ENGG1003 - Thursday Week 3

Review of `for/while/if-elif-else`
& overview of Week 4 assessed lab

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Lecture overview

1. Review of Monday's lecture
   - ▶ `for` loop
   - ▶ `while` loop
   - ▶ `if-elif-else`

2. Overview of Week 4 assessed lab
   - ▶ review of main topics covered in weeks 1–3
   - ▶ what to expect in assessed lab
   - ▶ reminder: worth 5% of overall course grade

1) Review of Monday's lecture

Reminder of main ideas in Monday's lecture:

- Iteration using **for** loop
  - ▶ fixed number of iterations

- Iteration using **while**
  - ▶ keep iterating whenever a Boolean condition is satisfied

- Branching: **if**, **elif** and **else**
  - ▶ conditional execution of code blocks
    - if
    - if-else
    - if-elif-else

Iteration using `for` loop

Example 1:

Write a Python program which uses a **for** loop to print the numbers $1, 2, 3, \ldots, 10$ to the console.

Your program should use the basic form of `for` loop

- ie: in loop header, use
  [1,2,3,4,5,6,7,8,9,10]

- Live demo

Python code for Example 1

- show code

- screenshot of console output

Example 2:

Modify your solution to Example 1 to use a **for** loop to print the *squares* of the numbers $1, 2, 3, \ldots, 10$ to the console using the following display format:

```
1**2  =  1
2**2  =  4
3**2  =  9
4**2  =  16
.
.
.
10**2  =  100
```

- Live demo

Python code for Example 2

- show code

- screenshot of console output

Example 3:

Modify your solution to Example 2 to use a **for** loop to print the squares of the numbers $1, 2, 3, \ldots, 1000$ to the console using the display format in Example 2. You *must* use the range function in the for loop header.

```
1^2 = 1
2^2 = 4
3^2 = 9
4^2 = 16
...
1000^2 = 1000000
```

- Live demo

Python code for Example 3

- show code

- screenshot of console output

Reflections on Examples 1–3

- xxx

- xxx

Iteration using `while` loop

Example 4:

Write a Python program which calculates the sum of the first N integers

$$S_N = 1^2 + 2^2 + 3^2 + \cdots + N^2$$

- your program *must* use a `while` loop
- demonstrate your program for $N = 10$
- check your answer is correct using the formula

$$S_N = \frac{N(N+1)(2N+1)}{6}$$

How do we start to solve this problem?

- Don't try and solve the whole problem at once!

- Start small and build up your code one small step at a time
  - ▶ . . . testing along the way

- suggested first step: display $1, 2, 3, \ldots, 10$ to the console
  - ▶ tests that your `while` loop syntax is correct

Python code for Example 4

- live demo—code developed in small stages

- show final code

- screenshot of console output

2) Overview of assessed lab in week 4

1. Python program with library function

2. Simple plotting

3. Simple printing

4. Iterative processing / conditional