Knowledge Retrieval Booklet

GCSE Computer Science (9-1)

J277/02 – Computational thinking, algorithms and programming.

Name: .....

Class: .....

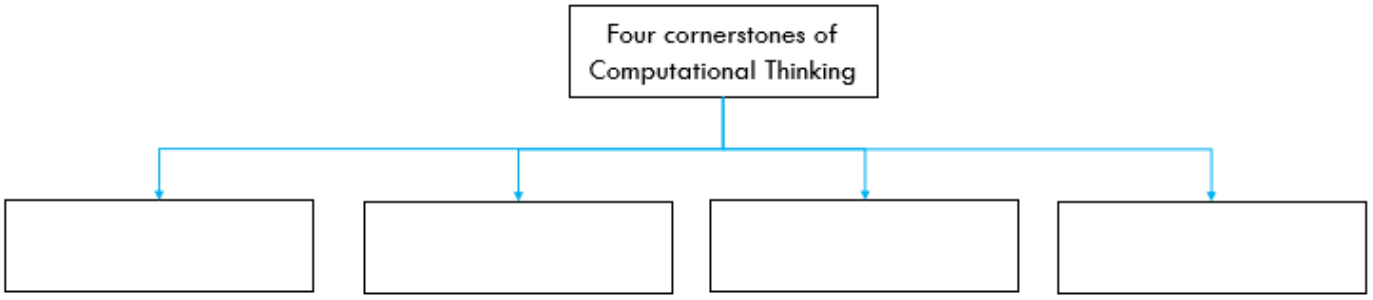
Date: .....

2.1.1 Computational thinking

Lesson 1

Activity 1

Complete the concept map below (1 point each)



Activity 2

Identify the key terms for the descriptions shown below. (1 point each)

The removal of unnecessary elements so that the important points remain.	When a complex problem is broken down into smaller sub-tasks to make it easier to solve.	A list of instructions designed to solve a problem.	The process of spotting regularities/similarities in data.

Total points	

2.1.2 Designing, creating and refining algorithms

Lesson 2

Activity 1

Complete the concept map below (1 point each)

Activity 2

Name each flow chart symbol shown below (1 point each)

Activity 3

Name the **three** programming constructs (1 point each)

Activity 4

Complete the match them up activity. (1 point each)

1. Pseudocode	A. Code is written that doesn't fit in with the rules of the language.
2. Flow charts	B. A diagram that depicts a process, system or computer algorithm.
3. Syntax errors	C. Used to allow programmers to follow the value of variables as each line of code is executed.
4. Logic errors	D. A plain language description of the steps in an algorithm.
5. Trace tables	E. Written in a form that is close to our human language.
6. High-level language	F. The program will appear to be working however, it might do what it's intended to do.

Total points	

2.1.3 Searching and sorting algorithms

Lesson 3

	Last lesson (1 point)
	Two lessons ago (2 points)

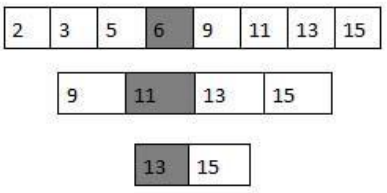
Activity 1:

What can you remember so far?

Name **one** computational thinking method	Name **one** computational thinking method	Name **one** programming construct	Name **one** programming construct	Name **one** common error found when writing code.
Name **one** programming construct	Name **one** computational thinking method	Name **one** common error found when writing code.	Name **one** computational thinking method	Name **two** ways of constructing an algorithm

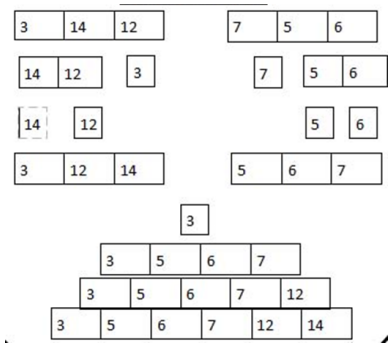
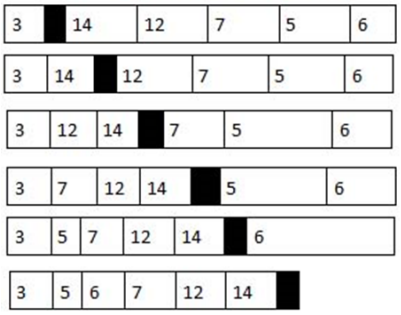
Activity 2

Name these two searching algorithms based on the diagrams shown below (1 point each)

2, 3, 5, 6, 9, 11, 13, 15 2, **3**, 5, 6, 9, 11, 13, 15 2, 3, **5**, 6, 9, 11, 13, 15 2, 3, 5, **6**, 9, 11, 13, 15 2, 3, 5, 6, **9**, 11, 13, 15 2, 3, 5, 6, 9, **11**, 13, 15 2, 3, 5, 6, 9, 11, **13**, 15	

Activity 3

Name these three sorting algorithms based on the diagrams shown below (1 point each)

		3,**14,12**,7,5,6 3,12,**14,7**,5,6 3,12,7,**14,5**,6 3,12,7,5,**14,6** 3,**12,7**,5,6,14 3,7,**12,5**,6,14 3,7,5,**12,6**,14 3,**7,5**,6,12,14 3,5,**7,6**,12,14 3,5,6,7,12,14

Total points	

2.2.1 Programming fundamentals

Lesson 4

Activity 1

Name what each of these arithmetic operators represent (1 point each)

Operator	Python representation	Meaning
+		
-		
*		
/		
DIV		
^		
MOD		

Activity 2:

Name what each of these comparison operators represent. (1 point each)

Operator	Meaning
==	
!=	
>	

<	
=>	
<=	

Total points	

2.2.2 Data types

Lesson 5

Activity 1

How much can you remember?

	Last lesson (1 point)		Two lessons ago (2 points)		Three lessons ago (3 points)		Four lessons ago (4 points)

Name **three** sorting algorithms	Name **one** programming construct	Name **four** computational thinking methods.	Name **one** programming construct
Name **two** ways of constructing an algorithm	Name **one** comparison operator	What does **^** represent?	What does **MOD** represent?
Name one comparison operator	Name **two** searching algorithms	Name one comparison operator	Name **one** programming construct

Activity 2

Name the data types based on the examples shown below (1 point each)

Example	**Data type**
"Hello"	
23	
TRUE	

3.12	
"C"	

Activity 3

Complete the missing words in this statement (1 point each)

_____ means changing the data type of a piece of data from one type to another. The data may be stored inside a _____.

Total points	

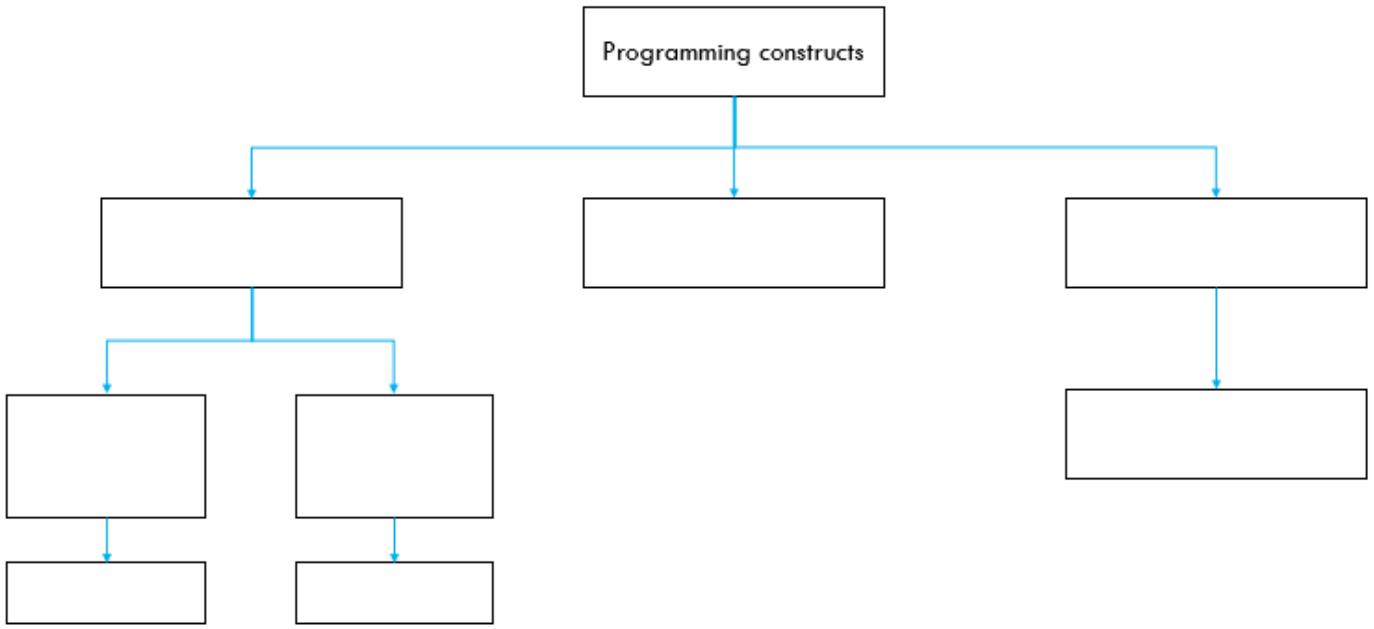
2.2.3 Additional programming techniques (Part 1)

Lesson 6

Activity 1

Complete the concept map below. The keywords have been provided (1 point each)

Condition-Controlled iteration	Counter-controlled iteration	FOR loop	IF statement	Iteration	Selection	Sequence	WHILE loop



Activity 2

Look at the code below and identify the output. (1 point each)

Code	Output

Name = “Antonia” Name.substring(0,1)	
Name = “Antonia” Name.substring(1,4)	
Name = “Antonia” Name.upper()	
Name = “Antonia” Name.length	
Name = “Antonia” Name.substring(0,-2)	

Total points	

2.2.3 Additional programming techniques (Part 2)

Lesson 7

Activity 1:

What can you remember so far?

1 lesson ago (1 Point)	2 lessons ago (2 Points)	3 lessons ago (3 points)	4 lessons ago (4 points)	5 lessons ago (5 points)	6 lessons ago (6 points)

Name **three** sorting algorithms	Name **two** searching algorithms	Name **four** computational thinking methods	What term is used to describe the conversion from one data type to another?
Which function checks the length of a string?	Name **three** arithmetic operators	Name **two** common types of error found when writing code.	Name **two** ways of constructing an algorithm
Name **four data** types	Name **three** comparison operators	Name **three** programming constructs	What command is used to take part of a string?

Activity 2

Completing the missing line of code in each case shown in the table below (1 point each)

Command	Code
Reading an existing text file.	F =open("File.txt" ___)
Writing a new text file	F =open("File.txt" ___)
Updating an existing text file	F =open("File.txt" ___)
Create a specified file.	F =open("File.txt" ___)
Closing a text file (Double points)	F =open("File.txt","r") _____

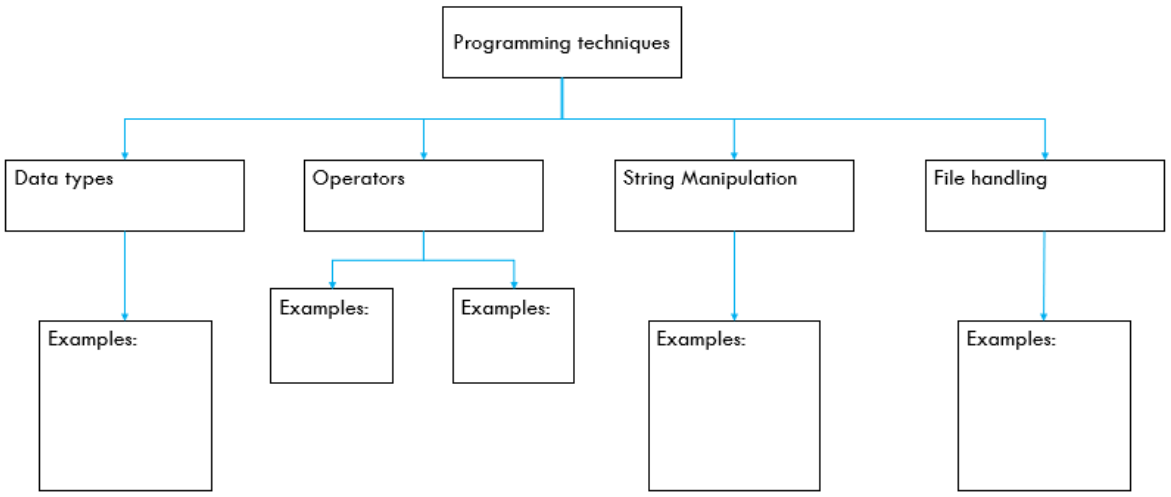
Total points	

2.2.3 Additional programming techniques (Part 3)

Lesson 8

Activity 1

Complete the concept map below where it says 'examples' (1 point each)



Activity 2

Match up the keywords with the definition (1 point each)

1. Primary Key	A. This SQL command will request fields that they want to appear in the final results.
2. Field	B. This is a field that will uniquely identify a record and removing any duplicates.

3. Record	C. This SQL command will request specific information from the selected fields.
4. SELECT	D. A category of data
5. FROM	E. An individual set of data.
6. WHERE	F. This SQL command means the source in which the information came from.

Activity 3

Look at the table below. Identify which Product No(s) will be output based on the following SQL statements. (1 point each)

Product No.	Registration	Make	Year	Mileage	Price
0001	AV60 HES	Peugeot	2010	33156	£5,500
0002	GF56 RTE	Toyota	2006	26875	£8,500
0003	FD02 YOU	Hyundai	2002	85300	£3,499
0004	AD62 HGF	Peugeot	2012	50887	£7,649
0005	AF63 THE	Peugeot	2013	45860	£6,780
0006	GF64 NGB	Renault	2014	38665	£6,199
0007	GR11 JUL	Renault	2011	90760	£2,999

SQL Command	Output
SELECT * FROM Cars WHERE Make = Toyota	
SELECT * FROM Cars WHERE Mileage > 40000	
SELECT * FROM Cars WHERE Make = Peugeot AND Price <7000	

Total points	

2.2.3 Additional programming techniques (Part 4)

Lesson 9

Activity 1:

What can you remember so far?

	1-2 lessons ago. (1 point)		3-4 lessons ago (2 points)		5-6 lessons ago (3 points)		7-8 lessons ago (4 points)

Name **two** searching algorithms	Name **three** SQL commands	Name **four** arithmetic operators	Name **four** comparison operators
Name **four** data types	Name **two** ways of constructing algorithms	Name **three** file handling commands	Name **three** sorting algorithms
Name **four** computational thinking methods	What term is used to describe the conversion from one data type to another?	Name **three** programming constructs	How do you convert a string contained words into capital letters?

Activity 2

Using the array shown below, identify what will the output will be from the snippets of code shown below. (1 point each)

Names	Sam	Jessica	David	Gemma	Dom

Code	**Output**
print (Names[2])	
print(len(Names))	
Names[0] = "Jake" print(Names)	
Names.append("Charlie") print(Names)	
Names.pop(3) print(Names)	
Names.sort() print(Names)	

Total points	

2.2.3 Additional programming techniques (Part 5)

Lesson 10

Activity 1

Using the code below, decipher to identify these three key terms below. (1 point each)

A	B	C	D	E	F	G	H	I	J	K	L	M	O	N	P	Q	R	S	T	U	V	W	X	Y	Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

19	5	17	21	5	15	3	5

19	5	12	5	3	20	9	14	15

9	20	5	18	1	20	9	14	15

Activity 2

Re-arrange the anagrams below to reveal three key terms related to subprograms. The descriptions have been provided. (1 point each)

conunfit	**coperrude**	**armrepeat**
A subprogram that can return a result based on its defined parameters.	A subprogram that will not return a result, but information can still be passed through it.	A special variable used within a function to return a result.

Activity 3

Re-arrange the order of this function from 1 = start to 5 = finish

Snippet	**Order**
Call the function and input value as a parameter	
Return the value	
End the function	
Create the function and set a parameter.	

Total points	

2.3.1 Defensive design

Lesson 11

Activity 1:

What can you remember so far?

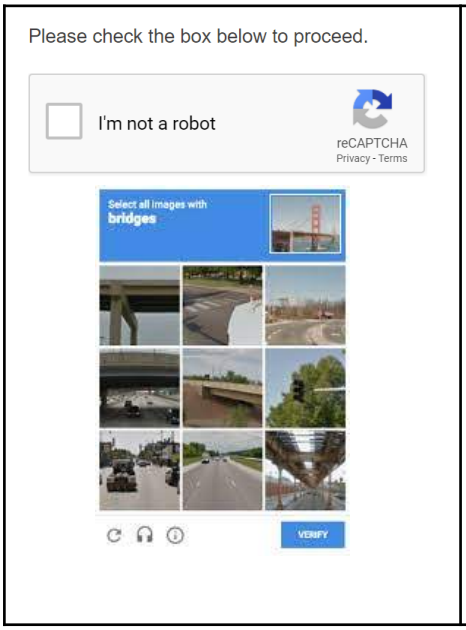
	Last week (1 point)		2-4 weeks ago (2 points)		5-8 weeks ago (3 points)		9-10 weeks ago (4 points)

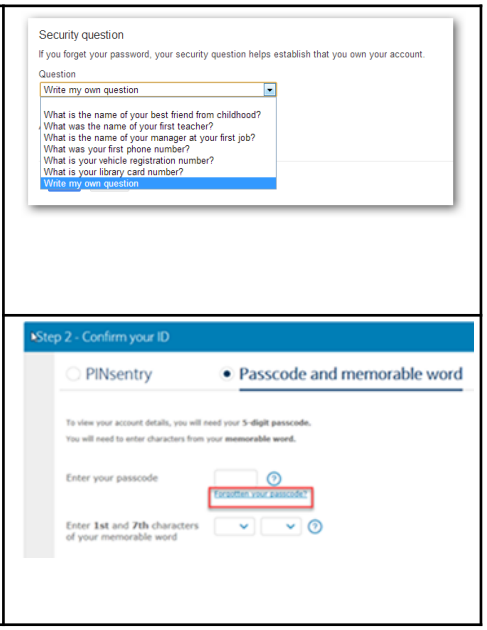
Name the subprogram that can return a result.	Name **three** programming constructs	Name **four** arithmetic operators	Which command allows you to add an item to an existing array?
Name **three** SQL commands.	Name **four** comparison operators	Name the subprogram that cannot return a result.	Which arithmetic operator will display the remainder of an

			equation which isn't equally divisible?
Name **five** data types	Name **three** file handling commands.	What term is used to describe one data type being converted to another?	Name **three** sorting algorithms and **two** searching algorithms.

Activity 2

Use the images below and label the different methods of authentication. (1 point each)





Total points	

2.3.1 Defensive design (Part 2)

Lesson 11

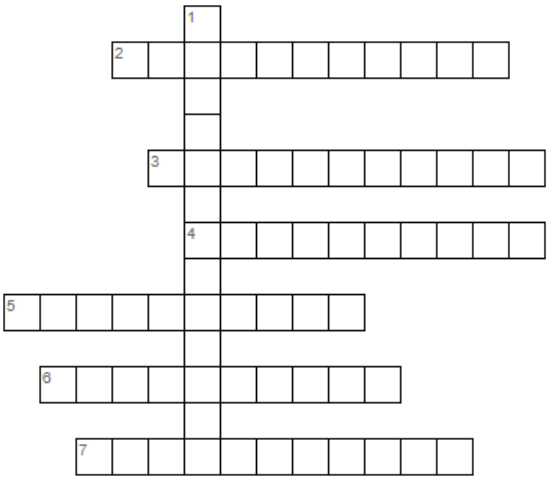
Activity 1:

Name three ways to maintain code (1 point each)

Activity 2

Complete the crossword shown below (1 point each)

Data validation



Across

2 Used to check data entered is the appropriate data type
3 Used to check if the data enter has sufficient amount of characters.
4 Used to verify whether a sequence of numbers have been entered correctly.
5 Used to check the quality of written communication in a document.
6 Used to check whether data entered fits within a set criteria.
7 Could be used to find the date and time on an online entry form.

Down

1 Used to check that a field has not been left blank.

Total points	

2.3.2 Testing

Lesson 12

Activity 1

How much can you remember? (1 point each)

Name **one** way of maintaining code.	Name **two** searching algorithms	Name **three** programming constructs	Name **four** computational thinking methods	Name **five** data types	Name **six** arithmetic operators	Name **seven** data validation methods

Activity 2

Look at the code and completed test table below. Identify what types of test data have been used. (1 point each)

```
#Guess the number challenge
import random

Answer = random.randint(1,100)#Random number between 1 and a 100.

score = 1 # Record number of guesses
guess = int(input("Enter a number between 1 and a 100"))

while guess != Answer: #While user guesses incorrectly.
    if guess < Answer: #Indicates whether they are too high or low.
        print("Too low")
    elif guess > Answer:
        print("Too high")
    elif guess == Answer:
        print("Correct")
    else:
        print("Out of range")
    score = score + 1 #Adds to guesses
    guess = int(input("Please enter a number between 1 and 100"))

print("Well done, it took you",score,"guesses") #Prints out the total
```

Test No.	Description	Test data	Expected outcome	Actual outcome
1	Test 54 as it's well within the specified range.		Program should work as intended.	Program does work as intended.
2	Test 1 as it's just inside the range.		Program should work as intended.	Program does work as intended.
3	Test 234 as it's just outside the range.		Program should not work as intended.	Program does not work as intended.
4	Test using the word Apple as it's not a number.		Program should not work as intended.	Program does not work as intended.

Activity 3:

Complete the missing gaps in the paragraph below. (1 point each)

_____ takes place during the development of the program. Whereas, _____ takes place when the development of the code is complete.

Total points	

2.4.1 Boolean logic

Lesson 13

Activity 1

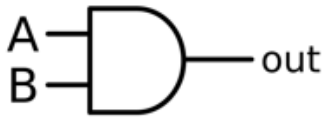
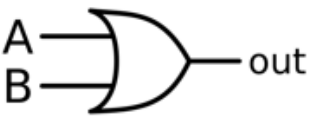
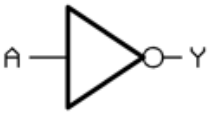
How much can you remember?

	Last week (1 point)		2 weeks ago (2 points)		3 weeks ago (3 points)		4 or more weeks ago (4 points)

Name **four** types of test data	Name **three** methods of authentication	Name **three** types data validation checks.
Name **four** ways of maintain code.	Name **two** subprograms	Name **three** programming constructs
Name **five** data types.	Name **two** searching algorithms	Name **three** sorting algorithms

Activity 2

Complete the table below (1 point each)

Diagram			
Gate			
Notation			
Boolean expression			
Truth table representation	A B Q	A B Q	A Y

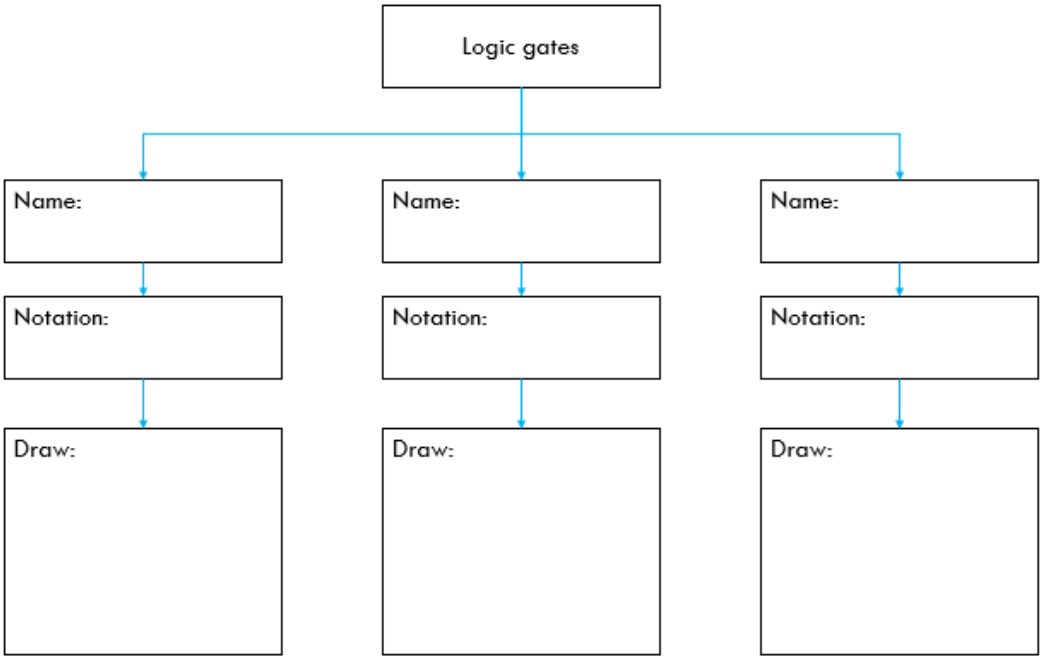
Total points	

2.5.1 Languages

Lesson 14

Activity 1

Complete the concept map below. (1 point each)



Activity 2

Name the languages shown in the table below and identify whether it is a high-level or low-level programming language (1 point each)

00001101010 110000110	**ADD 3** **STA 4** **HLT**	**print ("Hello world")** **print ("My name is Bob")**
Language:	Language:	Language:
High-level or Low-level?	High-level or Low-level?	High-level or Low-level?

Activity 3

Tick whether each statement relates to an interpreter or a compiler. (1 point each)

Statement	**Interpreter**	**Compiler**
Translates and execute one line of source code at a time.		
Instead of stopping at the first error, it will generate a list of errors (if any) all at once.		
If a line contains an error – then the program will stop at that line and go no further.		
Translates all of the code in one batch, instead of line by line.		
Code must be translated each time it's run		
Code will run faster.		

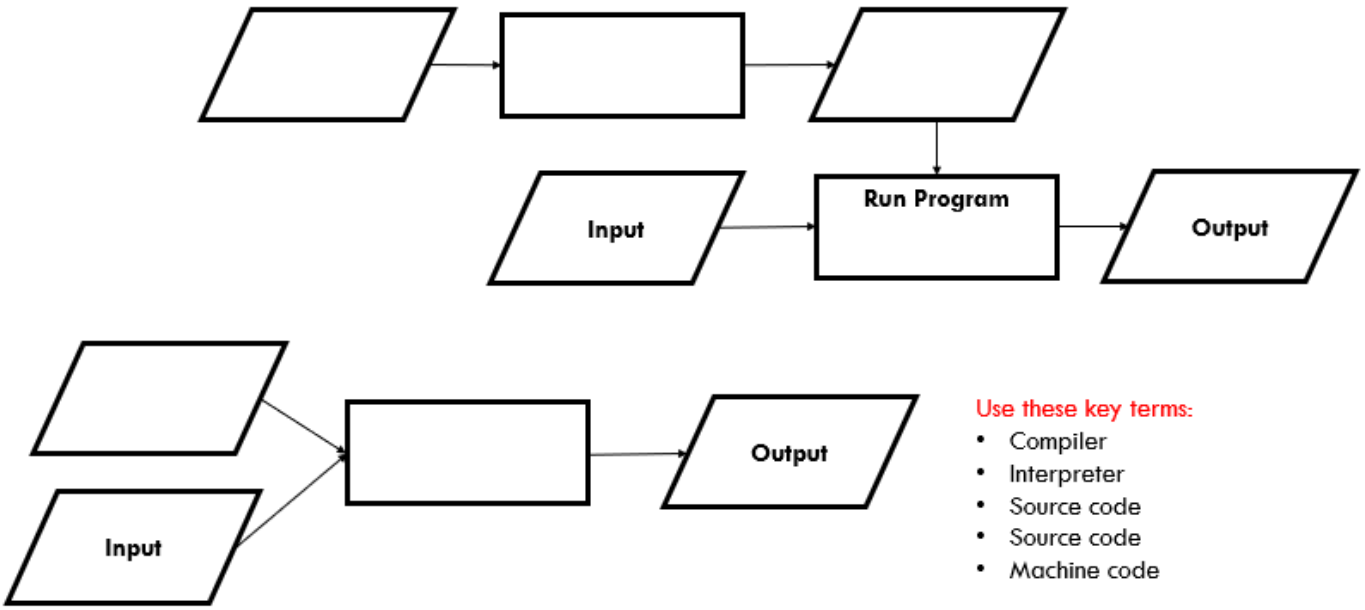
Total points	

2.5.2 The Integrated Development Environment (IDE)

Lesson 15

Activity 1

Complete the structure diagram shown below (1 point each)



Use these key terms:

- Compiler
- Interpreter
- Source code
- Source code
- Machine code

Activity 2

Name the IDE features based on the descriptions provided below. (1 point each)

Allows code to be inspected for errors with suggestions on where the problem lies.	Automatically indents the next line if required.	Displays source code in different colours so certain commands in orange, functions in purple etc..	It highlights matching sets to identify whether you've used the correct number of open and closed brackets.

Total points	

Final Challenge!

Score as many points as you can.

Name **four** IDE features (1 point)	Name **two** high-level language translators (2 points)	Name **three** logic gates (3 points)	List the **three** notations used to represent each logic gate (3 points)
Name **two** types of testing (4 points)	Name **four** types of test data (4 points)	Name **seven** data validation methods (5 points)	Name **four** ways to maintain code (5 points)
Name **four** methods use for authentication (5 points)	Name **two** types of subprograms (6 points)	Name **one** data structure you've studied that allows you to store multiple items under one identifier. (7 points)	Name **three** SQL commands (8 points)
Name **four** file handling commands (9 points)	Name **two** ways of manipulating a string (10 points)	Name **five** data types (11 points)	Name **three** logical operators (12 points)
Name all the comparison operators (13 points)	Name all the arithmetic operators (13 points)	Name **two** searching algorithms (14 points)	Name **three** sorting algorithms (14 points)
Name **two** commons error that occur when writing code (15 points)	Name **three** programming constructs (15 points)	Name **two** types of iteration (15 points)	Name **four** computational thinking methods (16 points)