Course Code: COMP2604

Course Title: Operating Systems

Submission: Assignment 2

Group Members:

Keanu Nichols 816004003

Atonia Andall 816009278

Rahel Stewart 816006578

Priya Maharaj 816006652

Chanelle Mondesir 816008039

2)

First Come First Serve

Process	P1	P2	P3	P4	P5
Burst Time	15	3	9	6	4
Time Elapsed	15	18	27	33	37
Wait Time	0	15	18	27	33
AWT	18.6ms				

Non-Pre-emptive Shortest Job First

Process	P2	P5	P4	P3	P1
Burst Time	3	4	6	9	15
Time Elapsed	3	7	13	22	37
Wait Time	0	3	7	13	22
AWT	9ms				

Non-Pre-emptive Priority Scheduling

Process	P1	P4	P5	P2	P3
Priority	5	4	3	2	1
Burst Time	15	6	4	3	9
Time Elapsed	15	21	25	28	37
Wait	0	15	21	25	28
AWT	17.8ms				

Round Robin (5ms Time Quantum)

Process	P1 (10)	P2 (0)	P3 (4)	P4(1)	P5(0)	P1(5)	P3(0)	P4(0)	P1(0)
Time E	5	8	13	18	22	27	31	32	37
Wait	0	5	8	13	18	17	14	13	5
AWT	18.6ms								

3)

Page	Loaded	Last Ref`	R
0	140	270	0
1	110	285	1
2	126	280	1
3	230	265	0

Second Chance

(Queue)

Page 1	Page 2	Page 0	Page 3
1	1	0	0

Page 3	Page 1	Page 2	Page 4
0	0	0	1

-The page where the reference bit not set and has been loaded least recently will be removed. (Page 0)

Least Recently Used

-The page that has been referenced the longest time ago is removed. (Page 3)

Clock

-Same as second chance. The page with reference bit that is not set and has been loaded least recently will be removed (Page 0)

4)

Given that main memory is 64K, a page/frame size is 4K and that a process's virtual memory size is 128K. (i) How many entries would a page table in this system contain? (ii) What is the size of the virtual address and a real memory address in this system? (iii) Explain how the memory management unit converts a virtual address into an address in real memory on this system.

(b) In a virtual memory management system, under what conditions are inverted page tables needed? How is such a table used?

a)

i) No. of pages= 2*10^(10+7)/2*10(12) =2*10^(17-12) = 5 pages
Entries: 2^5

ii) Virtual Memory=128K = 2*10^(7)*2*10^(10)= 17 bits
Offset=2*10^(12)=12 bits
Page= 17-12 =5 bits

Total: 17 bits

Page# =5 bits	Offset=12 bits

i) Main Memory=64K = 2*10^(6)*2*10^(10)= 16 bits
Offset=2*10^(12)=12 bits
Frame= 16-12 =4 bits

Total: 16 bits

Frame#= 4 bits	Offset=12 bits

ii) The processor would find the memory frame corresponding to the specified virtual memory page in the page table. The frame offset would be the same as the page offset.

b) Most operating systems use one page table per process in a multiprocessing environment. With a process in virtual memory, as the size as the process increases, the size of its page table also increases. A considerable amount of space can be occupied by just the page table. An inverted page table reduces the overhead of having such a big table by having each frame in main memory be represented by one page table entry. A single page table is therefore used for all processes and the number of entries in the page table is equal to the number frames in main memory.