

# GCSE OCR

Computer Science  
J277

3

## Iteration

Unit 7 Programming



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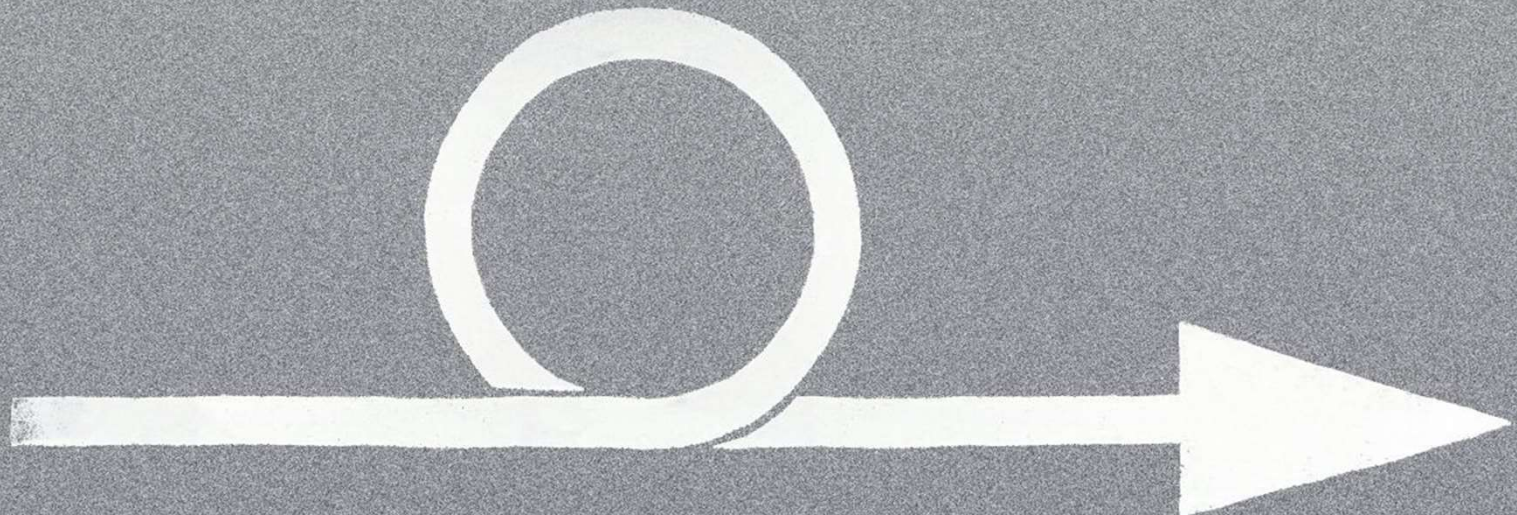
# Objectives

- Understand and use iteration in an algorithm
- Write algorithms in pseudocode involving sequence, selection and iteration



# Starter

- What does iteration mean?
  - What are **three** types of loop that can be used in programming languages for iteration?





# Iteration

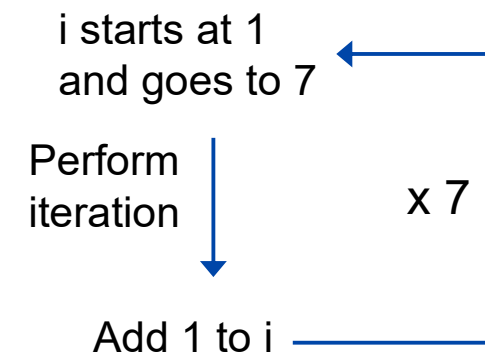
- Iteration means repetition of a section of code
- There are three types of iteration statement in most languages such as Visual Basic, Java, and C#
  - `for ... next`
  - `while ... endwhile`
  - `do ... until`
- Some languages, such as Python, do not have the `do ... until` statement



# For loops

- Use this when you want to execute the loop a specified number of times

```
total = 0
for i = 1 to 7
    dailyTemperature = input()
    total = total + dailyTemperature
next i
averageWeeksTemp = total / 7
print(averageWeeksTemp)
```



# While loops

- Use this when you want to execute the loop **while** a certain condition is true.

```
password = input("Please enter password: ")
while password != "jd8UpP2+d"
    password = input("Invalid password - try again")
endwhile
print("Correct password")
```

Check condition ←

Perform iteration  
if the condition  
is True

- The condition is tested at the **beginning** of the loop
  - How many times will the loop be executed if the user always enters "jd8Upp2d"?



# While loops

Answers

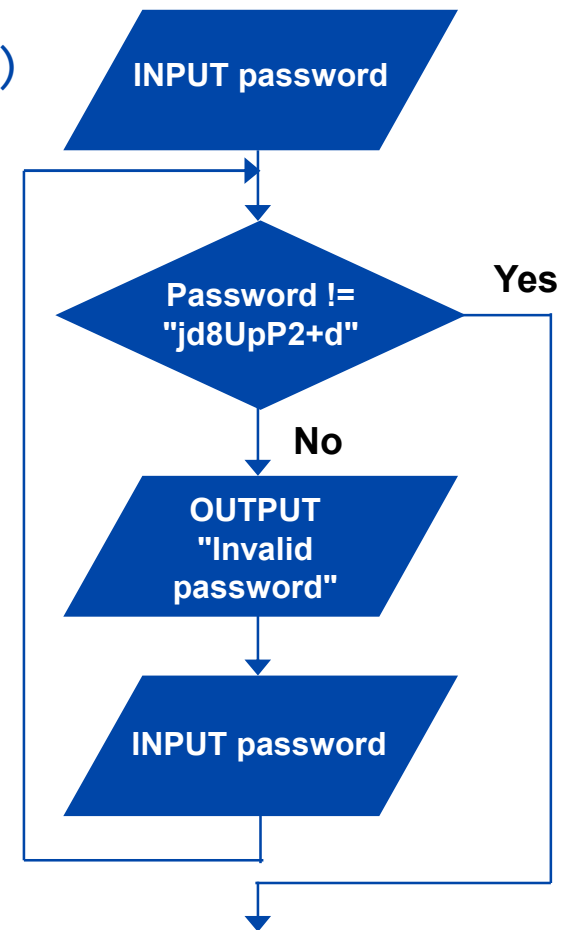
```
password = input("Please enter password: ")  
while password != "jd8UpP2+d"  
    password = input("Invalid password - try again")  
endwhile  
print("Correct password")
```

- How many times will the loop be executed if the user always enters "jd8Upp2d"?
  - The loop will continue forever as the password entered is incorrect
  - If a loop continues forever and there is no way to exit it, it is called an **infinite loop**



# Flowcharting while ... endwhile

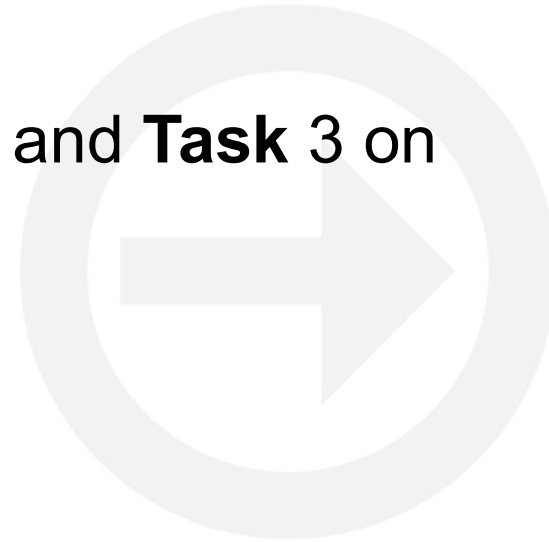
```
password = input("Please enter password: ")  
while password != "jd8UpP2+d"  
    password = input("Invalid password  
    - try again")  
endwhile  
print("Correct password")
```





# Worksheet 3

- Now complete **Task 1**, **Task 2** and **Task 3** on **Worksheet 3**



# do ... until loops

- Use this when you want to execute the loop **until** a certain condition is True
- The condition is tested at the **end** of the loop
- Rewrite this algorithm using a DO...UNTIL loop instead of a WHILE loop

```
password = input("Please enter password: ")
while password != "jd8UpP2+d"
    password = input("Invalid password - try again")
endwhile
print("Correct password")
```

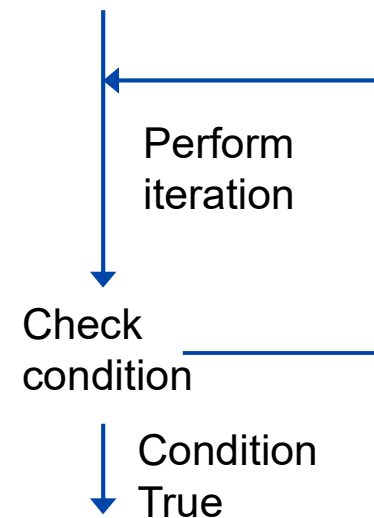




# do ... until loops

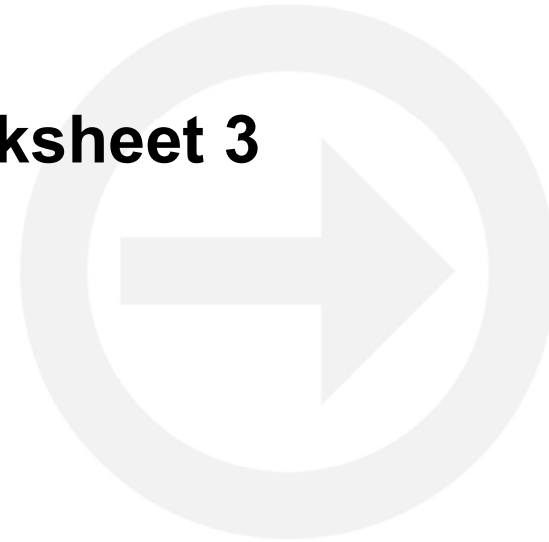
- Use this when you want to execute the loop **until** a certain condition is True
- The loop will always execute once
  - The condition is tested at the **end** of the loop

```
password = ""  
do  
    password = input("Invalid password - try again")  
until password == "jd8UpP2+d"  
print("Correct password")
```



# Worksheet 3

- Now complete **Task 4** on **Worksheet 3**





# Plenary

- What are **three** types of programming loops?
- For each of the following situations, explain how you could use a loop to solve it:
  - Ask a user to enter their name – if they don't enter a name longer than one letter, then keep on asking them to enter their name
  - Count from 1 to 100
  - Repeatedly check the state of a game to see if one of the players has won



# Plenary

Answers

- What are **three** types of programming loops?
  - FOR loop, WHILE loop, DO WHILE loop
- Ask a user to enter their name – if they don't enter a name longer than one letter, then keep on asking them to enter their name
  - DO WHILE loop
- Count from 1 to 100 – For loop
- Repeatedly check the state of a game to see if one of the players has won
  - WHILE loop





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