Coursework key dates

Assignment: Single piece of coursework, completed individually.

Theme: Write a program to perform and encryption and decryption task + a short (2 page) report

Set: Friday 19th November 2021 (Week 8)

Deadline: Friday 10th December 2021 (Week 11)

Drop-in support classes

On-campus Group 1	On-campus Group 2	Online
Friday	Friday	Thursday
13:00-14:00	14:00-15:00	9:00-10:00
MVB 1.15	MVB 1.15	remo

Group 1 : EMAT, Innovation, Biorobotics, everyone not listed in Groups 1/2

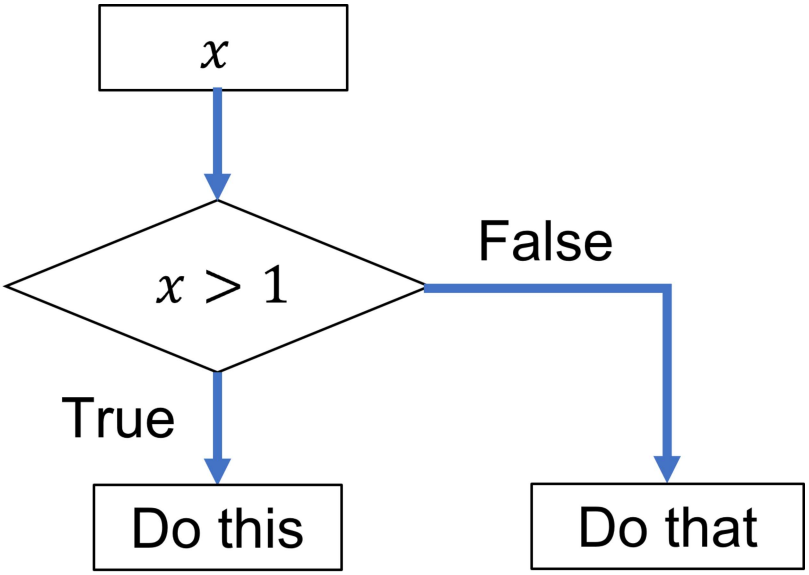
Group 2: EENG, EDES, Digital Health MSc & CDT

Introduction to Computer Programming

2.1 Control Flow

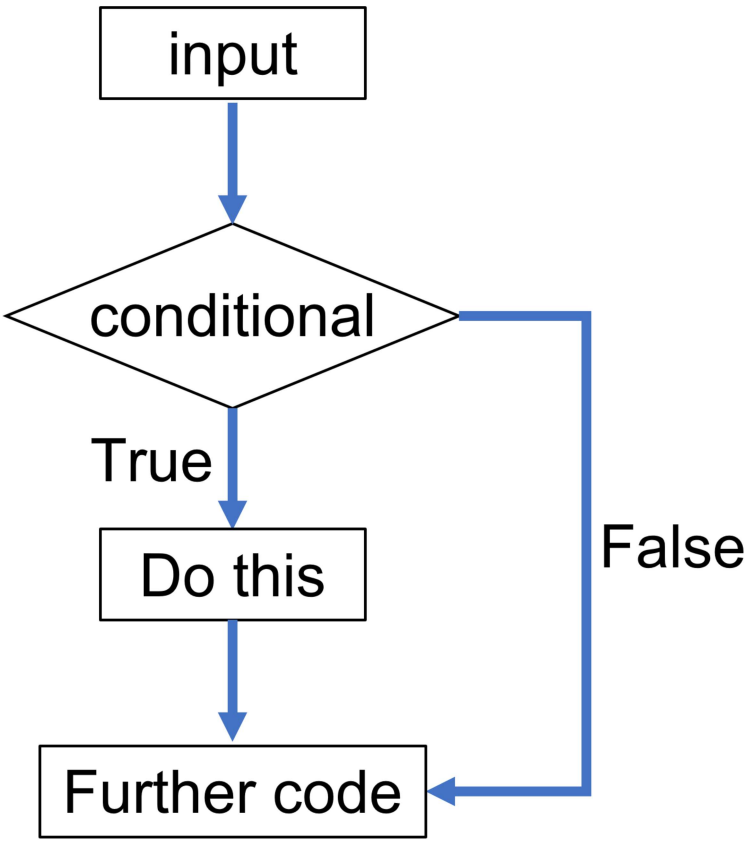
Conditional Statements

- Make decisions within a program and direct the flow.
- Run different blocks of code depending on whether a Boolean expression evaluates to `True` or `False` .
- This decision making is known as **Control Flow**



`if`

Runs a block of code only if a condition is `True`



In [1]:

```
x = 11

if x > 10:
    print("Do this") # block of code to run only if condition is True

print("Further code")
```

```
Do this
Further code
```

The colon `:` follows the condition to be evaluated.

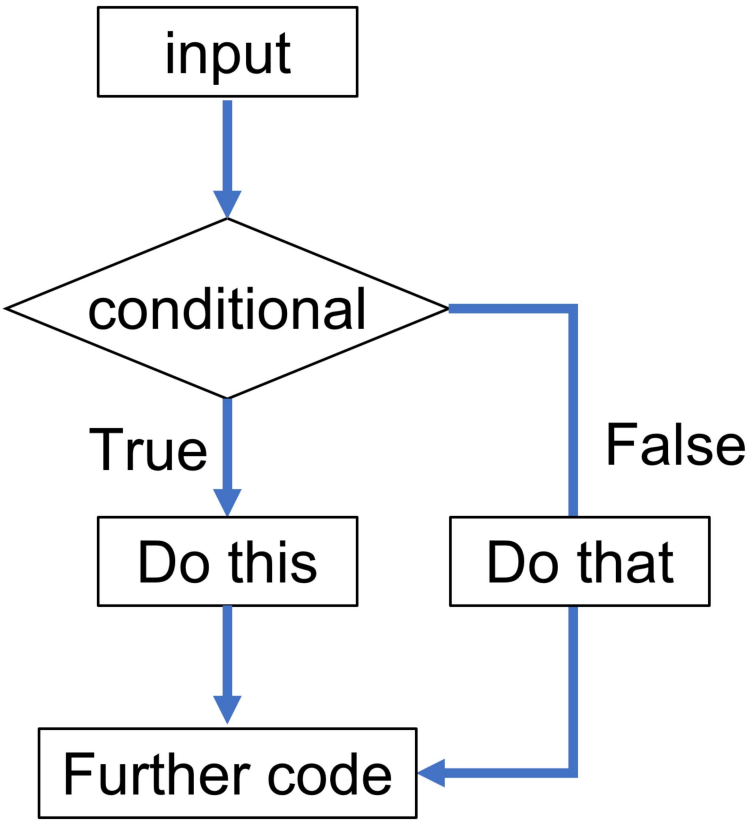
The indent is used to determine which pieces of code are executed in the case that the condition evaluates to `True`.

The indent can be any number of spaces.

- must be the same for all lines in a block of code.
- 4 spaces is considered best practise.
- Many IDEs (e.g. Spyder) automatically indent after you type `if:`.

`if... else`

Runs a block of code only if a condition is `True`
Otherwise runs a different block of code.



In [3]:

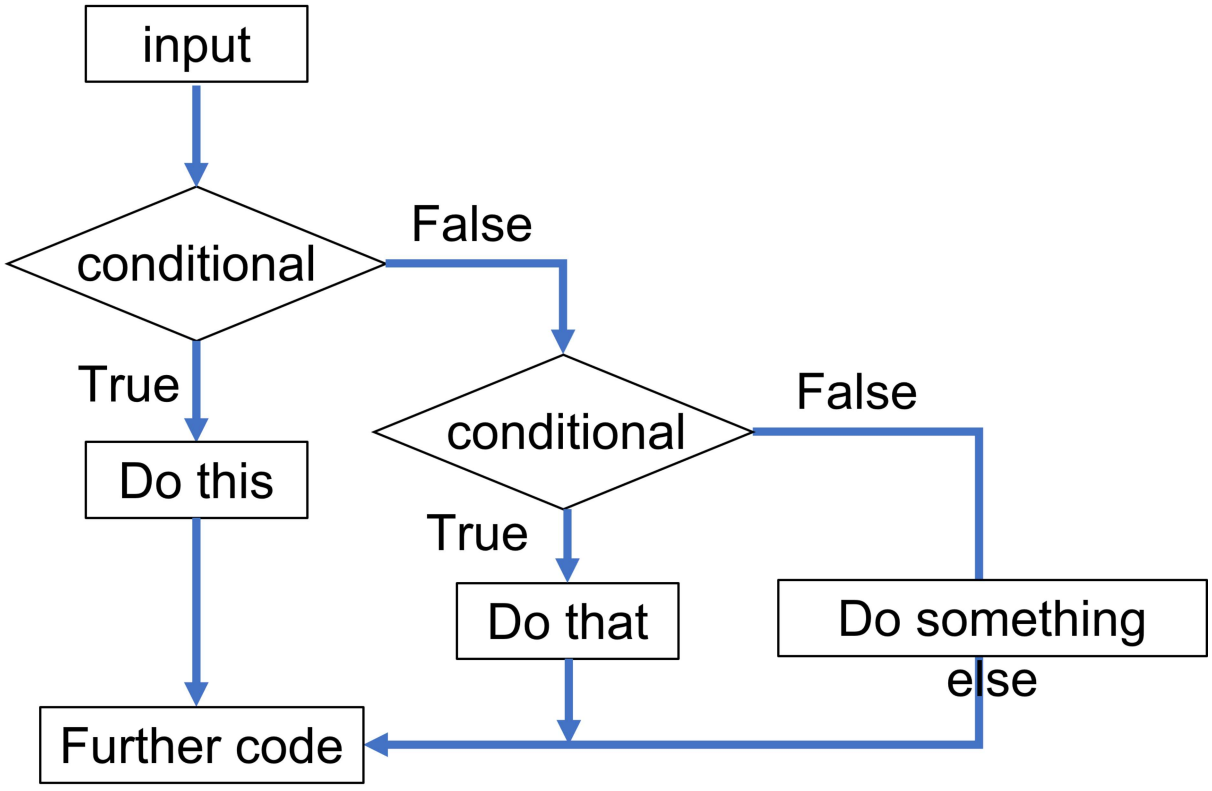
```
x = 9

if x > 10:
    print("Do this") # if condition is True
else:
    print("Do that") # if condition is False

print("Further code")
```

```
Do that
Further code
```

`if...elif...(else)`

Runs the indented block of code after `if` if the `if` condition is `True`
... or runs the indented block of code after `elif` if the `elif` condition is `True`
... otherwise runs the indented block of code after `else` .

Only one of the three blocks is executed.



In [5]:

```
x = 5

if x > 10:
    print("Do this")           # if condition is True
elif x > 5:
    print("Do that")           # if another condition is True
else:
    print("Do something else") # if all preceding conditions are False

print("Further code")
```

```
Do something else
Further code
```

An unlimited numer of `elif` statements can be used after an `if` statement

The `else` statement is optional.

In [9]:

```
x = 4

if x > 10:
    print("x is greater than 10") # if condition is True
elif x > 5:
    print("x is greater than 5") # if another condition is True
elif x > 0:
    print("x is greater than 0") # if another condition is True


print("Further code")
```

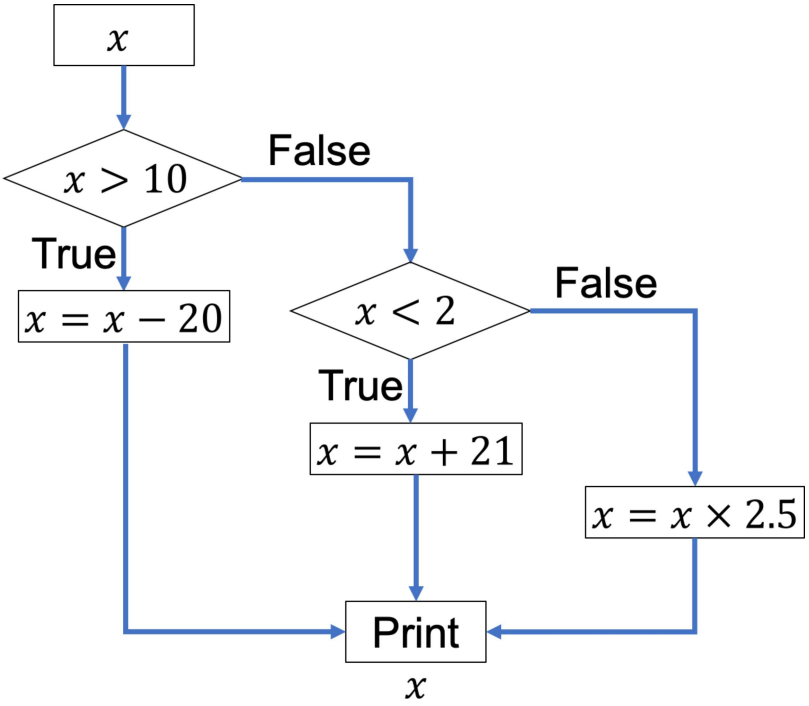
```
x is greater than 0
Further code
```

Summary

- Conditional statements (`if` , `elif` and `else`) perform a test on an expression with a a Boolean (`True` or `False`) value.
- Execute/skip blocks of code based on the `True` / `False` value of the expression.

In-class Demos

Example 1:
Write a program to modify the initial value of the variable `x` and print the new value, as shown in the flow diagram.



In [21]:

```
# Initial value of x

# x is greater than 10

# x is less than 2

# x is in range 2 to 10, inclusive

# Final value of x
```

Let's remind ourselves of an example from last week.

> **Is it lunchtime?**
> `True` if time between lunch start and end times.
> `False` if not.

> **Is it time for work?**
> `True` if time between work start and end times **and not** lunchtime.
> `False` if not.

Let's build on the example from last week by including control statements.

Example 2:
Write a program that tells the user what acitivty to do based on the time of day.

- eat lunch if it is lunchtime
- do work if it is time for work
- go home if it is before or after work

In [1]:

```
# --------- Program from last week -------------------
# Variables
t = 9.00            # current time
Ls = 13.00          # lunch starts
Le = 14.00          # lunch ends
Ws = 8.00           # work starts
We = 17.00          # work ends

lunchtime = Ls <= t < Le                    # lunchtime

work_time = Ws <= t < We and not lunchtime # work_time

#-----------------------------------------------------
```