

YEAR

Theme4
Programming

**Homework
Booklet**

Name

Form

Introduction

In this theme you will learn how to program! We will be using the Python programming language. It is free to download (have a play around at home!)

You will be applying the concepts discovered in Theme 3 - Algorithms such as sequence, selection and iteration within your programs.

At the bottom of each homework you will see an icon which will tell you how the homework will be assessed.

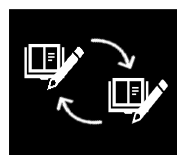
See below to find out what the icons mean:



Self Assessment: You will mark your work at the start of next lesson.
ENSURE YOU COMPLETE HOMEWORK AS MARKS WILL BE COLLECTED IN!



If you see this on a homework it means there will be an Edmodo quiz on the homework next lesson.
SO MAKE SURE YOU REVISE AND READ THE INFORMATION CAREFULLY!



If you see this on a homework it means you will be peer assessing the homework next lesson with another student.
MAKE SURE YOU HAVE YOUR HOMEWORK COMPLETED SO YOU CAN SWAP WITH ANOTHER PUPIL!

Failure to submit homework on time will result in a 45-minute detention.

If you lose your homework booklet you may be charged for a replacement and you MUST catch-up on any homework's lost!

Stuck? Got a question? Email your teacher.

Mr Rifai (Head of Computing)	rifaim@turton.uk.com
Miss Davison	davisone@turton.uk.com
Miss Pascoe	pascoej@turton.uk.com

H/w1 – Year 7 Recap

Due Date:

What is an algorithm? _____

Keyword Review – Write out the correct definitions

SEQUENCE

SELECTION

ITERATION

INPUT

PROCESS

OUTPUT



WWW:

EBI:

Peer assessed by:

H/W2 Sequencing (Year 7 Recap)

Due Date: _____

3 functions are programmed for a robot to follow. The functions are:

- Forward (n) – This moves the robot forward n number of squares
- TurnLeft () – This turns the robot left 90 degrees
- TurnRight () – This turns the robot right 90 degrees

Draw the path of the robot through the grids below after the following algorithms are executed.

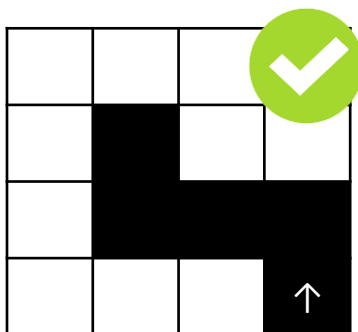
The first has been done for you!

Shade in the squares the robot passes through.

(The robot starts in the square marked by the ↑ facing in the direction of the arrow)

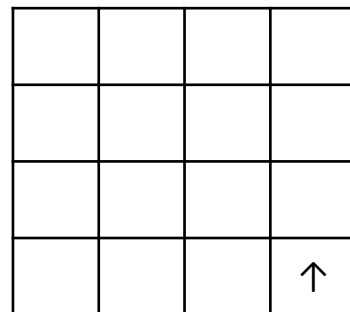
Algorithm 1

```
Forward(1)
TurnLeft()
Forward(2)
TurnRight()
Forward(1)
```



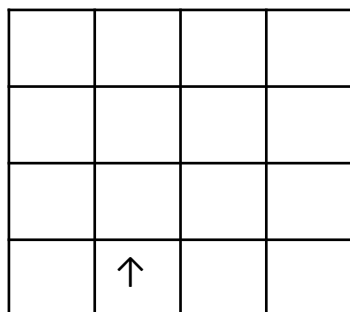
Algorithm 2

```
TurnLeft()
Forward(3)
TurnRight()
Forward(1)
```



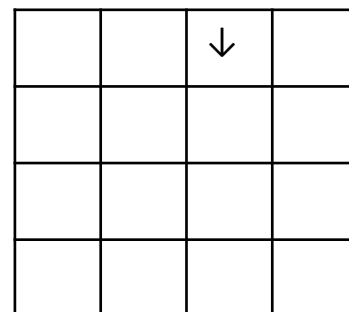
Algorithm 3

```
Forward(2)
TurnRight()
Forward(1)
TurnLeft()
Forward(1)
```



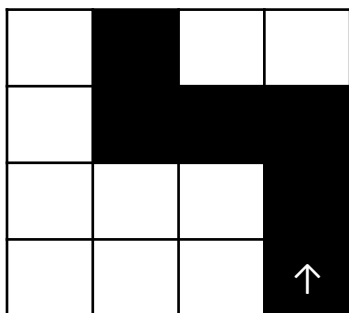
Algorithm 4

```
Forward(3)
TurnRight()
Forward(1)
TurnRight()
Forward(1)
TurnRight()
Forward(2)
```

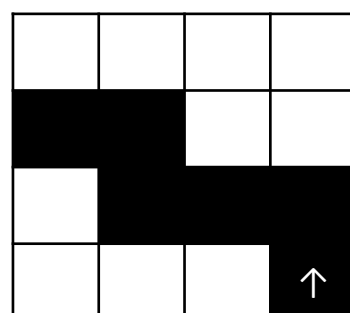


Look at the completed grids for algorithms 5 and 6. You need to write the algorithm that the robot would have followed to create the path (using sequencing).

Algorithm 5



Algorithm 6



Peer assess the above grids with the person next to you. Are they correct?



Score ____ / 5

H/W3 – What is Programming?

Due Date:

Programming is writing computer code to create a program, to solve a problem. **Programs** are created to implement **algorithms**. Algorithms can be represented as **pseudocode** or a **flowchart**, and programming is the translation of these into a computer program.

To tell a computer to do something, a program must be written to tell it exactly what to do and how to do it. If an algorithm has been designed, the computer program will follow this algorithm, step-by-step, which will tell the computer exactly what it should do.

What is a programming language?

A **programming language** is an artificial language that a computer understands. The language is made up of series of **statements** that fit together to form **instructions**. These instructions tell a computer what to do.

There are many different programming languages, some more complicated and complex than others. Among the most popular languages are:

- Python
- Java
- C++
- BASIC
- Scratch

Programming languages are designed to be easy for a human to understand and write in. However, a computer cannot run programs written in these languages directly. Most programming languages have to be translated into **machine code** before the computer can **execute** the instructions.

What is a program?

Programs are made up of **statements** that the programming language knows and understands.

Just as words are put together to form a sentence, a program puts one or more statements together to form an **instruction**. Each statement tells the computer to perform a specific task, and the instructions tell a computer what to do.

Example

The following sentence asks someone to write a message on a whiteboard: "Please write the words 'Hello world!' on the board."

This sentence is an instruction, which contains a single statement. The statement is 'write the words'. In **Python**, the equivalent statement is **print**.

```
>>> print("Hello world!")
```



Edmodo

Quiz Score attained: ____ / ____

H/W4 - Errors

Due Date:

You may come across errors when programming in Python.
Explain what a syntax error is?

```
>>> print(Hello World!)  
SyntaxError: invalid syntax  
>>> |
```

What is the error and how can we correct this?

```
>>> print("Hello World)  
SyntaxError: EOL while scanning string literal  
>>> |
```

What is the error and how can we correct this?

```
>>> pint("Hello World!")  
Traceback (most recent call last):  
  File "<pyshell#5>", line 1, in <module>  
    pint("Hello World!")  
NameError: name 'pint' is not defined
```

What is the error and how can we correct this?



WWW:

EBI:

Peer assessed by:

H/W5 - Keyword Review

Due Date:

Keyword Review – Write out the correct definitions

ALGORITHM

SEQUENCE

SYNTAX

STRING

Function Review – Write what the function is used for in Python

print()

input()



WWW:

EBI:

Peer assessed by:

H/W6 - Variables

Due Date:

Recapping the *print()* command.

• Which of these lines of code is correct?

- 1) Print("Hello World!")
- 2) print("Hello World!")
- 3) print(Hello World!)
- 4) print "Hello World"

What is the difference between Python's **script** mode (new file) and **interactive** mode (shell) ?

What is a variable?

Why do we need to label a variable or give a variable an **identifier**?

Write out Python code below to create three variables which store your **name**, **age** and favourite subject.



H/W7 – Data Types & More

Due Date:

What are the two different data types you have used in Python so far?
(See the hints in table below)

1) _____ 2) _____

Complete the table below:

Two different data types:	S _____	I _____
Description of data type		Whole numbers
Colour in Python?		Coloured in black font
Mainly used for?	Mostly used for output e.g. "writing sentences" and storing variables in Python	

#LOOK AT THE CODE BELOW AND ANSWER THE FOLLOWING QUESTIONS

```
print("What is your name?")
name = input()
print("What is your favourite colour?")
colour = input()
print(colours + " is a good colour! " + name + " is a nice name too!")
```

How many variables do you see?

Why won't this code work? Look carefully!



H/W8 - Selection

Due Date:

Look at the code below and answer the questions.

```
1 print("What is the capital of England?")
2 answer = input()
3 if answer == "London":
4     print("CORRECT!")
5 else:
6     print("INCORRECT!")
```

What are the words inside the speech marks known as? _____

What are print() and input() known as in Python? _____

At which line of code does selection take place? _____

In the space below: Write a program using Python **syntax** (see example code) which asks a user to enter their age. If the age is over 18 the program should print *"You are allowed to drive"* otherwise the program will print *"You are not old enough to drive"* and end.



Peer assessed by:

H/W9 – Knowledge Organiser Snapshot

Due Date:

Fill in the gaps based on the knowledge organiser.

What is a variable?

Include any corrections here in purple pen after the teacher has been through the answers.

A variable is made up of three parts:

- 1 _____
- 2 _____
- 3 _____

DATA TYPES	String	
		A whole number

Describe the keyword **assignment** using the examples below.

x = 5 #here we are assigning 5 to the variable x
name = input() #here whatever the user types in will be assigned to the variable, name.



H/W11 – Spellings

Due Date:

Practice spelling the words below. You will have a spelling test next lesson!
Write out the words 5 times. Pay attention to the spellings.

Sequence

Selection

Iteration

Variable

Identifier

Assignment

Definite

Indefinite

Algorithm

H/W12 – Knowledge Organiser Snapshot

Due Date:

Fill in the gaps using the knowledge organiser.

What is iteration?

There are 2 types of iteration:

- 1.
- 2.

IN PYTHON

```
x = 1
while x < 6:
    print x
    x = x + 1
```

```
for x in range(1,6):
    print x
```

Up to but NOT including 6!

Explain the code above and the type of loop used.

Explain the code above and the type of loop used.

What will be output when both of these programs are executed



H/W13 – Knowledge Organiser Snapshot

Due Date:

IDE'S

What is an IDE?

Include any corrections here in purple pen after the teacher has been through the answers.

In lesson you will have used IDLE and Pyscriptor.

Research and find three other IDE's programmers use

- 1 _____
- 2 _____
- 3 _____

Features of IDE's

IDLE

Pyscriptor

Features of IDE's	IDLE	Pyscriptor
Syntax checks. This recognises incorrect use of syntax and highlights any errors.		
Translator. This allows you to run/execute the code you have written		
Auto-completion. As you start to type the first part of a function, it completes the line for you!		
Syntax highlighting. Colour codes your code! E.g. strings in green when using IDLE		

Tick the correct boxes above.



WWW:

EBI:

Peer assessed by:

Programming 1

Year 8 | Theme 3

Knowledge Organiser

Variable – Sometimes we need computers to remember the information we give it. A variable can be thought of as a box (memory location) that the computer can use to store a value. The value held in the box may change or vary. A program can use as many variables as it needs.

- A variable is made up of three parts:
- A name (identifier)
 - A type (**data type** – see below)
 - A value (what you are storing)

name = "Mr Rifai"
 The variable is called **name**, its **data type** is a **string**, and its **value** is **Mr Rifai**

DATA TYPES	
String	Combination of characters that appear on the keyboard (alphanumeric)
Integer	A whole number

Assignment - In order to change the data value stored in a variable, you use an operation called assignment. Different values may be assigned to a variable at different times during the execution of a program.

x = 5 #here we are assigning 5 to the variable **x**
name = input() #here whatever the user types in will be assigned to the variable, **name**.

Algorithm - a sequence of steps/instructions that can be followed to complete a task.

Sequence

In a sequence structure, an action or event leads to the next in a predetermined order.

```
qty = input()
total = qty * price
print(total)
```

1

Selection

A question is asked, depending on the answer the program takes one, two or more courses of action.

```
x = input()
if x > 5 :
    print("too big")
else:
    print("just right!")
```

2

Iteration

A process wherein a set of instructions or structures are repeated in a sequence a set number of times or until a condition is met.

```
for count in range(1,11):
    print("ROVERS!")
```

3

3 Programming Constructs

IDE's
 An integrated development environment (IDE) is an application used to create software (programs). It provides you with a code editor (a place to write your code!)

IDLE	An IDE we have used to create python programs
PyScriptor	Another IDE we have used to create python programs!

Features of IDE's

	IDLE	PyScriptor
Syntax checks. This recognises incorrect use of syntax and highlights any errors.	✓	✓
Translator. This allows you to run/execute the code you have written	✓	✓
Auto-completion. As you start to type the first part of a function, it completes the line for you!		✓
Syntax highlighting. Colour codes your code! E.g. strings in green when using IDLE	✓	✓

There are 2 types of iteration:

1. **Indefinite** – code is repeated (iteration) continues until some **specified condition is met.**
 e.g. **WHILE** loop
2. **Definite** – code is repeated (iteration) is carried out a **set number of times.**
 e.g. **FOR** loop.

IN PYTHON

```
x = 1
while x < 6:
    print x
    x = x + 1
```

for x in range(1,6):
 print x

Up to but **NOT** including 6!

x starts at 1. We then enter the **WHILE** loop. x is less than 6 so we will print x and add one to x.
 x is now 2, still less than 6 so we print and continue...

Above is a **FOR** loop. x will start at 1 and then be printed. x will then be 2 and get printed.....this will continue till x is 5!

The code for each of the programs above outputs the same thing, **1,2,3,4,5.**