NAME: _____ (FIRST NAME **FIRST**) **TOTAL**: _____

COSC 3360/6310 THIRD QUIZ JULY 3, 2018

This exam is closed book. You can have one page of notes. UH expels cheaters.

1. Short answer questions. (6×5 points)

a) What is the main goal of the translation lookaside buffer?

To overcome the effect of doubling the memory access time in a virtual memory scheme _____

_____

_____

b) What is the main benefit of Gang scheduling?

To reduce the overhead when executing a set of related threads _____

_____

_____

c) Explain the priority inversion problem in the context of real-time scheduling.

Is a condition where the system forces a higher priority task to wait for a lower priority _____

_____

_____

d) What is the difference between SCAN and CSCAN (disk scheduling algorithms)?

SCAN: satisfies all outstanding requests until it reaches the last track in that direction then the direction is reversed.

C-SCAN: Restricts scanning to one direction only _____

e) Describe the main goal of long-term scheduling, medium-term scheduling, and short-term scheduling?

Long – Term Scheduling : A program becomes a process _____

Medium – Term Scheduling : A process uses virtual memory _____

Short – Term Scheduling : Selects the process that will be executed _____

f) What is the major disadvantage of: a) static memory partitions; and b) dynamic memory partitions?

a) Internal fragmentation. _____

b) External fragmentation. _____

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2. Simple choice questions: (10×3 points)

I. Select the RAID level that does **NOT** include redundancy:

a) RAID 1 b) RAID 2 c) RAID 3 d) RAID 5 **e) None of the above**

II. Select the value of the quantum that guarantees the same scheduling solution for FCFS and RR:

a) Q=min(T_S) **b) Q=max(T_S)** c) Q=min($T_{arrival}$) d) Q=max($T_{arrival}$) e) None of the above

III. Select the page size of a system where a logical memory address has an offset field size equal to 12 bits:

a) 4 KB b) 1 KB c) 2 KB d) None of the above

IV. What happens when the back-hand checks a frame with the use bit = 1 when executing the two-handed clock page replacement algorithm (UNIX):

a) Frame is ignored; b) use bit = 0 c) frame gets replaced d) None of the above

V. Select the type of address that represents memory location independent of the current assignment of data to memory:

a) Logical b) Physical c) Relative d) Absolute e) None of the above

VI. Select the resident set management combination that is **NOT** feasible.

a) Fixed allocation / Local Replacement **b) Fixed allocation / Global Replacement**
c) Variable allocation / Local Replacement d) Variable allocation / Global Replacement

VII. A fixed-length block of main memory is:

a) Page b) Segment c) Virtual memory **d) Frame** e) None of the above

VIII. What is the main objective of a real-time system?

a) Meeting all the deadlines b) Minimizing the waiting time. c) Maximizing CPU Utilization
d) None of the above

IX. Select the scheduling algorithm that **IS** preemptive:

a) FIFO b) FCFS **c) SRT** d) HRRN e) None of the above

X. The maximum size of a partition in the Buddy System memory management solution is:

a) Entire Memory b) Entire Memory / 2
c) Entire Memory / 4 d) None of the above

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3. Execute RR (Q=3), SPN, SRT, and HRRN for the following group of processes. (20 points).

Process	**A**	**B**	**C**	**D**
$T_{arrival}$	**0**	**1**	**2**	**3**
T_S	**2**	**3**	**4**	**1**

4. Execute the page replacement algorithms FIFO, LRU, and Clock for a system with 3 frames and the following string of page references (10 points):

Page references: 7,0,1,2,0,3,0,4,2,3,0,3,2

FIFO

7	7	7	2	2	2	2	4	4	4	0	0	0
	0	0	0	0	3	3	3	2	2	2	2	2
		1	1	1	1	0	0	0	3	3	3	3
			F		F	F	F	F	F	F		

LRU

7	7	7	2	2	2	2	4	4	4	0	0	0
	0	0	0	0	0	0	0	0	3	3	3	3
		1	1	1	3	3	3	2	2	2	2	2
			F		F		F	F	F	F		

CLOCK (a gray frame represents the pointer)

7^1	7^1	7^1	2^1	2^1	2^1	2^1	4^1	4^1	4^1	4^0	3^1	3^1
	0^1	0^1	0^0	0^1	0^0	0^1	0^0	2^1	2^1	2^0	2^0	2^1
		1^1	1^0	1^0	3^1	3^1	3^0	3^0	3^1	0^1	0^1	0^1
			F		F		F	F		F	F	

5. Consider a 32-bit file system and a 4 K-byte block size with an inode format that has 12 blocks for direct access, 1 block for single indirect access, 1 block for double indirect access. Calculate the following parameters (6 points).

LEVEL	Number of Blocks	Number of Bytes
Direct	12	12 blocks * 4 K-byte / block = 48 K-byte
Single Indirect	4 K-byte/4 bytes = 1024 blocks 32 bit FS -> 4 bytes	1024 blocks * 4 K-byte / block = 4 M-byte
Double Indirect	1024 * 1024 blocks	4 G-byte – 4 M-byte – 4 K-byte (max file size = 2^{32} = 4 G-byte)

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6. Write the argument for the chmod command to set the permissions of a file on a UNIX system to RW-R-X--X (4 points).

chmod(6,5,1)