Chhetri Academy

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GCSE COMPUTER SCIENCE

2.1

OCR J277 | Specification point 2.1.2

Designing, creating and refining algorithms

Untiered

Past paper question booklet

5	2018-2025	Untiered
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

2 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
```

(a) **(i)** Give the first **three** numbers that will be printed by this algorithm.

..... **[1]**

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

..... **[1]**

(b) Identify **two** basic programming constructs that have been used in this algorithm.

1 .....

.....

2 .....

.....

[2]

(c) **(i)** Describe what is meant by a variable.

.....

.....

.....

..... **[2]**

(ii) Identify **two** variables that have been used in the algorithm above.

1 .....

2 .....

[2]

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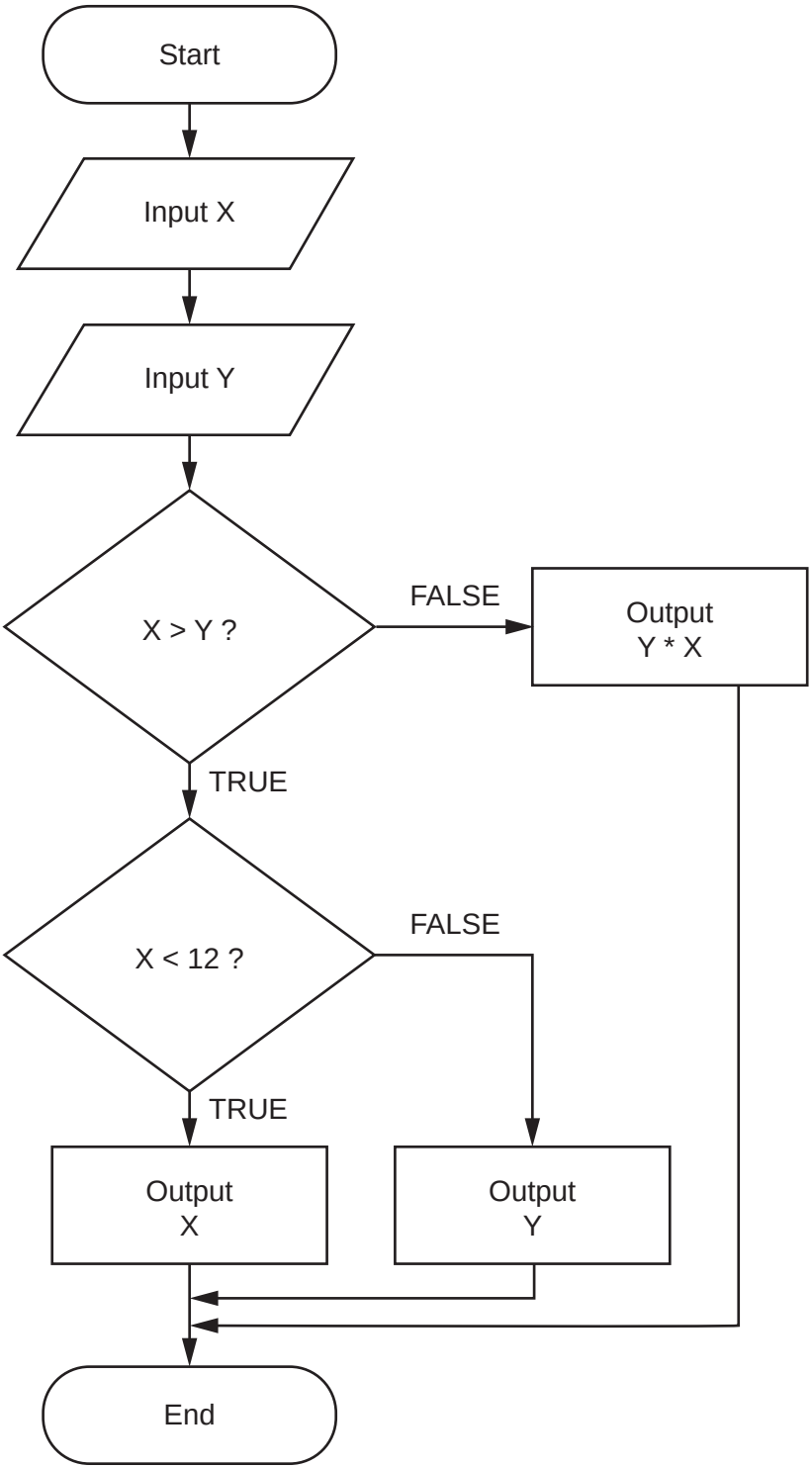
2 A programmer creates an algorithm using a flow chart.



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(a) Complete the table to give the output when each of the following set of values are input into the algorithm as X and Y.

Input value of X	Input value of Y	Output
15	10	
6	5	
2	3	
12	2	

[4]

(b) Write this algorithm using pseudocode.

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..... **[6]**

The algorithm is written in a high-level language. The high level code must be translated into machine code before a computer processor can execute it.

(c) Describe **two** methods of translating high level code into machine code.

1 .....

.....

.....

.....

.....

.....

2 .....

.....

.....

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.....

..... **[4]**

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1 **(a)** Tick (✓) **one** box in each row to identify whether the OCR Reference Language code given is an example of selection or iteration.

OCR Reference Language code	Selection	Iteration

`for i = 1 to 10`
`  print(i)`
`next i`		

`while score != 0`
`  playgame()`
`endwhile`		

`if playerHit() then`
`  score = 0`
`endif`		

`switch bonus:`
`  case 0:`
`  score = 9`
`  case 1:`
`  score = 7`
`  case 2:`
`  score = 5`
`endswitch`		

[4]

(b) Write pseudocode to increment the value held in the variable `score` by one.

.....

..... **[1]**

(c) State the name of each of the following computational thinking techniques.

Breaking a complex problem down into smaller problems.

.....

.....

Hiding or removing irrelevant details from a problem to reduce the complexity.

.....

.....

[2]

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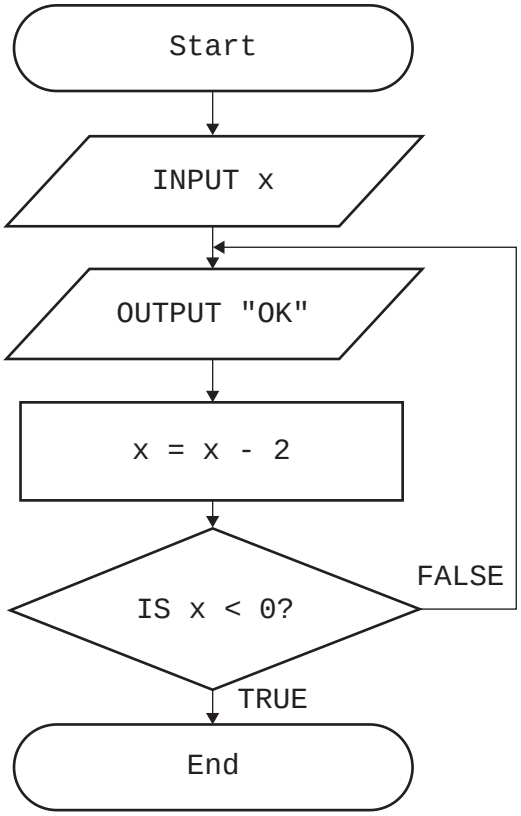
1 Tick (✓) **one** box in each row to identify the programming construct where each keyword is used.

Keyword	Programming construct	
	Selection	Iteration
`if`		
`for`		
`while`		

[3]

2 This flowchart uses iteration.



(a) Complete the table by identifying how many times "OK" will be output for when each value is input.

Input value	Number of times "OK" is output
3	
10	

[2]

(b) Iteration is a programming construct.

(i) Identify **and** describe **two** different examples of iteration that can be used in a high-level language.

1 .....

.....

.....

2 .....

.....

.....

[4]

(ii) Give the names of **two** other programming constructs that are used in a high-level language.

1 .....

2 .....

[2]

(c) A programmer implements the flowchart as a program in a high-level language using an Integrated Development Environment (IDE).

Identify and describe **two** tools that the programmer could use in the IDE to create a program from the flowchart.

Tool 1 .....

Description .....

.....

Tool 2 .....

Description .....

.....

[4]

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