T-LEVELS | Institute for Apprenticeships & Technical Education

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Centre Number | Learner ID

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

**Time** 2 hours 30 minutes

**Paper reference** **19536**

# Core

## PAPER 1: Digital Analysis, Legislation and Emerging Issues

**You do not need any other materials.**

Total Marks

## Instructions

- Use **black** ink or a 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 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* ▶

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Pearson

## SECTION A

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

**1** All employees at a college are required to sign an Acceptable Use Policy.

State **two** pieces of information that would be included in the college's Acceptable Use Policy.

1 .....

.....

2 .....

.....

**(Total for Question 1 = 2 marks)**

**2** **Figure 1** shows a partially completed diagram of a merge sort.

Complete **Figure 1** to show the **four** missing steps needed to complete the **merge** sort.

Step 1

| 23 | 16 | 6 | 18 | 14 | 9 | 17 | 4 |
|---|---|---|---|---|---|---|---|

Step 2

| 23 | 16 | 6 | 18 | | 14 | 9 | 17 | 4 |
|---|---|---|---|---|---|---|---|---|

Step 3

Step 4

Step 5

Step 6

Step 7

| 4 | 6 | 9 | 14 | 16 | 17 | 18 | 23 |
|---|---|---|---|---|---|---|---|

**Figure 1**

**(Total for Question 2 = 4 marks)**

**3** A developer is writing a computer program for a school.

The table shows two variables and the data they will hold.

| Variable | Data |
|---|---|
| Form | D, N, P or S |
| Library_Card_Issued | True or False |

(a) Explain the most appropriate data type for the **two** variables.

**(4)**

Form .....

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Library_Card_Issued .....

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(b) Explain **two** ways that a developer would use pattern recognition when developing a new program.

**(4)**

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2 .....

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**(Total for Question 3 = 8 marks)**

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**4** (a) Explain **one** reason why a developer would choose to express an algorithm as annotated program code.

**(3)**

(b) **Figure 2** shows a binary search function written in Python.

When testing the code it did not work as expected.

```
1  def binary_search(data, elem):
2
3      low = 0
4      high = len(data)
5
6      while low <= high:
7
8          middle = (low + high)
9
10         if data [middle] == elem:
11             return middle
12         elif data[middle] > elem:
13             high = middle - 1
14         else:
15             low = middle - 1
16     return -1
17
18
19 mylist=[1,8,10,19,55,63,70]
20 target=55
21 posn=binary_search(target,mylist)
22 print (posn)
```

**Figure 2**

The errors are known to be in lines 4, 8, 15 and 21

Write the correct code for **each** line.

**(4)**

Line 4

Line 8

Line 15

Line 21

**(Total for Question 4 = 7 marks)**

**5** **Figure 3** shows a section of Python code that is used to validate user input.

```
1 quantity =input("enter the number of tickets that you wish
  to purchase")
2 quantity=int(quantity)
3 if quantity<1 or quantity>10:
4     print("invalid number of tickets")
5 else:
6     print("valid number of tickets entered")
7
```

**Figure 3**

The developer is writing a test plan for the code.

Explain **two** ways that test data could be used to check the code in **Figure 3** works as intended.

1 .....

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2 .....

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**(Total for Question 5 = 4 marks)**

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**6** A company requires warehouse staff to be tested on their forklift driving skills.

There are both major and minor faults in the test.

A member of staff fails if:

- the number of major faults is more than 2
- the number of minor faults is more than 3
- the total number of faults is more than 4.

A program is required that will:

a. allow the user to enter the number of major faults

b. allow the user to enter the number of minor faults

c. decide whether the test is passed or not

d. output the result.

**Draw a flowchart that meets the rules of the program.**

Question 6 *continued*

**(Total for Question 6 = 6 marks)**

**7** Virtual Reality (VR) and Augmented Reality (AR) devices are becoming more common.

Evaluate the effect that the use of these devices has had on society.

In your answer you may wish to consider their use for both work and leisure.

**(9)**

**(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** In an ice skating competition, each competitor is given a number to uniquely identify them.

Each competitor is scored by six judges, who each award a mark between 0 and 10.

A developer is writing code for an application that will be used in this ice skating competition.

(a) One requirement of the application is to calculate the final score for a competitor.

The rules for calculating the final score are:

- There are six judges.
- A competitor is awarded a mark between 0 and 10 by each judge.
- The total is calculated.
- The highest and lowest mark are subtracted from this total.
- The result is the competitor's final score.

Develop a section of pseudocode that will output the final score for a single competitor. There is no need to validate a judge's mark.

**(6)**

Question 8 *continued*

(b) Explain **two** reasons why a Python dictionary would be used to store each competitor's final score.

**(4)**

Reason 1

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Reason 2

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(c) Discuss how the Intellectual Property Act protects the developer's work.

**(6)**

**(Total for Question 8 = 16 marks)**

**9** A developer is designing a new smartphone application (app) for a nationwide chain of painting and decorating shops.

To access this app users will have to register with the company.

Registered users will receive weekly messages via SMS and email informing them of exclusive offers.

The app will also contain video tutorials on how to complete common home maintenance tasks.

(a) One function in the app calculates the floor area of a single rectangular room.

Explain **two** reasons why this function would use a sequential program structure.

**(4)**

Reason 1

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Reason 2

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(b) One other feature of this app allows customers to use their smartphone as a self-scanning device whilst shopping in the company's stores.

The user scans the barcode of an item with their smartphone's camera.

Describe how a check digit is used to validate the scanned barcode.

**(4)**

(c) Describe how the developer could use integration testing to test the app.

**(2)**

(d) Not all people have equal access to digital technologies.

Evaluate the ethical and moral issues raised by unequal access and how this affects the company's customers.

**(9)**

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**(Total for Question 9 = 19 marks)**

**10** BeremMedd is a software development company.

The company's developers are working on a new project which will be used in self-driving cars.

(a) Describe how BeremMedd could use modularisation to develop this project.

**(3)**

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(b) One of the functions needed in the program is shown in **Figure 4**.

```
FUNCTION FormatTime (Raw24Time)
BEGIN FUNCTION
IF Raw24Time < 12 THEN
      RETURN (Raw24Time+"am")
ELSE
      IF Raw24Time == 12 THEN
            RETURN ("Midday")
      ELSE
            RETURN (Raw24Time - 12 +"pm")
      END IF
END IF
END FUNCTION
```

**Figure 4**

(i) State **two** relational operators used in the algorithm shown in **Figure 4.**

**(2)**

1 .....

2 .....

(ii) Describe how the algorithm shown in **Figure 4** works.

**(3)**

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(c) Describe how variable naming conventions can be used when developing software.

**(3)**

(d) One of the developers is unsure of his competency when developing a module in this project. The developer is a member of the British Computer Society (BCS).

Explain **one** way in which the BCS Code of Conduct would govern the member's behaviour in this case.

**(2)**

(e) BeremMedd is developing a safety warning module that would inform the car control unit about close objects.

BeremMedd is currently deciding between writing new code or using pre-written code (e.g. built-in functions, standard libraries, third-party code).

Evaluate the benefits and drawbacks of both approaches when developing code for this module.

**(12)**

**(Total for Question 10 = 25 marks)**

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

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