T-LEVELS | IfATE Institute for Apprenticeships and Technical Education

Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Learner ID

LL-

Technical Qualification in Digital Production, Design and Development (Level 3)

Monday 2 December 2024

Morning (Time: 2 hours 30 minutes)

Paper reference **19536**

Core: Examination

PAPER 1: Digital Analysis, Legislation and Emerging Issues

You do not need any other materials.

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 Pearson learner ID.
- There are two sections in this question paper. Answer **all** questions in Section A and Section B.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P76771A

©2024 Pearson Education Ltd.
1/1/1

P 7 6 7 7 1 A 0 1 2 4

Pearson

The T Level Technical Qualification is a qualification approved and managed by the Institute for Apprenticeships and Technical Education, and Pearson's development and delivery of the qualification and use of the mark is under the authority of the Institute for Apprenticeships and Technical Education.

SECTION A

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

1 One data type is character.

Give **two other** data types.

1 .....

.....

2 .....

.....

(Total for Question 1 = 2 marks)

2 Two popular computational thinking techniques are pattern recognition and decomposition.

(a) State **two other** computational thinking techniques.

(2)

1 .....

.....

2 .....

.....

(b) Explain why decomposition is used when developing algorithms.

(2)

.....

.....

.....

.....

(Total for Question 2 = 4 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

3 Figure 1 shows an algorithm that should calculate the total of a series of seven test marks held in a list.

The algorithm does not work as intended.

```
1  SET MyList TO [6,12,4,23,1,19,4]
2  Total = 0
3  FOR K = 0 TO 10
4     Total = Total + MyList[K]
5  IF Total > 100 THEN
6     SEND "Module passed" TO DISPLAY
```

Figure 1

(a) Explain why this algorithm would **not** work as intended.

(3)

(b) Explain the purpose of lines 5 and 6.

(3)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(c) Explain why a developer would annotate program code instead of drawing a flowchart.

(2)

(Total for Question 3 = 8 marks)

4 (a) Explain why sequencing would be used in an algorithm.

(2)

(b) Explain when a programmer would use a 'While' loop instead of a 'For' loop.

(2)

(c) Describe how a program would use a text file for input of data.

(3)

(Total for Question 4 = 7 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

5 Figure 2 shows a partially completed bubble sort.

Complete **Figure 2** to show the list after the next **four** passes needed to complete the bubble sort.

Unsorted list

35	84	19	72	56	8	40

Pass 1

35	19	72	56	8	40	84

Pass 2

Pass 3

Pass 4

Pass 5

Sorted list

8	19	35	40	56	72	84

Figure 2

(Total for Question 5 = 4 marks)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

6 A program is needed that will output a health rating for a recipe.

If the recipe contains over 30g of fat, then the health rating is Red. If the recipe contains over 20g of fat and over 10g of sugar, then the rating is Amber. All other recipes are Green.

The program must:

a. Allow the user to enter the number of grams of fat.

b. Allow the user to enter the number of grams of sugar.

c. Reject negative numbers.

d. Determine the health rating.

e. Output the health rating.

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Draw a flowchart that meets the rules of the program.

(Total for Question 6 = 6 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

7 Evaluate the effectiveness of using root cause analysis to solve problems.

(9)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(Total for Question 7 = 9 marks)

TOTAL FOR SECTION A = 40 MARKS

SECTION B

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

8 A company is developing a smartphone-based electronic payment system.

(a) All users of the system will be given a five-digit personal security number. The rightmost digit of the number will be a check digit.

A developer has written a section of code to calculate check digits. It is shown in **Figure 3**.

```
1  number = int(input("Please enter a 4-digit number: "))
2  z4 = number % 10
3  number = number//10
4  z3 = number % 10
5  number = number//10
6  z2 = number % 10
7  number = number//10
8  z1 = number
9  sum = z1+2*z2+3*z3+4*z4
10 checkdigit = sum%11
11 print("\nCheckdigit:", checkdigit)
12
```

Figure 3

(i) Describe how integer division and modulus are used in **Figure 3**.

(3)

DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA DO NOT WRITE IN THIS AREA

(ii) Describe how the developer could use pattern recognition to rewrite the code shown in **Figure 3**.

(3)

(b) The developer is concerned that a colleague is building unauthorised security bypass features into this system.

Describe how the developer could deal with these concerns.

(2)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(c) In order to use this payment system, it is anticipated that many people will need to purchase new smartphones.

Discuss the environmental issues related to people buying new smartphones and throwing away their old devices.

(6)

(Total for Question 8 = 14 marks)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

BLANK PAGE

QUESTION 9 BEGINS ON THE NEXT PAGE.

9 A car insurance company is developing a new digital system. This system will make use of the Internet of Things (IoT) to monitor driver behaviour and to assess risk.

(a) One module of code in the system calculates the risk rating of a journey.

The risk rating is calculated using these rules:

- every mile driven is given a risk score of 2
- if the average speed of the journey is over 60 miles per hour then the risk factor is 1.6, else the risk factor is 0.9
- the risk rating is the risk score multiplied by the risk factor.

The module will:

- receive the starting mileage, end mileage and average speed of the journey
- calculate the risk rating
- output the risk rating.

Develop a section of code that will calculate and output the risk rating.

(6)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(b) A developer working on this new system is a member of the British Computer Society (BCS).

Explain **two** ways that the BCS code of conduct influences the professional behaviour of developers.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(c) Evaluate how the Internet of Things (IoT) impacts on modern vehicles.

(9)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(Total for Question 9 = 19 marks)

10 A new digital system is being developed to analyse shopping habits and give shoppers rewards on their purchases.

(a) To create an account users must provide an email address and a suitable password. Developers have already identified the need to use presence checks on both items.

Describe **two other** validation techniques that can be used. You must describe a different validation technique for each item of data entered.

(4)

Email address

Password

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(b) Describe **two** types of testing that could be used when **developing** the new system.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

(c) Describe how an effective test plan could be constructed for the new system.

(3)

.....

.....

.....

.....

.....

.....

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(d) Explain **two** ways that the Intellectual Property Act can be used to protect any work done when developing the new system.

(4)

1 .....

.....

.....

.....

2 .....

.....

.....

.....

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(e) The system will analyse data such as the name of the shop visited, total cost of items purchased, number of items purchased and date of visit.

This functionality requires that the data is stored using data structures.

Evaluate the suitability of using lists and arrays to store this data.

Your evaluation should include:

- the benefits and drawbacks of lists
- the benefits and drawbacks of arrays
- a supported conclusion as to which data structure the developer should choose.

(12)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

(Total for Question 10 = 27 marks)

TOTAL FOR SECTION B = 60 MARKS
TOTAL FOR PAPER = 100 MARKS

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

BLANK PAGE