BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – M.Tech.(CSE)-2021
Course Name – Advanced Operating System
Course Code - PCC-MCS203
(Semester II)

Full Marks : 60
Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question)
1 x 15=15

1. Choose the correct alternative from the following :

(i) Select the facility which dynamically adds probes to a running system, both in user processes and in the kernel?

a) DTrace
b) DLocate
c) DMap
d) DAdd

(ii) Multiprocessing system gives a …. [select the appropriate]

a) Small system
b) tightly coupled system
c) loosely coupled system
d) Macro system

(iii) Program is_____ [select the appropriate]

a) Dynamic Concept
b) Distributed Concept
c) Real Time Concept
d) Static Concept

(iv) In FIFO page replacement algorithm, …….. for page replacement. [select the appropriate]

a) oldest page is chosen
b) newest page is chosen
c) random page is chosen
d) none of these

(v) Select the two components of the LRU page replacement policy that can be implemented in hardware-

a) Counters
b) RAM & Registers
c) Stack & Counters
d) Registers

(vi) Paging increases the ____ time. [select the appropriate]

a) waiting
b) execution
c) context – switch
d) all of these

(vii) I/O hardware contains ____ [select the appropriate]

a) bus
b) controller
c) I/O port and its registers
d) all of these

(viii) Select among the following which has capability based protection system?

a) hydra

b) cambridge CAP system

c) both hydra and cambridge CAP system

d) none of these

(ix) Identify the main function of the command interpreter -

a) to get and execute the next user-specified command

b) to provide the interface between the API and application program

c) to handle the files in operating system

d) none of these

(x) If there are a total of T = 100 shares to be divided among three processes, A, B and C. A is assigned 50 shares, B is assigned 15 shares and C is assigned 20 shares. If a new process D requested 30 shares, the admission controller would _____ [Evaluate and select]

a) allocate 30 shares to it

b) deny entry to D in the system

c) allocate 40 shares to it

d) allocate 50 shares to it

(xi) Select the condition to avoid deadlock-

a) there must be a fixed number of resources to allocate

b) resource allocation must be done only once

c) all deadlocked processes must be aborted

d) inversion technique can be used

(xii) Select the outermost component of Operating System -

a) Kernel

b) Shell

c) Both Kernel and shell

d) none of these

(xiii) For 3 page frames, the following is the reference string: 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1. Evaluate page faults does the LRU page replacement algorithm produce?

a) 10

b) 15

c) 11

d) 12

(xiv) A process P1 has a period of 50 and a CPU burst of $t1 = 25$, P2 has a period of 80 and a CPU burst of 35, contrast the priorities of P1 and P2.

a) remain the same throughout

b) keep varying from time to time

c) may or may not be change

d) none of these

(xv) A process P1 has a period of 50 and a CPU burst of $t1 = 25$, P2 has a period of 80 and a CPU burst of 35, Compare both processes with respect to EDF algorithm.

a) both processes be scheduled using EDF algorithm

b) both processes cannot be scheduled using EDF algorithm

c) cannot defined for EDF

d) none of these

Group-B
(Short Answer Type Questions)

3 x 5=15

2. Define Multiprocessor Synchronization.

3. Identify the four necessary and sufficient conditions behind the deadlock. (3)

4. Consider the following page reference string. 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2. Compute page faults would occur for the following replacement algorithm, assuming four size frame - FIFO page replacement. (3)

5. Correlate process and program.

6. Compare Job and Process. (3)

OR (3)

Analyse the limitations of Distributed Systems. (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. Compare Preemptive scheduling and Non-preemptive scheduling algorithm with neat diagram. (5)

8. "In a combined system, multiple threads within the same application can run in parallel on (5) multiple processors and a blocking system call need not block the entire process."— Describe the statement.

9. Evaluate the Average Waiting Time and Turn Around Time of FCFS, SJF and SRTF with (5) following conditions. There are total five processes. The arrival time of the five processes are 0, 1,2,3,4 (milliseconds). The burst time of the five processes are 7, 5, 3, 1, 2 (milliseconds).

10. Evaluate how logical address is translated into physical address with proper example. (5)

11. Illustrate the Producer-Consumer problem and explain how a bounded buffer can be used (5) to solve it. Discuss potential synchronization issues and their solutions.

12. Summarize the mechanism of inter process communication using shared memory in a (5) producer-consumer problem.

OR

Given memory partition of 100K, 500K, 200K, 300K, and 600K in order, how would each of (5) the First-fit, Best-fit and Worst-fit algorithms place the processes of 212K, 417K, 112K and 426K in order? Predict the correct algorithm makes the most efficient use of memory? Show the diagram of memory status in each case.

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