UNIVERSITI SAINS MALAYSIA

Stamford College

First Semester Examination
2002/2003 Academic Session
September 2002

External Degree Programme
Bachelor of Computer Science (Hons.)

CST102 – Introduction to Operating Systems & Data Communications

Duration: 3 hours

INSTRUCTIONS TO CANDIDATE:

- Please ensure that this examination paper contains **FOUR** questions in **FOUR** printed pages before you start the examination.
- Answer **ALL** questions.
- On each page, write *only your **Student ID***.

Question 1

1. Memory Management is a part of operating system. Basically it is used to store information.

(a) Memory Management in computer system is divided into two. By using at least one example, explain the two categories of Memory Management. [4 marks]

(b) What is the function of linker in the execution of a program? [2 marks]

(c) Give two features for each of the two approaches used to implement virtual memory. [4 marks]

(d) What is spooling? Give 2 reasons for its use. [6 marks]

(e) List five (5) elements that are usually stored in a File System's file descriptor. [5 marks]

(f) Explain the following terms:
(i) DASD
(ii) DNS
(iii) DMA
(iv) MTBF [4 marks]

Question 2

2. (a) In a multi-process system, at any moment every process is in one of three states: running, ready or waiting. What causes the transitions between these states, and when do they occur? [10 marks]

(b) Suppose a system uses priority scheduling, where a small integer means a high priority.

Pi	Service Time	Priority
0	350	5
1	125	2
2	475	3
3	250	1
4	75	4

(i) Define service time and turnaround time. [4 marks]

(ii) Give Gantt chart illustrating the execution of these processes. [6 marks]

(iii) What is the average turnaround time? [5 marks]

Question 3

3. (a) Given the Access Control List below, determine whether the listed file access is permitted or otherwise.

File	Access
Inventory.txt	Student A(RWED), Student B(RWE)
Search.exe	Admin(RW),Global(RE)
Index.html	Student B(RD), Global(R)
Accounts.dbf	Global( )
Search.c	Global ( ) , Student B (RWD)
Logo.jpg	Student A(R), Student B (WD), Global ( )

(I) Outsider executes the program "Search.exe". [1 mark]

(ii) Student B compiles source code that generates a new version of "Search.exe". [1 mark]

(iii) Admin deletes the old "Accounts.dbf" file. [1 mark]

(iv) Student A modifies " Inventory.txt", and asks Admin to check the modified file. [1 mark]

(v) Student A executes "Search.exe" to search for files of type *.txt containing the text "Balance". [1 mark]

(vi) Outsiders access the web server that refers to the file "Index.html". [1 mark]

(b) With the help of a diagram, explain in detail the concepts and implementations of Direct I/O Polling Read Operation of device management.

[10 marks]

(c) A disk has 150 tracks(0-149) which needs to be accessed to fulfil I/O requests given in the following order:

Track 13,45,3,109,72

At this moment, the read/write head is at track 12. Draw a diagram for each of the following cases, indicating the sequence of track access and give the Total Number of tracks travelled.

(i) C-LOOK – the read/write head is moving to higher numbered tracks at that moment.

(ii) FCFS

[9 marks]

Question 4

4. (a) Describe two key differences between the circuit and packet switching techniques for wide area networks.

[6 marks]

(b) You want to download a file from a remote site using the File Transfer Protocol (FTP) . To perform the file transfer, your computer issues a "Get File" command. Show the encapsulation process as the Get File command moves from your computer through routers into the Internet.

[9 marks]

(c) Match the following to one of the seven OSI models:

(i) Define Frame.

(ii) Transmits Signal across physical medium.

(iii) Source to destination delivery.

(iv) IP addressing.

[4 marks]

(d) What are two main features for each type of network that determine whether a communication systems is a LAN, MAN or WAN?

[6 marks]

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