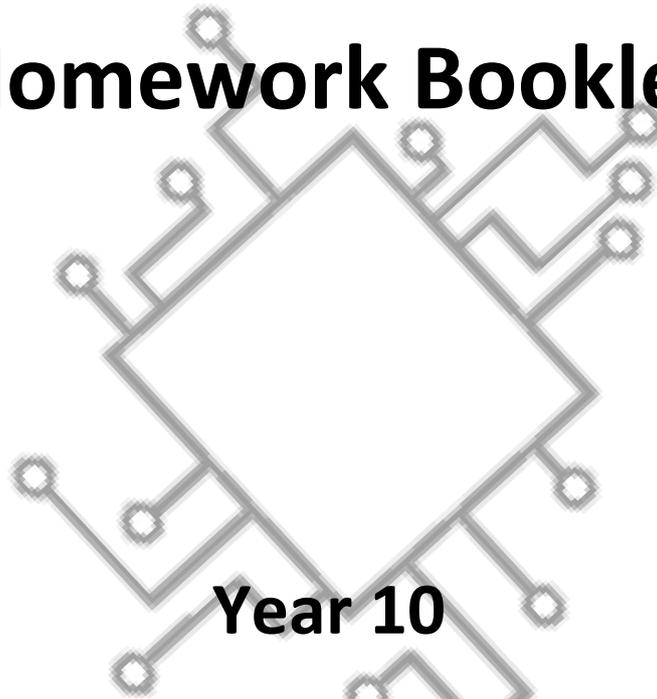


Name : _____



Computer Science Homework Booklet



Year 10

Term 1 :: Programming Constructs

Homework 1 : Datatypes	Due Date :	Completed? <input type="checkbox"/>
Homework 2 : Algorithms with conditionals	Due Date :	Completed? <input type="checkbox"/>
Homework 3 : Using formulas in calculations	Due Date :	Completed? <input type="checkbox"/>
Homework 4 : Programming constructs	Due Date :	Completed? <input type="checkbox"/>
Homework 5 : Iteration	Due Date :	Completed? <input type="checkbox"/>
Homework 6 : Revision	Due Date :	Completed? <input type="checkbox"/>

Homework 1 : Datatypes

1 A computer program calculates the correct dose in grams of a type of medicine, this algorithm is shown below:

```
age = input("Enter the age:")
gender = input("Enter the gender:")
if age < 20 then
    dose = age * 0.1
else
    dose = 2
endif
if gender == "Female" then
    isPregnant = input("Are they
pregnant?:")
    if isPregnant == TRUE AND dose >
1.5 then
        dose = 1.5
    endif
else
    dose = dose * 0.5
endif
```

The data type of the variable Age is integer.

State the data type of the following variables used in the algorithm.

Variable	Data Type
Gender	
Dose	
isPregnant	

[3]

A mail-order company buys dresses from America and France to see in the UK.

2 The company uses the following algorithm to convert sizes before printing them in its catalogue. Half sizes are not possible (e.g. size 12.5)

```
size = input("Enter the size: ")
origin = input("Enter the origin: ")
if origin = "America" then
    size = size + 2
else
    if origin = "France" then
        size = size - 26
    Endif
Endif
print(size)
```

State the most appropriate data type for the variables Origin and Size, giving a reason for your choice.

Origin
Data Type
Reason
Size
Data Type
Reason

Homework 2 : Algorithms with conditionals

1 A taxi company calculates the cost of a day-time journey is £3 for the first kilometre and £2 for every kilometre after that. If there are five or more passengers in the taxi, an extra 50% is added to the charge.

Write an algorithm to calculate the cost of a day-time journey.

Your algorithm should:

- Allow the number of passengers and the distance of the journey to be input as whole numbers
- Calculate the cost of the journey
- Output the cost that has been calculated

Homework 3 : Using formulas in calculations

OCR Airlines allows passengers to carry up to 25kg of luggage free of charge. Any additional luggage is charged at £10 per kg. No luggage weight over 50kg is allowed.

Write an algorithm that:

- Asks the user to enter the weight of luggage (in kg)
- Displays an error message if the luggage is over 50kg
- If the luggage is allowed, calculates the price to be paid and outputs this.

Homework 4 : Programming constructs

1. A taxi uses a computer to communicate with the central office and to calculate customers' fares.

The program in the computer uses sequence, selection and iteration. State whether the operations below use **sequence**, **selection** or **iteration**.

Performing a series of different set-up operations when the computer is switched on.

--

Beeping repeatedly after a message is sent, until the drive presses a button to show that the message has been read.

--

Deciding whether to use the DayTimeRate or the EveningRate functions to calculate a customer's fare.

--

2. Julie is writing a computer game that simulates a 100m race. Each time the space bar is pressed, the position of the player moves up by 1. When the position reaches 100, the player has won.

Here is Julie's algorithm for the program

```
const playerKey = " "
position = 0
repeat
  keyPressed = input("")
  if keyPressed == playerKey then
    position = position + 1
  endif
until position = 100
```

State what is meant by selection and iteration using examples from Julie's algorithm

Selection	
Example	
Iteration	
Example	

3. An algorithm is written that finds the mean average (i.e. the total of the numbers divided by how many numbers there are) of a set of 10 numbers are stored in an array numberArray.

```
const quantity = 10
for count = 0 to quantity
    total = total + numberArray[count]
next count
mean = total / 10
print(mean)
```

Identify **two** forms of iteration that are **not** used in this algorithm.

1	
2	

[2]

Homework 5 : Iteration

1. A programmer has written an algorithm to output a series of numbers. The algorithm is shown below:

```
01 for k = 1 to 3
02     for p = 1 to 5
03         print (k + p)
04     next p
05 next k
06 m = 7
07 print m * m
```

Give the first **three** numbers that will be printed by this algorithm.

[1]

State how many times line **03** will be executed if the algorithm runs through once.

[1]

2. Write a program that uses a for loop (count-controlled) which prints out the numbers 1 to 10

Homework 6 : Revision

1. Explain the difference between a for loop and a while loop

Billy writes a program that will output the higher of two numbers entered, this algorithm is shown below.

```
num1 = input("Enter number 1: ")
num2 = input("Enter number 2: ")
if num1 > num2 then
    print(num1)
else
    print(num2)
endif
```

2. Correct this algorithm to ensure that it also accounts for if the numbers are the same and then outputs an appropriate message.

3. An infinite loop is where a section of a program repeats indefinitely.

For each of the pseudocode algorithms shown below, tick the appropriate box to show whether they will loop infinitely or not.

Pseudocode	Will loop infinitely	Will <u>not</u> loop infinitely
01 x = 0 02 while True 03 print x 04 endwhile		
01 x = 0 02 while x < 10 03 print x 04 endwhile		
01 x = 0 02 while x < 10 03 print x 04 x = x + 1 04 endwhile		
01 y = 5 02 for x = 1 to y 03 print x 04 next		

[4]