TE-IT-SEM V (LRGS) 11/5/16

O.S.

**QP Code : 31067**

MAX MARKS : 80 TIME : 03 HRS

N.B. 1. Question No 1 is **compulsory.**

2. Solve any **three** questions out of remaining five questions.

3. Assume suitable data if necessary.

Q. 1. Solve any **four** out of five sub questions

a. What are the major functions carried out by an operating system? (05)

b. Describe the types of semaphores. (05)

c. Discuss the problem of consumer-producer. (05)

d. Explain various process scheduling queues. (05)

e. Differentiate between internal and external fragmentation. (05)

Q. 2. a) Briefly explain the different kernel architectures. (10)

b) State the necessary conditions for deadlock. How to prevent the deadlock? (10)

Q. 3 a) Calculate number of page faults and page hits for the page replacement policies FIFO, Optimal & LRU for given reference string 6,0,5,2,0,3,0,4,2,3,0,3,2,5,2,0, 5,6,0,5(assuming three frame size). (10)

b) Discuss the various file allocation methods. (10)

Q. 4 a) What is mutual exclusion? Explain Peterson's algorithm for mutual exclusion. (10)

b) Explain the file systems of Windows and Linux operating system. (10)

Q.5 a) Assume that the disk head is initially positioned over track 100. For the disk space request of 27, 129, 110, 186, 147, 41, 10, 64 and 120. Show how disk scheduling is carried out for SSTF, C-SCAN, C-LLOK. Calculate the average seek length and show the tracing of the requests. (10)

b) Define the terms Critical section, Race condition, Process Control Block, Kernel and shell of OS , Context Switch. (10)

Q. 6. Write a note on

a. Comparison between FCFS & SJF scheduling algorithms. (06)

b. Paging and segmentation (08)

c. Process state diagram (06)

T3325 / T0526 OPERATING SYSTEMS

T.E. SEM V / IT / 20.11.17 / NOV 2017

**Q. P. Code:-24599**

(3 Hours) **Total Marks: 80**

N.B. 1) Question **no.1 is compulsory**

2) Solve any **Three** questions from remaining five.

3) Assume suitable data wherever required

Q.1 Answer any four

a) Compare and contrast between thread and process 05

b) What is system call? Explain any four system calls 05

c) Explain internal & external fragmentation 05

d) Explain various RAID levels 05

e) Write short note on File Access methods 05

Q.2 a) What are the four conditions that create deadlock? Explain dead lock prevention and avoidance techniques. 10

b) Draw and Explain various states of process with the help of state transition diagram. 10

Q.3 a) Calculate the Hit and faults using FIFO, Optimal and LRU page replacement policies for the following page sequence (2,3,5,4,2,5,7,3,8,7) assume page frame size is 3. 10

b) What is semaphore? Explain different types of the semaphores. 10

Q.4 a) Explain objectives and functions of OS. 10

b) What is scheduling? Give different scheduling policies and their comparison. 10

Q.5 a) What is thread? Explain user level and kernel level thread. 10

b) What is paging? Explain how logical address converted into physical address. 10

Q.6 Write short note on (any four) 20

a) I-node

b) Android OS

c) Producer consumer problem

d) Inter process communication

e) Process control Block

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TE Sem-V (CBSGS) (IT) 18/11/2015
O.S.

**QP Code : 5585**

Total Marks 80

Note : Q1 is compulsory.
Attempt any THREE out of the remaining questions.

Q1. Attempt any 4 sub questions

a) What are the characteristics of modern operating systems. (5 M)
b) What is internal and external fragmentation? (5.M)
c) What is a Process Control Block ( PCB ) ? (5 M)
d Define the terms critical section and race condition. (5 M)
e) Draw and explain process state transition diagram. (5 M)

Q2. a) Explain the conditions for deadlock. Also explain how the deadlock can be determined with the help of resource allocation graph. (10 M)
b) Explain different kernel architectures in detail (10 M)

Q3 a) On a disk with 1000 cylinders, number 0-999. Compute the number of tracks the disk arm must move to satisfy all request in the disk queue. Assume the last request received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains request for the following tracks. 123, 874, 692, 475, 105 , 376. (10 M)
Perform the computation for the following scheduling algorithms.
i. FIFO ii. SSTF iii. SCAN.
b) Explain different types of schedulers. (10 M)

Q4 a) Explain File Allocation methods in detail. (10 M)
b) Consider the following page reference string (10 M)
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6
how many page faults would occur for the following replacement algorithms assuming three, five frames for LRU, FIFO and Optimal Replacement.

Q5. a) Brief the evolution of an OS
b) Consider the given snap of the system (10 M)

| | Allocation | | | | Max | | | | Available | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| P0 | 0 | 2 | 1 | 2 | 0 | 3 | 2 | 2 | 2 | 5 | 3 | 2 |
| P1 | 1 | 1 | 0 | 2 | 2 | 7 | 5 | 2 | | | | |
| P2 | 2 | 2 | 5 | 4 | 2 | 3 | 7 | 6 | | | | |
| P3 | 0 | 3 | 1 | 2 | 1 | 6 | 4 | 2 | | | | |
| P4 | 2 | 4 | 1 | 4 | 3 | 6 | 5 | 8 | | | | |

Answer the following questions using Banker's algorithm





[TURN OVER]



(i) What is the content of Matrix *need?*
(ii) Is the system in safe state?
(iii) If a request from process P1arrives for (1,3,2,1) can the request be granted immediately?

Q6 Write notes on ( any two) (20 M)
a) Multithreading
b) Linux File system
c) Producer Consumer Problem.
d) RAID.

T / O.S / comp / CBGS / 22.11.16

Operating System

OP CODE : 581102

(3 Hours) Total Marks: 80

N.B. 1. Q.no.1 is **compulsory**
2. Attempt any **three** out of the remaining five questions
3. Figures to **right** indicate **full** marks
4. Assume suitable data if necessary but justify the same

Q.1. Attempt the following **(Any four)**
a. What is Kernel? Describe briefly the approaches of designing Kernel. (5)
b. Explain the difference between paging and Segmentation (5)
c. Explain the effect of page size on performance of Operating System (5)
d. Explain various I/O buffering techniques. (5)
e. What do you mean by Busy Waiting? What is wrong with it? (5)

Q.2. a. Calculate hit and miss for the following string using page replacement policies - FIFO, LRU and Optimal. Compare it for the frame size 3 & 4.

1 2 3 2 1 5 2 1 6 2 5 6 3 1 3 6 1 2 4 3 (10)

b. What is a deadlock? Explain the necessary and sufficient conditions for true deadlock. Also suggest techniques to avoid deadlocks. (10)

Q.3. a. Explain an algorithm for producer-consumer problem (10)
b. Explain the banker's algorithm in detail. (10)

Q.4. a. Explain the hardware support for paging (10)
b. Assume the following processes arrive for execution at the time indicated and the length of cpu burst time given in msec. (10)

| Job | Burst time | Priority | Arrival time |
|---|---|---|---|
| P1 | 8 | 3 | 3 |
| P2 | 1 | 1 | 1 |
| P3 | 3 | 2 | 2 |
| P4 | 2 | 3 | 3 |
| P5 | 6 | 4 | 4 |

For the above process parameters, find average waiting times and average turnaround times for the following scheduling algorithms- First Come First Serve, Shortest Job First, non preemptive priority and Round Robin (assume quantum= 2 units)

Q.5. a. Explain LINUX operating system with Kernel, Memory management & scheduling. (10)
b. Compare the following Disk scheduling algorithms using appropriate example- SSTF, FCFS, SCAN, C-SCAN, LOOK (10)

Q.6. Write notes on the following: (20)

a. Resource Allocation Graph
b. Process Control Block
c. Demand Paging
e. Scheduling in Linux system

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T.E. Sem II I.T. CBGS O.S. 13/05/15

**QP Code : 3404**

**Total Marks : 80** **Duration : 3 Hrs**

**N.B : 1) Q.1 is compulsory .**

**2) Attempt Any 3 out of remaining .**

**3) Assume suitable data wherever required .**

Q.1 Answer any four:

a) What is a system call? Explain any four system calls. 5

b) Write a note on File Access methods 5

c) Explain Internal & external Fragmentation 5

d) Explain various RAID levels. 5

e) Discuss message passing 5

Q.2 a) what are the problems associated with Critical region? How to overcome the problems using Semaphore? 10

b) What is scheduling? Give different scheduling policies & their comparison. 10

Q.3 a) Discuss various approaches for I/O Buffering provided by OS. 10

b) Differentiate between Paging & Segmentation. Also explain Various Page replacement algorithms. 10

Q.4 a) Explain Objectives & Functions of OS . 10

b) Discuss in detail various disk scheduling algorithms . 10

Q.5 a) What is a thread? Explain user Level Threads & Kernel Level Threads 10

b) What is meant by Interprocess communication? Explain Shared memory & message passing . 10

Q.6 Write a note on: 20

a) Process control Block

b) Android OS

c) Process state transition Diagram

d) Producer consumer problem

**JP-Con. 8660-15.**

IT| Sem V | CBSGS | OS

**Q.P. Code : 594200**

**( 3 Hours )** **[Total Marks : 80**

**N.B.: (1) Question No. 1 is compulsory.**
**(2) Solve any three questions out of remaining five.**
**(3) Figures to right indicate full marks.**
**(4) Assume suitable data where necessary.**

1. (a) Describe the file systems of Windows. [5]
   (b) Write the deadlock detection algorithm [5]
   (c) What are the differences between user level-threads and kernel-level threads? Under what circumstances one better than the other? [5]
   (d) Describe how does critical section avoid race condition? What are the properties which data item should possess to implement critical section? [5]

2 (a) A page size of 4096 bytes and following page table [10]

| Page No | In/out | Frame |
|---|---|---|
| 0 | out | 333 |
| 1 | in | 300 |
| 2 | in | 1000 |
| 3 | out | 100 |
| 4 | out | 500 |
| 5 | in | 120 |
| 6 | out | 412 |
| 7 | in | 740 |

Which of the following virtual addresses would generate a page fault? For those that do not generate page fault , to what physical address would they translate?
i) 21610 ii)35410 iii)27012 iv)10234

(b) What is semaphore? Explain the counting semaphore with the help of example. [10]

3 (a) Consider a system running 10 I/O bound tasks and one CPU bound task. Assume that I/O bound task issues an I/O operation once for every millisecond of CPU computing and that each I/O operation takes 10 milliseconds to complete. Also assume that the context switching overhead is 0.1 millisecond and that all processes are long running tasks. What is the CPU utilization for a round robin scheduler when : [10]
i)The time quantum is 1 millisecond ii) The time quantum is 10 milliseconds

(b) Show that Peterson's algorithm satisfies the requirements of a mechanism to control access to a critical section [10]

**TURN OVER**

**Q.P. Code : 594200**



4 (a) Consider the following snapshot of the process to be executed. Draw the Gantt chart and determine the average waiting time and average turnaround time for FCFS, SJF(pre-emptive), SJF(nonpreemptive ) and round robin (quantum=2) scheduling algorithm. [10]

| Process | Arrival Time | Burst Time |
|---|---|---|
| P1 | 0 | 7 |
| P2 | 1 | 4 |
| P3 | 3 | 3 |
| P4 | 5 | 1 |
| P5 | 7 | 5 |

(b) What is a kernel? Describe briefly the approaches of designing kernel [10]

5 (a) On a simple paging system with $2^M$ bytes of physical memory, 256 pages of logical address space, and a page size of $2^{10}$ bytes. [10]
i) How many bytes are in page frame?
ii) How many bits in the physical address specify the page frame?
iii) How many entries in the page table?
iv) How many bits are in the logical address?

(b) What criteria should be adopted for choosing type of file organization? Describe the implementation of file allocation techniques? [10]

6 (a) Consider the following snapshot of the system:- [10]

| Process | Allocation | Max. | Available |
|---|---|---|---|
| | A B C | A B C | A B C |
| P0 | 1 1 2 | 4 3 3 | 2 1 0 |
| P1 | 2 1 2 | 3 2 2 | |
| P2 | 0 2 0 | 4 4 2 | |
| P3 | 0 6 3 | 2 6 3 | |
| P4 | 1 1 2 | 2 2 3 | |

Answer the following questions using Banker's algorithm?
i) Determine the total amount of resource of each type. ii) What is the content of need matrix? iii) Determine if the system is in safe state using safety algorithm. iv) If a request from process p1 arrives for (1,1,0) can the request be granted immediately.

(b) Explain the Android operating system. [10]

T.E. Sem V (CBGS) - (I.T.)
Operating System

18/11/14

QP Code : **14836**

(3 Hours) [ Total Marks : 80

Note: Q1 is compulsory.

Solve any three questions from remaining five.

Figure from right indicates full marks.

Assume suitable data wherever required.

Q1. Answer any four. (20)

a) Differentiate: Monolithic kernel and Microkernel.
b) Discuss I/O buffering in detail.
c) Explain Semaphore.
d) Write short note on: producer –consumer problem.
e) Compare and contrast: thread and process.

Q2a) What is Deadlock? State necessary conditions for deadlock. (10)

How to prevent deadlock?

Q2b) draw process state transition diagram and explain the following transitions: (10)

i) Running to ready ii) Waiting to ready

iii) Running to waiting iv) Blocked to ready

v) Running to terminated

Q3 a) calculate Hit and Miss using LRU, Optimal, FIFO page replacement policies (10)

for the following sequence. Page frame size is 3.

0, 4, 3 ,2 ,1 ,4, 6, 3, 0, 8, 9, 3, 8, 5.

Q3 b)Explain file allocation methods in detail with proper diagram. (10)

Q4a)Use following scheduling algorithms to calculate ATAT and AWT for (10)

the following processes.

i)FCFS ii)pre-emptive and non pre-emptive SJF iii)preemptive priority .

| Process | Arrival Time | Burst Time | Priority |
|---|---|---|---|
| P1 | 0 | 8 | 3 |
| P2 | 1 | 1 | 1 |
| P3 | 2 | 3 | 2 |
| P4 | 3 | 2 | 3 |
| P5 | 4 | 6 | 4 |





Q4b) What is meant by inter-process communication? (10)

Q5a) Explain paging in detail. Describe how logical address is converted into (10)

physical address?

Q5b) (10)

| Process | Max | | | | Allocation | | | | Available | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| P0 | 6 | 0 | 1 | 2 | 4 | 0 | 0 | 1 | 3 | 2 | 1 | 1 |
| P1 | 1 | 7 | 5 | 0 | 1 | 1 | 0 | 0 | | | | |
| P2 | 2 | 3 | 5 | 6 | 1 | 2 | 5 | 4 | | | | |
| P3 | 1 | 6 | 5 | 3 | 0 | 6 | 3 | 3 | | | | |
| P4 | 1 | 6 | 5 | 6 | 0 | 2 | 1 | 2 | | | | |

Using Banker's algorithm answer the following questions-

i) How many resources of type A,B, C, D are there?

ii) What are the contents of need matrix?

iii) Find if the system is in safe state? If it is, find the safe sequence.

Q6 Write short notes on: (any four) (10)

a) Characteristics of Modern operating system
b) RAID
c) Android OS
d) Distributed operating system
e) I-node