

## ACOM1900 Intro. to Programming:

### Control Flow

Roy Ruddle

with thanks to Tony Jenkins & Nick Efford  
(CR11 and previous ACOM1900 material)

1

University of Leeds

Roy Ruddle

## Objectives

To:

- Consider "flow of control"
- Revisit Boolean values and operators
- Introduce the idea of an assertion (or condition)
- Show how these can be used to affect flow of control
- Show how this can be used for simple error handling

Allows us to:

- Extend our programs to be more flexible and robust

2

University of Leeds

Roy Ruddle

## The idea

- A program
  - Is a set of instructions
  - Executed "top down" (the "flow of control")
  - More sophisticated flow usually required
- Achieve using
  - Conditions:
    - Parts of program only executed in certain cases
    - Booleans: variables that can hold one of two values (True or False)
  - Loops: parts executed repeatedly

3

University of Leeds

Roy Ruddle

## Assertion

- Statement that's True or False
  - $x < 1$
- Used to control which statements executed

4

University of Leeds

Roy Ruddle

## Conditions

```
if condition is true:  
    do this
```

5

University of Leeds

Roy Ruddle

## Conditions

```
if condition is true:  
    do this  
if condition is false:  
    do this
```

6

University of Leeds

Roy Ruddle

## Conditions

```
if condition is true:
    do this
else:
    do this
```

7

University of Leeds

Roy Ruddle

## Conditions

```
if condition is true:
    do this
else if another condition is true:
    do this
else:
    do this
```

8

University of Leeds

Roy Ruddle

## Conditions

- Assertion (condition) can be used to make statements execute repeatedly

```
while condition is true:
    do this
```

9

University of Leeds

Roy Ruddle

## Loops

- Alternatively, a loop may be required to execute a certain number of times

```
for every letter in this word:
    do this
```

```
ten times:
    do this
```

10

University of Leeds

Roy Ruddle

## Example: Converting temperatures

- Write program to print table of temperature conversions from Celsius to Fahrenheit

11

University of Leeds

Roy Ruddle

## Summary

- Boolean values are either True or False
  - Values can be manipulated using operators
  - Can be used to express *conditions*
- Conditions can be used to alter flow of control
  - Control which statements execute
  - Execute repeatedly
- Now we can write complete useful programs!
  
- Assignment
  - Complete **Control flow** worksheet

12

University of Leeds

Roy Ruddle