Introduction to Programming

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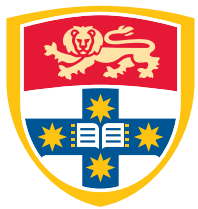

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Week 5: Basis of program design process

We will cover: Loop structures, filters, and nested loops

You should read: §§1.3, 1.4 of Sedgewick

Lecture : Basis of program design process

Program design process

All programs have input, processing, output

The input type often dictates the required control flow

The output so far has been print to console (stdout). In any case, the programmer needs to understand what is the output.

Programmers needs to combine different control flow to achieve the desired effect

User menus

Write a basic math program.
It presents three options for the user. 1) allow entry of number which will be checked if positive or negative. 2) allow entry of two numbers which will print the fraction value. 3) quit the program. The options will be presented until the user quits. No error checking is required.

Menu:

```
1) Is positive number
2) Enter fraction
3) Quit
```

```
1) Is positive number -> 3 -> "Yes", -1 -> "No"
2) Enter fraction -> asks for two numbers and prints the
fraction value x/y.  3/4 -> "0.75"
3) Quit -> "Bye!"
```

User menus (cont.)

Menu:

```
1) Is positive number
2) Enter fraction
3) Quit
```

Input multiple values

Write a program that asks the user for multiple input values

Input correct values - range based

Write a program that asks the user for *correct* input for 1 dimensional range

Input correct values - predefined values

Write a program that asks the user for *correct* input from a defined list of correct values

Input multiple correct values

Write a program that asks the user for multiple *correct* input values

Process multiple values - without user

Write a program that processes input from command line arguments

Summary

Hints about control flow obtained from input

Format/requirements of output are critical to correctness

There are combinations of flow control to achieve a desired outcome.

Nested loops have outer and inner components. These substructures can be used to solve a smaller part of the problem

Write more different programs to get experience with variations of control flow!