Faculty of Engineering, KFS University

Subject operating systems exam

9/ 6 / 2019, 2nd term final exam examiner: prof. Ali Sakr

3rd year, computer and control systems dep. Full marks 100 M

Solve the next problems, each problem assigned to 10 marks

The exam fulfill NARS metrics: a.3, a. 8. a13 ,a19 , b.2, b.6, b.7 , b.17, C17

1=a- **Discuss the page allocation policies (First fit , Best fit , Worst fit) ,**

b- discuss the memory hierarchy: (Registers, L1 and L2 Caches, Main memory, L3 Cache, Disks and Tapes)

2= **Define: page mapping table, thrashing, Process Control Block (PCB), Multithreading , polling, bootstrapping, Unauthorized access , Malicious intruders, Trap Doors, Logic Bomb,**

3= a-**Discuss five states of process**

b- **discuss Swapping, trashing, address translation , starvation, and semaphores**

4= **define Conditions for deadlock, discuss deadlocks prevention and recovery tools , what are conditions for a safe system, write an algorithm to detect deadlock,**

5= **show how OS deal the stream, character, and block peripherals, define sequence of program requests to interrupt to print a file**

6= **Let A buffer management process for an associative memory that uses 4 pages , find how to replace using least frequently used (LFU), FIFS policies, find hit and fail rates, if sequence of pages is 2,3,2,1,5, 2,4,5,3,2,5,2,4,3,1. why we need counter for each page.**

7= **in disk management process, the next sequence of tracks is requested, find the average movements between tracks using FCFS and shortest handling time policies for the sequence: 70, 50, 80, 10, 60, 40, 20, 120, 90, 60, what is average time.**

8= **Consider two computers, with two different instruction sets- processors, both of which have a clock rate of 4000 MHz. The following measurements are recorded on both computers running a given set of benchmark**

programs: Determine the effective CPI, MIPS rate, and execution time for each machine.

Instruction type		Million instructions	Cycle per instruction
Computer A	Arithmetic and logic	8	4
	Memory move, load & store	6	4
	Branch and control	4	4
	others	2	2
Computer B	Arithmetic and logic	10	2
	Memory move, load & store	8	3
	Branch and control	4	4
	others	2	2

9= **define time parameters for disk, , how os can improve system performance**

10= if the pattern 1100 1110 1001 was received as 1100 1010 1001 how can OS detect the location of error