Save My Exams

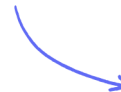**A Level · OCR · Computer Science**

🕐 22 mins   ❓ 3 questions

Exam Questions

2.4 Types of Programming Language

Programming Paradigms / Procedural Programming / Assembly Language & Little Man Computer / Modes of Addressing

Total Marks   **/22**

1 A computer uses a stack data structure, implemented using an array, to store numbers entered by the user.

The array is zero based and has 100 locations.

The program is amended to include the use of several queue data structures.

Discuss the use of object-oriented programming and procedural programming to create and manipulate the queue data structures.

You should include the following in your answer:

- the features of object-oriented programming

- the features of procedural programming

- the benefits of using object-oriented instead of procedural programming when creating several queue structures.

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(9 marks)

2 A charity uses a desktop computer to record financial donations that it receives. The computer contains a single core, 2.4GHz processor with 2MB cache.

Fig. 1 shows assembly code written using the Little Man Computer (LMC). The program calculates and outputs the total amount that is donated to the charity in any particular day. Depending on the amount, an additional bonus may be added to each amount donated.

```
start      INP
           STA donation
           SUB hundred
           BRP bonus
nobonus    LDA total
           ADD donation
           STA total
           OUT
           BRA start
bonus      LDA total
           ADD donation
           ADD twenty
           STA total
           OUT
           BRA start
hundred    DAT 100
twenty     DAT 20
donation   DAT 0
total      DAT 0
```

Write LMC code that will reset the value of the memory location labelled total to zero and then stop the program.

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(1 mark)

3 In assembly language, different modes of addressing memory can be used.

Discuss the different modes used. You should include:

- How the operand value is determined

- What an operand of 27 would refer to in that mode

- The reasons for requiring multiple modes of addressing

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(12 marks)