Class / Semester / Subject Code: S.Y.B.Sc.(C.S.) / III /-USCS303 –Operating System

Date: 15.10.2019   Time : (2½ Hours)   Total Marks: 75

N.B.   (1)   All questions are compulsory.
       (2)   Figures to the right indicate marks for respective sub questions.
       (3)   Figures to the right indicate marks.
       (4)   Illustrations, in-depth answers and diagram will be appreciated.
       (5)   Mixing of sub-question is not allowed.

Q.1)   Attempt all. (Each of 5 marks)   (15)
       (a)   Multiple Choice Questions (Choose the correct alternative.)   (5)
       (i)   _____ increases CPU utilization by organizing jobs so that the
              CPU always has one to execute.
              (a)   Memory   (b)   Processor
              (c)   Scheduling   (d)   Multiprogramming
       (ii)   A file is an _____ data type.
              (a)   Abstract   (b)   String
              (c)   Integer   (d)   Character
       (iii) _____ are necessary condition to occur deadlock
              i. Mutual Exclusion   ii. Hold and wait
              iii. No pre-emption   iv. Circular wait
              (a)   i ,ii, iv   (b)   ii ,iii ,iv
              (c)   i ,ii   (d)   i, ii, iii, iv
       (iv)   Process control block does not contain which of the following.
              (a)   Code   (b)   Stack
              (c)   Bootstrap   (d)   data
       (v)   end () and abort() are system calls under _____ category.
              (a)   File management   (b)   Communication
              (c)   Process management   (d)   None

       (b)   Fill in the blanks.   (5)
              (LRU, pure demand paging, FIFO, dynamic loading, thread library, logical
              address, command line, multiprogramming)
       (i)   An address generated by CPU is commonly referred to as a_____.
       (ii)   _____ interface uses text commands and a method for entering them
       (iii) A_____ provides the programmer with an API for creating and
              managing threads.
       (iv)   In _____scheme, processor never brings a page into memory until it is
              required.
       (v)   _____ page replacement algorithm suffers from Belady's anamoly

       (c)   Short Answers Write answers in one or two lines.   (5)
       (i)   What is file?
       (ii)   What is the use of base register and limit register?
       (iii) Define thread?
       (iv)   What is mean by orphan process?
       (v)   What is process identifier (PID)?

Q.2)   Attempt the following:(ANY THREE)   (15)
- (i) List the major categories of system calls. Explain any two of them in detail.
- (ii) Distinguish between the client-server and peer-to-peer models of distributed systems.
- (iii) Explain Process Control Block
- (iv) Explain the different computing environments.
- (v) Explain the multithreading models.
- (vi) Explain indirect communication in message passing system.

Q.3)   Attempt the following:(ANY THREE)   (15)
- (i) Explain in brief The Critical Section Problem.
- (ii) What is semaphore? Write its usage.
- (iii) Consider the following set of processes with the length of CPU burst time given in milliseconds. Illustrate the execution of processes using Round Robin algorithm. Draw Gantt chart. Also calculate average waiting time and turnaround time. Time Quantum=3ms.

Process	Arrival Time	Burst Time
P1	5	5
P2	4	6
P3	3	7
P4	1	9
P5	2	2
P6	6	3

- (iv) How you avoid deadlock?
- (v) Explain the following concepts:
  (1)Starvation (2) burst time (3) TAT (4) waiting time
  (5) CPU utilization
- (vi) Explain resource allocation graph.

Q.4)   Attempt the following:(ANY THREE)   (15)
- (i) What is swapping? Explain in detail.
- (ii) For the following page reference string calculate number of page faults with OPT and LRU. Frame size = 3.
  5 3 2 1 3 4 5 1 2 3 4 5 3 2 4
- (iii) Explain demand paging.
- (iv) Explain the disk structure.
- (v) Write short note on file operations.
- (vi) Consider a disk queue with requests for I/O to blocks on cylinders
  98, 34, 56, 122, 56, 75, 67, 183
  Find total head movement of cylinders of head starts at 56 using FCFS and SSTF scheduling.

Q.5)   Attempt the following:(ANY THREE)   (15)
- (i) Explain short-term, medium-term and long term scheduler.
- (ii) Write a note on Dinning-philosophers problem
- (iii) Explain Banker's algorithm
- (iv) Explain services offered by operating system.
- (v) Describe the file system structure in detail.
- (vi) Write short note on Segmentation.

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