**Advanced GCE**

**COMPUTING**     **2511**

Integrated Information Systems

| Tuesday | **20 JUNE 2006** | Morning | 1 hour 30 minutes |
|---|---|---|---|

| Candidate Name | | Centre Number | Candidate Number |
|---|---|---|---|
| | | | |

**TIME**    1 hour 30 minutes

**INSTRUCTIONS TO CANDIDATES**

- Write your name in the space above.
- Write your Centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- If you run out of space for an answer, continue on the spare pages at the back of the booklet.
- If you use these spare pages, you must write the question number next to your answer. You can also use the spare pages for rough work.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is 90 (86 + 4 written communication.
- You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.
- No marks will be awarded for using brand names of software packages or hardware.

| FOR EXAMINER'S USE | | |
|---|---|---|
| Question no. | Max. Mark | Mark |
| 1 | 5 | |
| 2 | 12 | |
| 3 | 32 | |
| 4 | 16 | |
| 5 | 12 | |
| 6 | 5 | |
| 7 | 4 | |
| WC | 4 | |
| TOTAL | 90 | |

**This question paper consists of 12 printed pages, 3 lined pages and 1 blank page.**

Anita and Zach have a small publishing business that sells textbooks on CD-ROM to schools and colleges. At present they do not have any employees. They are now considering employing an analyst/programmer to produce multimedia materials for teaching A Level Computing.

**1    (a)    (i)**    State a method, that would be suitable in this case, for collecting information about the requirements of the multimedia system.

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**(ii)**    Give **two** reasons why your choice of method is the most appropriate.

Reason 1 ................................................................................................

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Reason 2 ................................................................................................

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**(b)**    Explain why the software would have to be custom-written.

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**2**    Anita and Zach are computer literate and believe that SSADM (Structured Systems Analysis and Design Methodology) should be used to develop software.

**(a)**    Describe **three** stages in SSADM.

1 ...........................................................................................................

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2 ...........................................................................................................

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3 ...........................................................................................................

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**(b)** Describe why it may **not** be advisable to use SSADM in this case.

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**(c)** Anita and Zach use top-down design to solve problems.

Explain the meaning of *top-down design* and state **two** advantages of its use.

Top-down design ......................................................................................................

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Advantage 1 ............................................................................................................

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Advantage 2 ............................................................................................................

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**3** **(a)** Anita and Zach have created the interface shown in Fig. 1 to demonstrate the fetch-execute cycle.

**(i)** On Fig. 1, label the following registers (use the abbreviations given).

- CIR – current instruction register
- MAR – memory address register
- MDR – memory data register
- PC – program counter
- ACC – accumulator
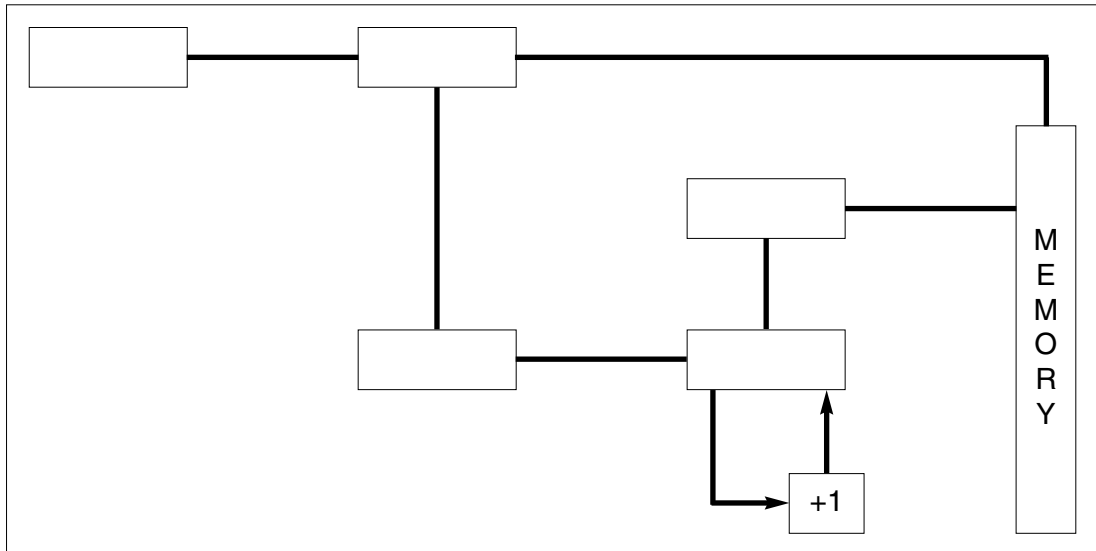


**Fig. 1**

[4]

**(ii)** State the purpose of each of these registers.

CIR............................................................................................................................

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MAR..........................................................................................................................

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MDR..........................................................................................................................

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PC..............................................................................................................................

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**(b)** Anita and Zach also wish to animate the insertion of data into a linked list. They have drawn the diagram shown in Fig. 2(a) which shows the linked list and a free list that contains cells that can be used to hold further data.

Head of
list
pointer

| | Anita | → | Daniel | → | Hanif | → | Petra | → | Zach |

Head of
free list
pointer
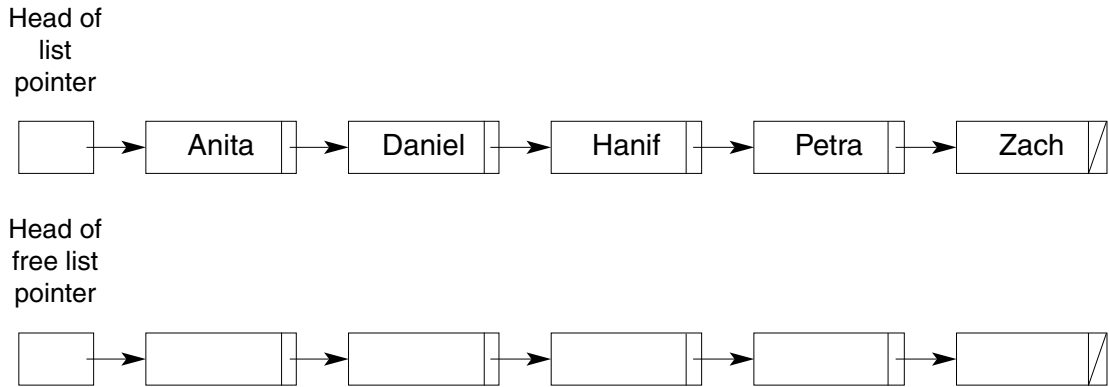
**Fig. 2(a)**

**(i)** By inserting data and pointers on Fig. 2(b), show how the name Fay is inserted into the linked list in alphabetical order.

Head of
list
pointer

Head of
free list
pointer
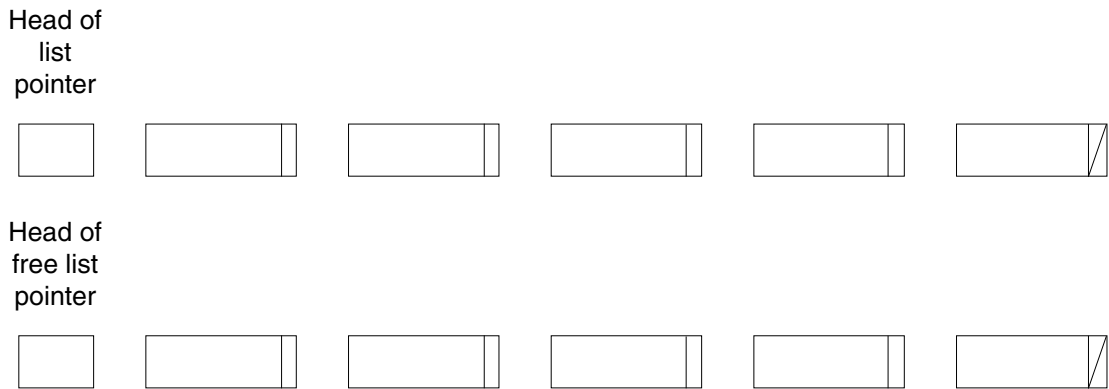
**Fig. 2(b)**

[4]

**(ii)** By inserting pointers on Fig. 2(c), show how the name Daniel is deleted from the original list.

Head of
list
pointer

| | Anita | | Daniel | | Hanif | | Petra | | Zach |

Head of
free list
pointer

**Fig. 2(c)**

[4]

**[Turn over**
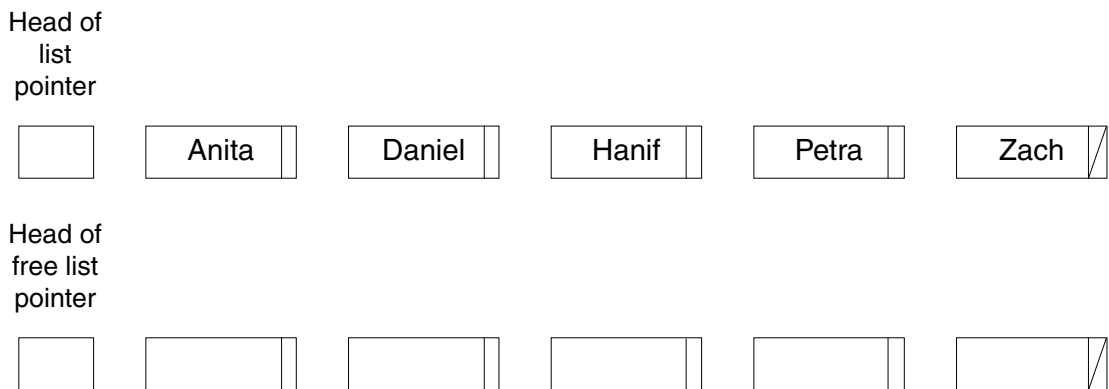
**(c)** The multimedia system must be managed, monitored and maintained. This involves the use of up-to-date documentation and quality control.

Explain the meaning of these terms.

Up-to-date documentation..............................................................................................

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Quality control ..............................................................................................................

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**(d)** Describe **three** methods that may be used to make a program more understandable.

Method 1 .......................................................................................................................

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Method 2 .......................................................................................................................

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Method 3 .......................................................................................................................

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**(e)** A human computer interface (HCI) has to be designed for each multimedia tutorial.

Describe **three** characteristics of HCI design that should be considered when creating a user interface.

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2 ...........................................................................................................................................

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3 ...........................................................................................................................................

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**[Turn over**

**4 (a)** For each of the following applications, state a method of implementation, describe the method and give a reason for your choice.

**(i)** A warehouse is to be automated so that products are placed in the warehouse and retrieved for dispatch by computer controlled robots.

Method of implementation ........................................................................................

Description...............................................................................................................

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Reason ....................................................................................................................

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**(ii)** A small general store is run by Mr & Mrs Aziz. At the moment each item is individually priced and Mr & Mrs Aziz enter the price manually into a till. They wish to change to a system that will allow them to make use of the bar codes on the items.

Method of implementation ........................................................................................

Description...............................................................................................................

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Reason ....................................................................................................................

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**(iii)** A company uses a computer system to produce the payroll each month. The management of the company wishes to introduce a completely new payroll system.

Method of implementation ........................................................................................

Description...............................................................................................................

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Reason ....................................................................................................................

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**(b)** An autopilot in an aeroplane and an electricity billing system require different response times.

Compare the hardware and software requirements of the two systems.

Hardware....................................................................................................................................

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Software ...................................................................................................................................

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**[Turn over**

**5** Anita and Zach are considering using e-commerce to help to organise their business.

**(a)** Describe **three** advantages and **one** disadvantage to the **business** of Anita and Zach using e-commerce.

Advantage 1 ................................................................................................................

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Advantage 2 ................................................................................................................

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Advantage 3 ................................................................................................................

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Disadvantage ...............................................................................................................

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**(b)** Describe **one** advantage and **one** disadvantage to the **customer** of using e-commerce when purchasing publications from Anita and Zach.

Advantage ....................................................................................................................

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Disadvantage ...............................................................................................................

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**6** In developing the multimedia teaching package for linked lists, the following tasks have been identified and the duration of each has been estimated.

| Task | Description | Duration (hours) |
|------|-------------|------------------|
| a | Design HCI for linked list | 3 |
| b | Create the HCI | 4 |
| c | Design insertion routines | 4 |
| d | Design deletion routines | 5 |
| e | Code insertion routines | 3 |
| f | Code deletion routines | 4 |
| g | Test insertion routines | 2 |
| h | Test deletion routines | 3 |
| i | Test the package | 2 |

Assuming unlimited resources, draw a critical path analysis (CPA) diagram to show when these tasks can be done. Label the tasks and state the length of the critical path.

CPA Diagram

[4]

Critical path length.................................................................................................................[1]

**[Turn over**

**7** Many of the customers use their mobile phones to access Anita and Zach's web site on the Internet.

Using a labelled diagram, explain how a mobile phone network works.

[4]

If you use these lined pages to complete the answer to any question, the question number **must** be clearly shown.

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