Answer the following questions. You may assume any missing data.

Question 1:

(a) Explain each of the following statements: "An OS : a government" and "An OS is interrupt driven"

(b) What is a system call? What is the purpose of system calls, and how do system calls relate to the OS and the concept of dual –mode (kernel mode and the user mo :) operation?

(c) Consider the various definitions of *operating system* Consider whether the OS should include applications such as Web browsers and mail programs. Argue bot that it should and that it should not, and support your answer.

(d) What are the main steps in a DMA transfer? How c ·s DMA increase system performance? How does it complicate the hardware design?

Question 2:

(a) Discuss the storage structure in a system. Show how st ge systems ca be organized in a hierarchy.

(b) Suppose a disk drive has 5000 cylinders, numbered ( ) 4999, the drive is currently serving a request at cylinder 500, and the previous request was at cylinde)0. The queue pending requests, in FIFO, is: 220, 300, 1500, 2000, 600, 4000, and 2500. Starting from tl urrent head position, what is the total distance (in cylinders) that disk arm moves to satisfy all the pendin :quests, for each of the following disk scheduling algorithms: (i) FCFS   (ii) SCAN   (iii) LOOK.

(c) Consider the following set of processes, with the length he CPU-burst time given in milliseconds.

Process	Arrival Time	CPU B	-Time	Priority
P1	0	)0		10
P2	120	;0		3
P3	20	40		8
P4	10	10		7
P5	50	50		4

Draw three Gantt charts illustrating the execution of the rocesses using FCFS, a preemptive SJF, and a preemptive priority (assume Linux) scheduling. Whic . the above schedulers results in the minimal average waiting time?

Question 3:

(a) What is a process? What is a thread? What are the main a tages of multithreading?

(b) Draw the thread state transition diagram and indicate th ion that causes each transition of JVM thread model.

(c) Write a multithreaded Java program that outputs $Z = |\bar{t} - \bar{X}| / \sum_{j=1}^{M} |Yj - \bar{Y}|$, where M and N are

positive integers, $\bar{X}$ is the average of Xs and $\bar{Y}$ is :he av · value of Ys. The computation of Z should be done two concurrent threads, each computing only one st tion. A primary thread then combines the two partial results. The program should work as follow: the ρ n create two threads, the user will enter each of the following : a positive integer N, the values of X sitive integer M, and the values of Yj, and finally the primary thread outputs the values of Z.

Question 4:

(a) What are the major acti ities of an OS in regard to process gement?

(b) What is the meant by ' File System"? Give a short compar iong FAT32, NTFS, and HPFS.

(c) It is required to write a Java program that simulates the ti f a clock by displaying the words "tick" and "tock" on the scree .. To accomplish this, write a class c 'ickTock that contains two methods: *tick()* and *tock()*. The ti :() methods displays the word "Tick" k() displays "Tock". To run the clock, two threads are creat. ., one that calls tick() and one that calls The goal is to make the two threads execute in a way that th. output from the program displays a cont Tick Tock" – that is , a repeated pattern of one tick follov :d by one tock.

Tanta University

Faculty of Engineering

Department of Computer Science

3rd year final exam **3** / **6** / 2007

Electronic Measurement Systems

Time allowed: 3 Hours

* Answer all the following questions:

Q1: a) Explain with diagram the principle operation of basic Liquid Crystal Displays (LCD).

b) What are the additions to basic LCD in order to produce large area displays with sufficient brightness and contrast ratio?

c) What are the additions to basic LCD in order to produce colour displays?

Q2: a) Explain with diagram the principle operation of black and white laser printer.

b) From your point of view, what are the additions to laser printer in order to become a laser colour printer?

c) Explain with diagram the principle operation of chart recorder. What are the types of multi-channel recorder?

Q3: a) Explain briefly the main types of common optical sources?

b) Explain with diagrams the differences between reflection and refraction of light?

c) When reflection happens?

Q4: a) Explain how Pulse-echo technique can be used for metal thickness determination and discovery of the presence of internal defects.

b) What are the conditions which should be obeyed by the transmitted pulse signal?

c) What are advantages and disadvantages of Pulse-echo compared to TOFD technique?

Q5: a) What are the even harmonics?

b) What is the duty cycle?

c) Plot the circuit diagrams of base clipper and slicer circuit.

My Best Regards

Dr. Osama Zahran