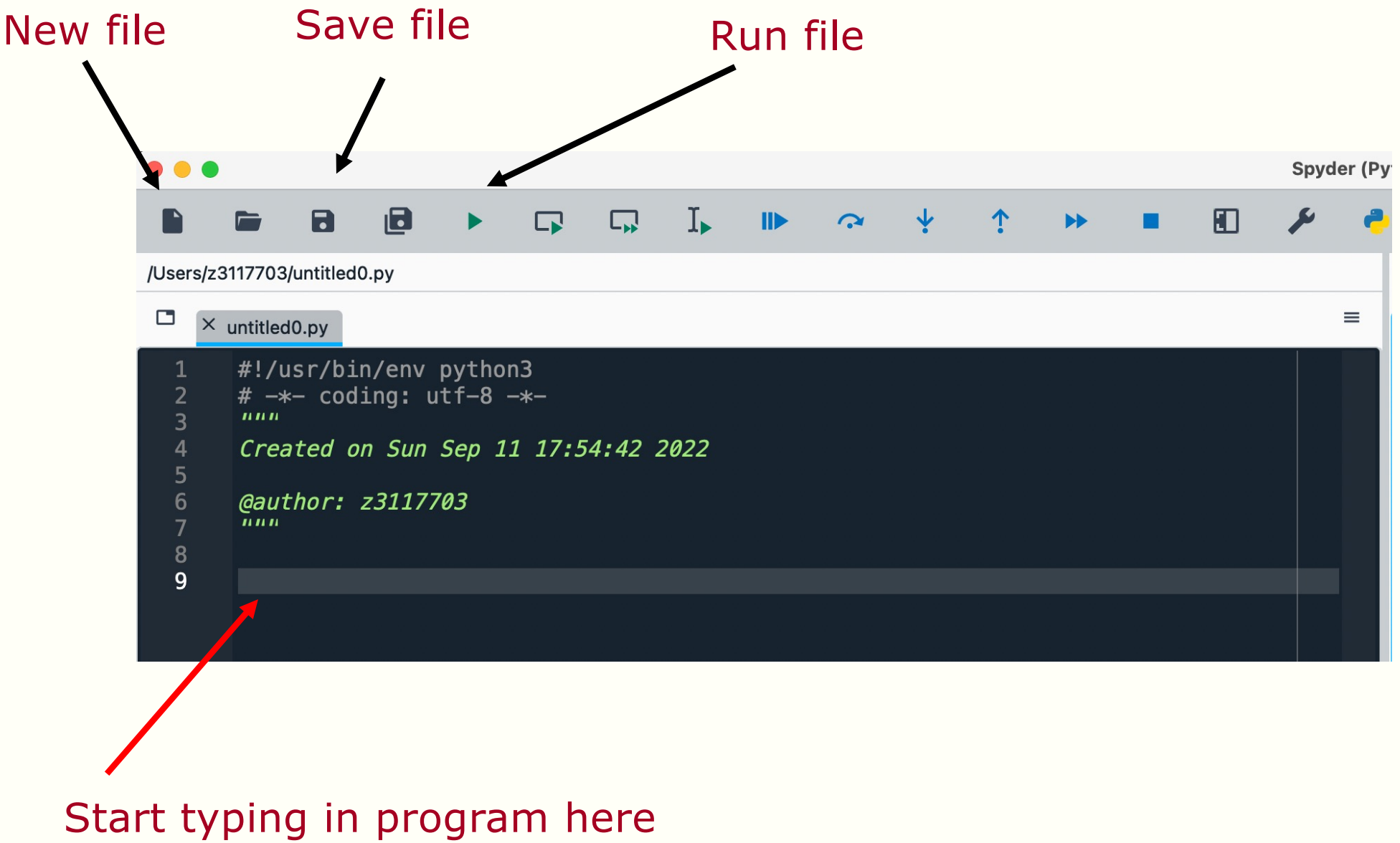
ENGG1811 Computing for Engineers

Day 1 Getting started

The Spyder editor



Draw a triangle (version 1)

```
 9  import draw
10
11  draw.start()
12  draw.draw_line(0, 0, 1, 0)
13  draw.draw_line(1, 0, 0.8, 0.9)
14  draw.draw_line(0.8, 0.9, 0, 0)
```

- After typing the program, you should save it:
  - Do give the program a meaningful name.
  - Organise files using folders
  - Note that Python programs have the extension .py
  - Don't forget to save the file regularly when you work on Spyder
- You can run the program using the run button 
- Results will be displayed in a plot under the "Plots" tab

Program execution (1)

```
 9  import draw
10
11  draw.start()
12  draw.draw_line(0, 0, 1, 0)
13  draw.draw_line(1, 0, 0.8, 0.9)
14  draw.draw_line(0.8, 0.9, 0, 0)
```

- This program consists of 5 statements
  - At lines 9, 11 and 12-14
- The statements are executed in the order that they appear
- Line 9 enables us to use the draw facility
- You always need to use draw.start() before drawing

Program execution (2)

```
 9  import draw
10
11  draw.start()
12  draw.draw_line(0, 0, 1, 0)
13  draw.draw_line(1, 0, 0.8, 0.9)
14  draw.draw_line(0.8, 0.9, 0, 0)
```

- Each code line in 12-14 draws a line in the picture
- E.g., draw.draw_line(1, 0, 0.8, 0.9) draws a line segment between (1, 0) and (0.8, 0.9)

Draw a triangle (Version 2)

```
 9  import draw
10
11  draw.start()
12  # Draw a triangle with the vertices at (0,0), (1,0) and (0.8, 0.9)
13  draw.draw_line(0, 0, 1, 0)
14  draw.draw_line(1, 0, 0.8, 0.9)
15  draw.draw_line(0.8, 0.9, 0, 0)
```

- Comments are added to explain what a program does
  - All text after the # symbol is comment
- Comments are ignored when a program is executed
- Comments are for people to read

Change a vertex

```
 9  import draw
10
11  draw.start()
12  # Draw a triangle with the vertices at (0,0), (1,0) and (0.8, 0.9)
13  draw.draw_line(0, 0, 1, 0)
14  draw.draw_line(1, 0, 0.8, 0.9)
15  draw.draw_line(0.8, 0.9, 0, 0)
```

- Let us say we want to change the vertex from (1,0) to (0.2, 0.5), and I will purposely make a mistake

```
 9  import draw
10
11  draw.start()
12  # Draw a triangle with the vertices at (0,0), (0.2,0.5) and (0.8, 0.9)
13  draw.draw_line(0, 0, 0.2, 0.5)
14  draw.draw_line(0.2, 0, 0.8, 0.9)
15  draw.draw_line(0.8, 0.9, 0, 0)
```

Draw a triangle (Version 3)

- Use variables to specify the coordinates
- Complete the code in sample_draw_a_triangle.py
  - Fill in Lines 21, 26 using the sample code below

```
13  import draw
14
15  # Draw a triangle with vertices (x0, y0), (x1, y1) and (x2, y2)
16  x0 = 0
17  y0 = 0
18  x1 = 0.2
19  y1 = 0.5
20  x2 = 0.8
21  y2 = 0.9
22
23  draw.start()
24  draw.draw_line(x0, y0, x2, y2)
25  draw.draw_line(x2, y2, x1, y1)
26  draw.draw_line(x1, y1, x0, y0)
```

Next steps

- Work on Exercises 1 to 3

- After that, I will introduce:
  - move() and turn()
    - sample_start_move_turn.py
  - Repetition using range()
    - sample_draw_a_square_long.py
    - sample_draw_a_square.py

- Work on the rest of the exercises