Programming – 2021/20 O Level 2210

1. Nov/2021/Paper2/Paper_22/No.1c

(c) Write an algorithm to show how your program carries out **Task 3**, using either pseudocode, programming statements or a flowchart. Assume **Tasks 1** and **2** have already been completed.

[6]

2. Nov/2021/Paper2/Paper_22/No.4b

The pseudocode algorithm should work as a calculator and output the result.

```
1   Continue ← 1
2   WHILE Continue = 0
3     OUTPUT "Enter 1 for +, 2 for -, 3 for * or 4 for /"
4     INPUT Operator
5     OUTPUT "Enter the first value"
6     INPUT Value1
7     OUTPUT "Enter the second value"
8     OUTPUT Value2
9     IF Operator
10      1: Answer ← Value1 + Value2
11      2: Answer ← Value1 - Value2
12      3: Answer ← Value1 * Value2
13      4: Answer ← Value1 / Value2
14    ENDCASE
15    OUTPUT "The answer is ", Value1
16    OUTPUT "Do you wish to enter more values (Yes or No)?"
17    INPUT MoreValues
18    IF MoreValues = "No"
19      THEN
20        Continue ← 1
21    ENDIF
22  UNTIL Continue = 0
```

(a) Find the **five** errors in the pseudocode and suggest a correction for each error.

Error 1 .....

Correction .....

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Error 2 .....

Correction .....

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Error 3 .....

Correction .....

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Error 4 .....

Correction .....

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Error 5 .....

Correction .....

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[5]

(b) The algorithm needs changing to allow only the numbers 1, 2, 3, or 4 to be entered for the input variable `Operator`.

Write the pseudocode to perform this task and state where in the algorithm it would be located.

Pseudocode .....

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Location in algorithm .....

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[5]

3. June/2021/Paper2/Paper_21/No.4b

The pseudocode algorithm shown has been written by a teacher to enter marks for the students in her class and then to apply some simple processing.

```
Count ← 0
REPEAT
  INPUT Score[Count]
  IF Score[Count] >= 70
    THEN
      Grade[Count] ← "A"
    ELSE
      IF Score[Count] >= 60
        THEN
          Grade[Count] ← "B"
        ELSE
          IF Score[Count] >= 50
            THEN
              Grade[Count] ← "C"
            ELSE
              IF Score[Count] >= 40
                THEN
                  Grade[Count] ← "D"
                ELSE
                  IF Score[Count] >= 30
                    THEN
                      Grade[Count] ← "E"
                    ELSE
                      Grade[Count] ← "F"
                  ENDIF
              ENDIF
          ENDIF
      ENDIF
  ENDIF
  Count ← Count + 1
UNTIL Count = 30
```

(a) Describe what happens in this algorithm.

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(b) Write the pseudocode to output the contents of the arrays `Score[]` and `Grade[]` along with suitable messages.

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4. June/2021/Paper2/Paper_21/No.1c

(a) All variables, constants and other identifiers must have meaningful names.

(i) Identify **one** constant you could have used for **Task 1**, give the value that would be assigned to it and its use.

Constant .....

Value .....

Use .....

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[3]

(ii) Identify **one** variable and **one** array you could have used for **Task 1**.
Explain the use of each one.

Variable .....

Use .....

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Array .....

Use .....

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[4]

(b) Explain how you should change your program in **Task 1** to allow a tutor to enter up to eight candidates for the election.

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(c) Write an algorithm using pseudocode, programming statements **or** a flowchart to show how your program completes these parts of **Task 2**:

- Allows students to enter their unique voter number before casting their vote.
- Checks whether the student has already voted:
  - if so, supplies a suitable message and does **not** allow them to vote.
  - if not, stores the unique voter number, but **not** their vote, in a suitable data structure.

It is **not** necessary to show parts completed in **Task 1**, including counting of votes for each candidate.

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5. June/2021/Paper2/Paper_22/No.2

(a) Write an algorithm in pseudocode to input 500 positive whole numbers. Each number input must be less than 1000. Find and output the largest number input, the smallest number input and the range (difference between the largest number and smallest number).

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6. June/2021/Paper2/Paper_22/No.1c

All variables, constants and other identifiers must have meaningful names.

(a) Identify and give the data type and use of **one** array that you could have used for **Task 1**.

Array .....

Data type .....

Use .....

[3]

(b) Describe **two** validation checks that could be used when inputting the number of tickets to buy for **Task 2**. For each validation check give one example of normal data and one example of erroneous data.

Validation check 1 .....

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Normal data .....

Erroneous data .....

Validation check 2 .....

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Normal data .....

Erroneous data .....

[6]

(c) Write an algorithm for the part of **Task 2** that inputs the tickets required, calculates the total price for the ticket(s) purchased by a passenger including a group discount (if applicable) and updates the data structures used for the totals.
Use **either** pseudocode, programming statements **or** a flowchart.

[6]

(d) Explain how your program completed **Task 3**. Include any programming statements that you have used and fully explain the purpose of each statement.

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7. June/2021/Paper2/Paper_22/No.5a

(a) Write an algorithm in pseudocode to input 500 positive whole numbers. Each number input must be less than 1000. Find and output the largest number input, the smallest number input and the range (difference between the largest number and smallest number).

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(b) Describe how the algorithm could be changed to make testing less time-consuming.

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8. June/2020/Paper2/Paper_21/No.1

All variables, constants and other identifiers must have meaningful names.

(a) (i) Identify **two** arrays you could have used for **Task 1** and, in each case, state its purpose.

Array 1 .....

Purpose .....

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Array 2 .....

Purpose .....

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[4]

(ii) Identify **two** variables you could have used for **Task 1** and, in each case, state its purpose.

Variable 1 .....

Purpose .....

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Variable 2 .....

Purpose .....

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[4]

(b) Explain why the item code data could **not** be stored as a real data type and identify the most suitable data type for the item code data.

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(c) Write an algorithm to show how you input your choice of mobile device and SIM card (part of **Task 1**), using **either** pseudocode, programming statements **or** a flowchart. It is **not** necessary to show initialisation or setting up of arrays containing product details.

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(d) Explain how your program completes **Task 3**. Any programming statements used in your answer must be fully explained.

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9. June/2020/Paper2/Paper_22/No.1

All variables, constants and other identifiers must have meaningful names.

(a) Identify **two** variables that you could have used for **Task 1**. Give the data type and state the use of each variable.

Variable 1 .....

Data type .....

Use .....

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Variable 2 .....

Data type .....

Use .....

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[4]

(b) Data input by a customer for **Task 1** includes the day and the hour of arrival.

Identify **one** suitable validation check for each input and justify your choice. Your validation checks must be different.

Day of arrival – validation check .....

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Justification .....

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Hour of arrival – validation check .....

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Justification .....

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[4]

(c) Explain how your program for **Task 1** ensured that the frequent parking number entered by the customer had a valid check digit.

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(d) Write an algorithm for part of **Task 2** that simulates customer payment and calculating total payments using **either** pseudocode, programming statements **or** a flowchart. Assume that **Task 1** has been completed.

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(e) Explain how your program completed **Task 3**. Assume that **Task 2** has been completed. Any programming statements used in your answer must be fully explained.

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10. June/2020/Paper2/Paper_22/No.5

Arrays are data structures used in programming. Explain what is meant by the terms dimension and index in an array. Use examples of arrays in your explanations.

Dimension .....

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Index .....

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[3]

11. Nov/2020/Paper2/Paper_22/No.1c

All variables, constants and other identifiers must have meaningful names.

(a) (i) Identify **one** array you could have used for **Task 1** and state its purpose.

Array .....

Purpose .....

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[2]

(ii) Identify **one** variable you could have used for **Task 2** and state its purpose.

Variable .....

Purpose .....

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[2]

(iii) Identify **one** constant you could have used for **Task 3** and state its purpose.

Constant .....

Purpose .....

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[2]

(b) Explain the benefits of storing Price as a real data type.

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(c) Write an algorithm to show how you completed **Task 1**, using **either** pseudocode, programming statements **or** a flowchart. It is not necessary to show initialisation or setting up of arrays in your answer.

[6]

(d) Explain how your program completes **Task 3**. Any programming statements used in your answer must be fully explained.

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(e) Describe how you could alter your program to allow more than one computer to be bought.

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12. Nov/2021/Paper2/Paper_22/No.4

This pseudocode algorithm allows 5000 numbers to be entered and stored in an array called `Number`.

```
FOR Count ← 1 TO 5000
  INPUT Number[Count]
NEXT Count
```

Extend and re-write the algorithm using pseudocode to also count and output how many of the numbers stored in the array are greater than 500, using the variable `Higher`. Only output `Higher` once with an appropriate message.

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