Welcome!

COMP1511 18s1
Programming Fundamentals

Before we begin...

introduce yourself to the person sitting next to you

why did they decide to study computing?

Overview

after this lecture, you should be able to...

understand the basics of while loops
understand the basics of nested while loops
write programs using while loops to solve simple problems
know about the course style guide

(note: you shouldn't be able to do all of these immediately after watching this lecture, however, this lecture should hopefully give you the foundations you need to develop these skills. remember: programming is like learning any other language, it takes consistent and regular practice.)
Admin

Don't panic!

lecture recordings are on WebCMS3
Echo360 was sad last night ;(
weekly tests start this week
don't be scared!
course style guide published

Loops

what if we want to do something multiple times?

Use a loop!

keep doing this while this condition is true

Anatomy of a Loop

initialisation
- condition
- statements
- update

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Anatomy of a Loop

initialisation
set up our variables

condition
while "something"...

statements
things we do inside our loop

update
move along to the next iteration

Aside: Definitions

iterate
perform repeatedly

iteration
the repetition of a process
A Counting Loop

"Do this thing \( n \) different times"

sometimes, it's explicit:
e.g. print out 'hello world!' 10 times

sometimes, it's not:
e.g. print out the numbers from 1-10
e.g. calculate the power of a number (e.g.,

use a loop counter
... a variable that we use in our loop
to count how many times we've done something

A Counting Loop

do something until we've done it \( n \) times

e.g. print out 'hello world!' 10 times

counter starts at 0
print "hello world!"; increase counter to 1 (we've done it once)
print "hello world!"; increase counter to 2 (we've done it twice)
print "hello world!"; increase counter to 3 (we've done it three times)
...
print "hello world!"; increase counter to 9 (we've done it 9 times)
print "hello world!"; increase counter to 10 (we've done it 10 times)

now stop, because we've done it 10 times.

A Counting Loop

how would we code this?

start our counter at 0
print "hello world!"
while counter is less than 10,
increase our counter by 1
Anatomy of a Loop

**Initialisation**
set up our variables

**Condition**
while "something"...

**Statements**
things we do inside our loop

**Update**
move along to the next iteration

```plaintext
// set up our loop counter, start at 0
while (????) {
    ???
    ???
}
```

```plaintext
// set up our loop counter, start at 0
while (something) {
    ???
    ???
}
```
// set up our loop counter, start at 0
while (something) {
    // do something
    // move to the next iteration of the loop
}

int i = 0;
while (i < 10) {
    // do something
    // move to the next iteration of the loop
}
how do we know when to stop?

Loop Counters

```c
int i = 0;
while (i < 10) {
    printf("hello, world!\n");
    i = i + 1;
}
```
Loop Counters

// Print out “hello, world!” n times,
// where n is chosen by the user.

int num;
printf("Enter a number: ");
scanf("%d", &num);

int i = 0;
while (i < num) {
    printf("hello, world!\n");
    i = i + 1;
}

Sentinel Value (Flag)

int finished = 0;
while (!finished) {
    printf("hello, world!\n");
    finished = 1;
}

Sentinel Value (Flag)

// Print out the number that the user entered
// Stop when they type 0

int n = 1;
while (n != 0) {
    printf("You entered: %d\n", n);
    scanf("%d", &n);
}

what is a style guide?
nested loops

```java
while (something) {
    while (somethingElse) {
    }
}
```

Demo: Printing a Square

scan in a number: width
print out a square of width * width stars.

e.g. for width = 4:
```
* * * *
* * * *
* * * *
* * * *
```

**challenge**: can you just print the outside?
```
* * * *
* * *
* *
* *
```
Feedback?

bit.do/comp1511-feedback-week3

alternate link: https://andrewb3.typeform.com/to/KuVZP4