Write your name here

Surname	Other names

Pearson Edexcel
Level 1/Level 2
International GCSE (9–1)

Centre Number | | | | | |

Candidate Number | | | | |

Computer Science

Paper 2: Application of Computational Thinking

Sample assessment material for first teaching
September 2017
Time: 3 hours

Paper Reference
4CP0/02

You must have: A computer workstation with appropriate programming language code editing software and tools, including a code interpreter/compiler, CODES folder containing code and data files, pseudocode reference

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions **requiring a written answer** in the spaces provided – *there may be more space than you need*.
- Only **one** programming language must be used throughout the test.
- Carry out practical tasks on the computer system and save new or amended code using the name given with the appropriate file extension.
- Do **not** overwrite the original code and data files provided to you.
- You must **not** use the internet during the test.

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
- This paper covers Python, C# and Java.
- The CODES folder in your user area includes all the code and data files you need.
- The invigilator will tell you where to store your work.

Advice

- Read each question carefully before you start to answer it.
- Save your work regularly.
- Check your answers and work if you have time at the end.

Turn over ▶

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Pearson

Answer ALL questions. Write your answers in the spaces provided.

1 Programmers use accepted programming constructs when writing code.

(a) Open the file **Q01a** in the code editor.

Answer these questions about the code.

(i) Identify the name given to a **data structure** in the code.

(1)

.....

(ii) Identify the line number(s) showing **repetition**.

(1)

.....

(iii) Identify the line number(s) showing **selection**.

(1)

.....

(iv) Identify the name of a **variable**.

(1)

.....

(b) Open the file **Q01b** in the code editor.

Answer these questions about the code.

(i) Identify **one** technique that could be used to make the code in **Q01b** more readable.

(1)

.....

(ii) State **one** reason why code should be readable.

(1)

.....

.....

(c) (i) Give a definition of a syntax error.

(1)

.....

.....

(ii) Open the file **Q01c** in the code editor.

Amend the code to correct three program errors.

Save your amended code as **Q01cFINISHED** with the correct file extension for the programming language.

(3)

(Total for Question 1 = 10 marks)

2 A football club uses computer applications.

(a) The club collects this data about visitors:

- country of origin
- number of adults and children in each party.

This pseudocode contains the logic required to do this.

```
# Print prompt and take country from user
SEND "Enter the country you're visiting from: " TO DISPLAY
RECEIVE country FROM (STRING) KEYBOARD

# Tell the user their country
SEND ("You are from: " & country) TO DISPLAY

# Take number of adults in party
SEND "Enter the number of adults in your party: " TO DISPLAY
RECEIVE adults FROM (INTEGER) KEYBOARD

# Take number of children in party
SEND "Enter the number of children in your party: " TO DISPLAY
RECEIVE children FROM (INTEGER) KEYBOARD

# Calculate total number in party
SET total TO adults + children

# Tell user the total
SEND ("The total in your party is: " & total)

```

Write a program to implement the logic in the pseudocode.

Do not add any further functionality.

You **must** use the structure given in file **Q02a** to write the program.

Save your amended code as **Q02aFINISHED** with the correct file extension for the programming language.

(10)

(b) Each seat in the football stadium has a unique identifier. The identifier is made up of two letters and two numbers, separated by a hyphen.

AB-45, NP-98, ab-46, nP-90 are valid seat identifiers.

Complete the table to show **two** additional validation tests and invalid data.

(4)

Validation test	**Invalid data**
Is hyphen included?	AB^12

(c) The football club makes money selling tickets, food and other items. Attendance at matches is also monitored.

At the end of each week, the data collected is processed.

Attendance is considered along with income (money coming in).

Open the file **Q02c** in the code editor.

Amend the code to complete the 'If statement' used to produce the outputs described in the table. Do not add any further functionality.

Save your amended code as **Q02cFINISHED** with the correct file extension for the programming language.

Condition	**Output message**
Attendance is at least 1500	Sufficient profit made this week
Income is at least 45000	Sufficient profit made this week
Attendance is at least 750; income is at least 22500	Income in line with attendance this week
Attendance is fewer than 500	Attendance is very low this week Contact fan club
All other inputs	Possible accounting error

(4)

(Total for Question 2 = 18 marks)

3 A holiday company has a website. They would like to publish the daily temperatures in their most popular destinations.

(a) Describe **one** benefit of using subprograms.

(2)

(b) The holiday company needs to be able to convert temperatures between Celsius and Fahrenheit.

Open the file **Q03b** in the code editor.

Answer these questions about the code.

(i) Identify the name of a **built-in** subprogram in the code.

(1)

(ii) Identify the name of a **user-defined** subprogram.

(1)

(iii) Identify the name of **one** input parameter used in a subprogram.

(1)

(iv) Identify the name of a subprogram that does **not** use input parameters.

(1)

(v) Identify the name of a **local** variable.

(1)

(vi) Identify the name of a **global** variable.

(1)

(vii) One line in the code is identified as **not** working as expected.

State why this line does **not** work as expected.

(1)

(c) The holiday company needs to assign numbers to their most popular destinations.

Cities.txt	Numbered.txt
London Hong Kong Delhi Istanbul Tokyo Mumbai Mexico City New York City Rio de Janeiro Singapore	1 London 2 Hong Kong 3 Delhi 4 Istanbul 5 Tokyo 6 Mumbai 7 Mexico City 8 New York City 9 Rio de Janeiro 10 Singapore

The files **Q03c** and **Cities.txt** are provided.

Open the code named **Q03c** in the code editor.

Write a program to implement these requirements.

For all lines in the **Cities.txt** file, the code must:

- read the line
- append a line number and a space to the front
- write the new line to a **Numbered.txt** file
- print the line to the display

You must use the structure given in file **Q03c** to complete the program.
Do not add further functionality.

Save your amended code as **Q03cFINISHED** with the correct file extension for the programming language.

(7)

(Total for Question 3 = 16 marks)

4 A list of numbers is to be sorted using a bubble sort algorithm.

(a) Give a definition of the term 'algorithm'.

(1)

.....

.....

(b) Here is a list of numbers that need to be sorted in **ascending** order.

28	7	26	21	34	18	16	9

Perform the first pass of a bubble sort.

Use this space for working to help you answer the questions.

(i) Complete the table to show how the list will have changed at the end of the first pass.

(1)

(ii) State the number of comparisons made in the first pass.

(1)

.....

(iii) State the number of swaps made in the first pass.

(1)

.....

(c) A bubble sort is only one type of sorting algorithm.

(i) Give **one** reason why a bubble sort is inefficient when sorting a large dataset.

(1)

.....

.....

(ii) State the position in a list that will always remain unchanged after the first pass of any ascending order bubble sort.

(1)

.....

(Total for Question 4 = 6 marks)

5 Data, stored as numbers, is very easily processed using computer algorithms.

(a) Open the file **Q05a** in the code editor.

Complete the trace table to show the execution of the code.

You may not need to fill in all the rows in the table.

(5)

target	rs	rm	r

(b) Open the file named **Q05b** in the code editor.

Write a program to determine a discount based on an amount entered.

The program should:

- allow the user to input total spend
- display the output message based on the total spend entered.

Total spend	Text output message
More than 300	Discount is 10%
More than 0	No discount
All other input	Invalid input

No validation of input is required.

Save your amended code as **Q05bFINISHED** with the correct file extension for the programming language.

(5)

(Total for Question 5 = 10 marks)

6 Open the file named **Q06** in the code editor.

In file **Q06**, the names and years of birth of artists are stored in a 2-dimensional data structure.

Labels for their work need to be created by joining the first letter of their last name, the first letter of their first name and their year of birth.

For example, a label for (*'Andy', 'Warhol', 1928*) would be '*WA1928*'.

Write a program to:

- process each artist to create a label
- store all the labels in the data structure named 'theLabels'
- display the labels for all the artists
- find and display the name and year of birth of the youngest artist.

Your program should function correctly, even if 'theArtists' data structure has more, fewer, or different artists.

You **must** use the data structures in file **Q06**.

Save your amended code as **Q06FINISHED** with the correct file extension for the programming language.

(Total for Question 6 = 20 marks)

TOTAL FOR PAPER = 80 MARKS