

Candidate Name : _____

CT Group : _____

Index No : _____

**PIONEER JUNIOR COLLEGE
JC 2 Preliminary Examination**



H2 COMPUTING

9754/2

PAPER 2

Tuesday

16 SEPTEMBER 2008

2½ hours

TIME 1400h – 1630h

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.

Write your name, CT Group, and Register No. in the spaces provided on this cover page and on your answer scripts.

Attach this cover sheet to Section A.

Submit answers to Section A and B separately.

Answer all questions.

INFORMATION FOR CANDIDATES

This question paper consists of 3 printed pages (inclusive of this page).

The number of marks is given in brackets [] at the end of each question or part question.

The use of an electronic calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

| FOR EXAMINER'S USE | | |
|--------------------|--------|-------|
| | Scored | Marks |
| Section A | | 50 |
| Section B | | 50 |
| TOTAL | | 100 |

This question paper consists of 5 printed pages.

SECTION A [50 marks]

A company specialises in staging exhibitions. Each exhibition is based around a theme, for instance once a year the company organises an exhibition aimed at administrators and teachers in colleges. The company hires a suitable venue and the sells exhibition space to appropriate businesses. It then advertises the event to a suitable audience.

- 1 Details of the exhibitors are stored in a computer file. Each record contains
 - The name of the exhibitor;
 - The address to which correspondence should be sent;
 - A code to indicate a positive or negative response to the next exhibition;
 - A 3 figure code number for the exhibition to be attended;
 - The floor area required at that exhibition.
 - (a) The field containing the name of the exhibitor is a text field and contains a number of ASCII characters. Explain what is meant by an *ASCII character*. [2]
 - (b) State the data type which should be used for the response field, giving reasons for your answer. [2]
 - (c) The required floor area is an unsigned integer. Describe how an unsigned integer is stored in a computer system. [2]
 - (d) State one essential field which is not listed, explaining why it is essential. [2]
 - (e) The file is stored as a serial file. Justify the choice of a serial file. [2]

- 2 The computer used has the following registers in its central processor. Explain the purpose of each of the registers used:
 - (a) Memory Data Register (MDR), [2]
 - (b) Memory Address Register (MAR), [2]
 - (c) Current Instruction Register (CIR). [2]

- 3 The computer file used to store the details of the exhibitors is organized as an indexed sequential file. Field in the exhibitor file include exhibitor name, his address, next exhibition response code, exhibition attendance number and floor area size.
 - (a) A field, not mentioned above, is the exhibitor ID number. This acts as the key field. The exhibitor ID number is a 6 digit number. This field contains a check digit. State the reason for using a check digit and explain how it is calculated. [5]
 - (b) Describe briefly how the file is organised [3]
 - (c) By considering two types of operation on the file, explain why is this a suitable type of file organisation. [2]

- 4
 - (a) Describe the implications for the company to store the exhibitors' personal data on its computer system. [3]
 - (b) The company is dependent on its computer system to carry out its daily operations. Give three problems that could result in system failure and, for each problem, suggest how recovery could be achieved. [3]

- 5 The environment in a particular exhibition hall is computer controlled.
 - (a) State suitable input and output hardware that will allow a computer to control such a system. Give reasons for your answers. [4]
 - (b) The computer system has the required temperature (T) input. The system is programmed to maintain the temperature in the hall to within two degrees of T.
 - (i) Explain why the system is set up in this way and not to keep the temperature to T. [2]
 - (ii) Using pseudocode, write an algorithm to control the temperature in the hall, given that the actual temperature is A, and the processor can switch both a heater (H) and an air conditioner (C) to be ON or OFF. [6]

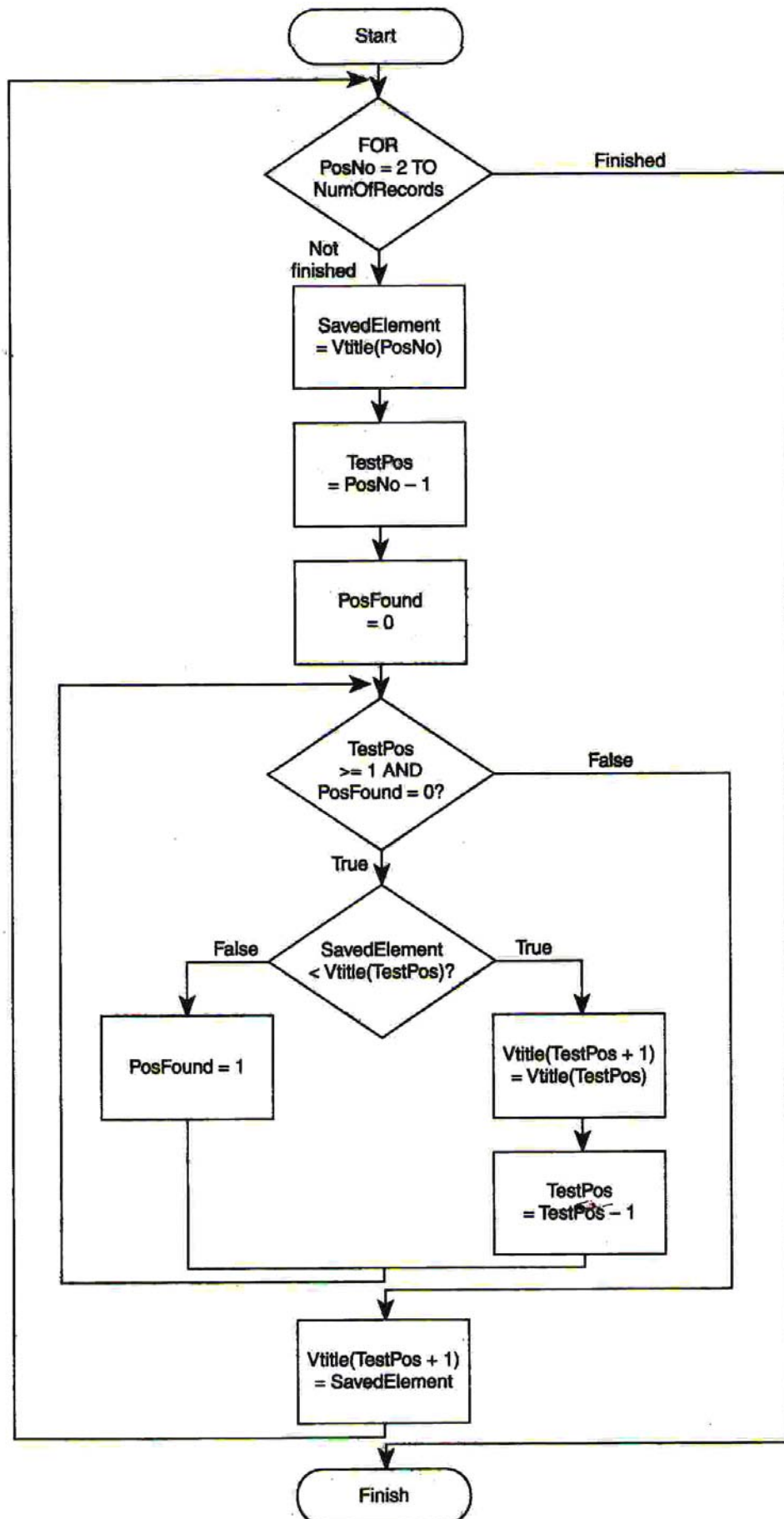
6 The exhibitors provide video titles of the exhibits. These titles are read into an array called Vtitle. The program in Program Flowchart 1 below sorts the video titles.

(a) State the name of the sorting program used.

[1]

(b) Briefly describe how the program works.

[5]

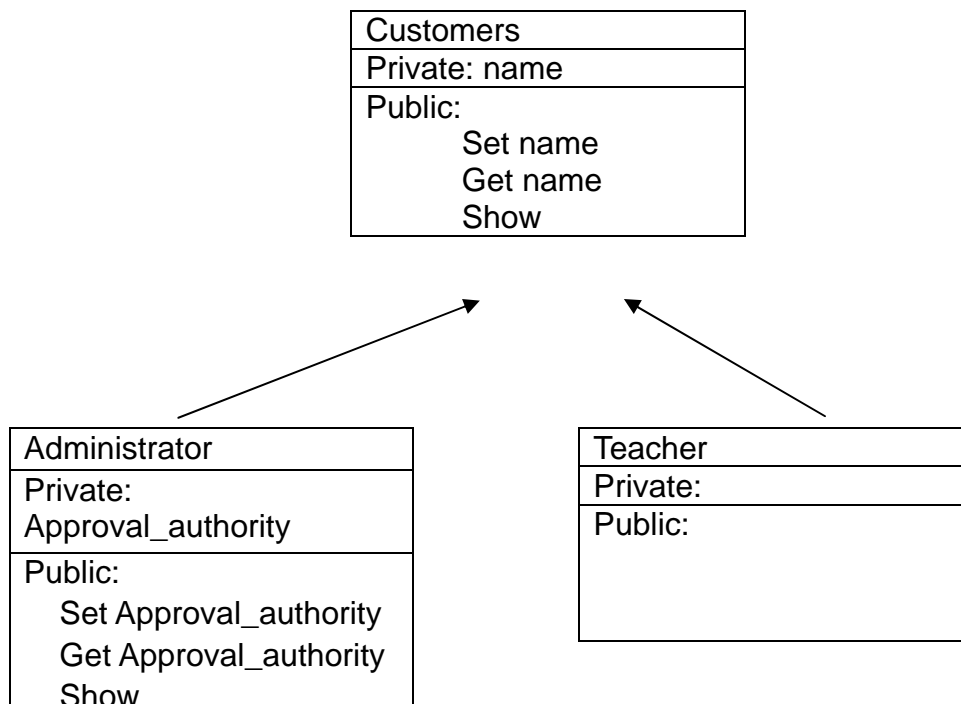


Program Flowchart 1

SECTION B (50 marks)

7 The company would like to computerise the production of the layouts for its exhibitions. A systems analyst is employed to oversee the production of the new software. The analyst adopts a top-down approach to the problem.

- (a) Explain what is meant by a top-down approach. [4]
- (b) The finished software is subjected to black box and white box testing and also to alpha and beta testing. State what is meant by [4]
- (i) black box testing
 - (ii) white box testing
 - (iii) alpha testing
 - (iv) beta testing.
- (c) Figure 7.1 shows the three classes and some of their private attributes and public methods.



Use this example to explain the following terms:

- (i) Encapsulation
 - (ii) Inheritance
 - (iii) Polymorphism. [6]
- (d) Give an appropriate attribute for the class 'Teacher' and justify your answer. [2]
- (e) Explain the purpose of a public method. [2]
- (f) (i) Explain the meaning of the term reusability in OOP.
 (ii) Explain the benefits of reusability when developing software. [6]

The company provides a number of services for its customers that are computer-based.

- (g) Give three services using different types of operating system, stating the operating system appropriate for each. [6]

- 8 The company wants to set up a new computer network. Although many staff currently uses stand-alone desktop systems the company has no experience of networking. As an IT consultant, the system analyst has been asked to prepare a report for the company director, outlining the issues, and the potential benefits, to communications and productivity that such network could bring. Your report should include:

- (a) A Local Area Network (LAN) is recommended to the company, what is LAN? [4]
- (b) A description of the various network topologies with diagrams as in the following:
 - (i) Bus [2]
 - (ii) Ring [2]
 - (iii) Star [2]
- (c) A description of the various network components which would be involved; [4]
- (d) A description of relative merits of different types of network which could be considered; [3]
- (e) A description of the security and accounting issues involved. [3]