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Centre number

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# Level 3 Technical Level

## IT: PROGRAMMING

### Unit 2 Computer programming

Thursday 7 June 2018

Afternoon

Time allowed: 2 hours

#### Materials

For this paper you may use:

- a ruler
- a scientific calculator (non-programmable)
- stencils or other drawing equipment (eg flowchart stencils).

#### Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer each question in the space provided. Do not write outside the box around each question or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- If you need more space use the additional pages at the back of this booklet.

#### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- There are 50 marks in **Section A** and 30 marks in **Section B**. Both sections should be attempted.

#### Advice

- In all calculations, show clearly how you work out your answer.
- Use diagrams, where appropriate, to clarify your answers.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

| For Examiner's Use |      |
|--------------------|------|
| Question           | Mark |
| 1–5                |      |
| 6                  |      |
| 7                  |      |
| 8                  |      |
| 9                  |      |
| 10                 |      |
| 11                 |      |
| 12                 |      |
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| 15                 |      |
| 16                 |      |
| 17                 |      |
| 18                 |      |
| <b>TOTAL</b>       |      |



J U N 1 8 F 5 0 7 6 4 6 5 0 1

G/KL/Jun18/E4

**F/507/6465**

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ANSWER IN THE SPACES PROVIDED**



**Section A**Answer **all** questions in this section.**Total for this section: 50 marks**In multiple choice questions, only **one** answer per question is allowed.

For each answer completely fill in the circle alongside the appropriate answer.

CORRECT METHOD



WRONG METHODS



If you want to change your answer you must cross out your original answer as shown.



If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.

You may do your working in the blank space around each question but this will not be marked.  
Do **not** use additional sheets for this working.**0 1**Which **one** of the following variable types is the best choice to store 'whole numbers'?**[1 mark]****A** real☐**B** single character☐**C** integer☐**D** floating point☐**0 2**Which **one** of the following languages is not classed as multi-paradigm?**[1 mark]****A** C++☐**B** Oz☐**C** Prolog☐**D** Java☐**Turn over ►**

|   |   |
|---|---|
| 0 | 3 |
|---|---|

In programming, which **one** of the following are FIFO and LIFO examples of?

[1 mark]

A debugging

☐

B greedy algorithms

☐

C binary files

☐

D queues and stacks

☐

|   |   |
|---|---|
| 0 | 4 |
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Which **one** of the following is a disadvantage of black box testing?

[1 mark]

A tester requires knowledge of specific languages

☐

B tests a limited number of paths

☐

C tester must be non-technical

☐

D tests are done from an end user's point of view

☐

|   |   |
|---|---|
| 0 | 5 |
|---|---|

Which **one** of the following is **not** a class of algorithm?

[1 mark]

A divide and conquer

☐

B greedy

☐

C breakpoints

☐

D brute force

☐

|   |
|---|
| 5 |
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0 6

Machine code and high-level languages can both be used for programming.

0 6 . 1

Describe **two** characteristics of a high-level language.

[2 marks]

1 \_\_\_\_\_

\_\_\_\_\_

2 \_\_\_\_\_

\_\_\_\_\_

0 6 . 2

Give **one** advantage of using machine code instead of a high-level language.

[1 mark]

\_\_\_\_\_

3

0 7

In the logic paradigm, CLACL represents CLAC-Language.

0 7 . 1

What does the acronym CLAC stand for?

[1 mark]

\_\_\_\_\_

0 7 . 2

Who are the target users of CLACL?

[1 mark]

\_\_\_\_\_

2

0 8

Quad programming is one technique for developing a computer program.

0 8 . 1

How is quad programming organised?

[1 mark]

\_\_\_\_\_

\_\_\_\_\_

0 8 . 2

Give **one** use of quad programming.

[1 mark]

\_\_\_\_\_

\_\_\_\_\_

2

Turn over ►



0 9

The Python code in **Figure 1** shows a list on Line 01 and a function definition on Line 03 and Line 04. The function is called on Line 06 and Line 07.

**Figure 1**

|    |                                              |
|----|----------------------------------------------|
| 01 | months=[31,28,31,30,31,30,31,31,30,31,30,31] |
| 02 |                                              |
| 03 | def daysinmonth(month):                      |
| 04 | print(months[month])                         |
| 05 |                                              |
| 06 | print(daysinmonth(1))                        |
| 07 | print(daysinmonth(11))                       |

The output from the code is as follows:

**Figure 2**

|      |
|------|
| 28   |
| None |
| 31   |
| None |

0 9 . 1

In the output shown in **Figure 2**, state why the first line shows the value 28 rather than 31.

**[1 mark]**


---

0 9 . 2

Which part of Line 03 in **Figure 1** is the parameter?

**[1 mark]**


---

0 9 . 3

Which part of Line 07 in **Figure 1** is the argument?

**[1 mark]**


---



0 9 . 4

Explain why the word 'None' appears between each number in the output in **Figure 2**.

[3 marks]

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0 9 . 5

How would you fix the problem identified in Question **09.4** to give only the expected output of 28 and 31?

[1 mark]

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1 0 . 1

In programming, what variable type would you use to represent a data table?

[1 mark]

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1 0 . 2

Give **two** examples of where data tables might be used.

[2 marks]

1 

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2 

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7

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3

Turn over ►



1 1

Explain what a pointer is in computer programming.

[2 marks]

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2

1 2

A student writes the code in **Figure 3** to find the highest number. There are errors in the code.

**Figure 3**

```

01 n1=5
02 n2=10
03 n3=8
04
05 if (n1 >= n2) and (n1 >= n3):
06     num = n1
07 elif (n2 >= n1) and (n2 <= n3):
08     num = n2
09 else:
10     num = n4
11
12 print("The number output is",num)

```

1 2 . 1

Identify the variable which is used to store the highest number.

[1 mark]

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1 2 . 2

In the code in **Figure 3** give the line numbers where a value is being assigned to a variable.

[2 marks]

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|   |   |   |   |
|---|---|---|---|
| 1 | 2 | . | 3 |
|---|---|---|---|

There is a name error in the code in **Figure 3**.

Give the line number where the error occurs and state how you would correct it.

[2 marks]

Line number \_\_\_\_\_

Correction \_\_\_\_\_

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | . | 4 |
|---|---|---|---|

The name error in the code in **Figure 3** is corrected.

When the code is run, what number is output on Line 12?

[1 mark]

\_\_\_\_\_

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | . | 5 |
|---|---|---|---|

In the code in **Figure 3**, identify one other line that contains an error.

[1 mark]

\_\_\_\_\_

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | . | 6 |
|---|---|---|---|

How would you correct the line you have identified so that the program runs as expected?

[1 mark]

\_\_\_\_\_

\_\_\_\_\_

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| 8 |
|---|

Turn over for the next question

Turn over ►



|   |   |
|---|---|
| 1 | 3 |
|---|---|

Various techniques may be used in the planning and design of software.

|   |   |   |   |
|---|---|---|---|
| 1 | 3 | . | 1 |
|---|---|---|---|

Explain the problems a software design team might have if they use flowcharts instead of storyboarding to show a user-interface to a client.

**[3 marks]**

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|   |   |   |   |
|---|---|---|---|
| 1 | 3 | . | 2 |
|---|---|---|---|

Explain when a software design team might use a structure diagram.  
Use an example in your answer.

**[3 marks]**

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Compare the waterfall and spiral software development models.

**[6 marks]**

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| 6 |
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**Turn over for the next question**

**Turn over ►**



|   |   |
|---|---|
| 1 | 5 |
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**[6 marks]**

[illegible]

3



**Section B**Answer **all** questions in this section.**1 6**

When developing a software product, it is essential that clear project requirements are gathered at the start of the lifecycle.

**1 6 . 1**

Describe the purpose of the requirement gathering phase.

**[2 marks]**

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**1 6 . 2**

Describe **two** ways to gather project requirements that are of good quality.

**[4 marks]**

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**6****Turn over ►**



**Turn over for the next question**

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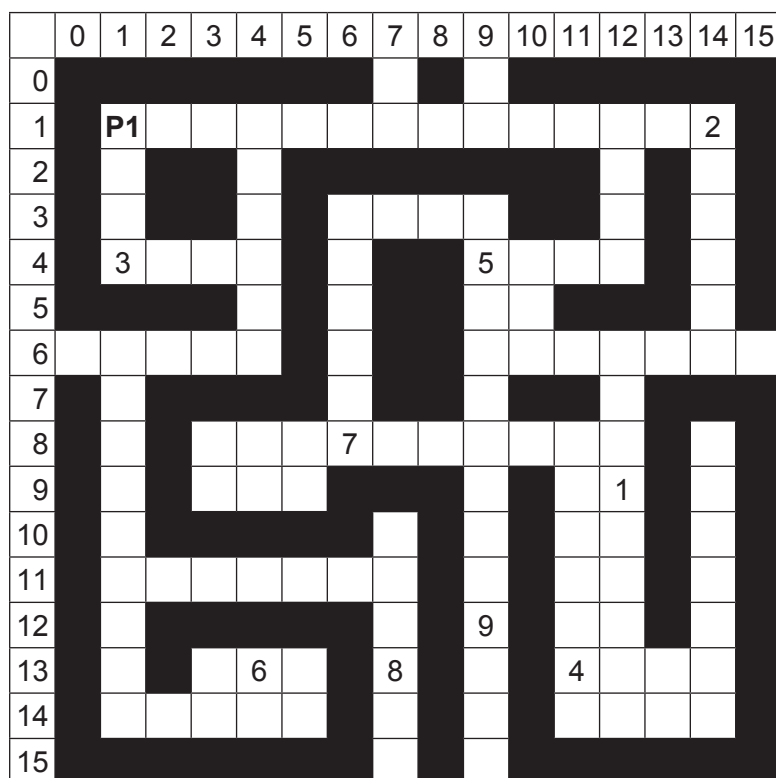
**Turn over ►**



1 8

Figure 4 shows the layout of a maze in a computer game.

Figure 4



In the game, **Player 1** moves around the maze in **Figure 4** collecting numbers.

**Player 1** starts at (1,1) shown on the grid as **P1**.

The rules:

- Players can move up/down, left/right, but not diagonally.
- No player can move onto a black square.
- If a player goes off the grid, they reappear on the opposite side.  
For example, 1 move up from (7,0) is (7,15).
- If a player moves on to a square with a number, that number is added to their score and the number removed from the grid.
- Each player starts with 0 points.
- The game ends when all the numbers have been picked up.





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|   |   |   |   |
|---|---|---|---|
| 1 | 8 | . | 2 |
|---|---|---|---|

The code is being modified so that **Player 1** can now play against the computer.

Explain the additional features and techniques you would need to consider.

**[6 marks]**

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15

**END OF QUESTIONS**



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[illegible]

[illegible]

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