Operating System VTU Question Paper Set 2017

USN | | | | | | | | | | |

10EC65

Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Mention the different classes of operating systems. What is the prime concern addressed in each class? **(04 Marks)**

b. Explain the functions of multiprogramming supervisor in detail. Also give the architectural support. **(10 Marks)**

c. Differentiate between Hard Real time Systems vs. Soft Real time Systems. **(06 Marks)**

2 a. List the features operating system fails to handle when installed in a different machine. **(02 Marks)**

b. Explain (i) System generation (ii) Configuration tools (iii) Dynamic configuration of supervisor. **(12 Marks)**

c. Explain monolithic structure of O.S. Give its drawbacks. **(06 Marks)**

3 a. Explain four kinds of process interaction. **(04 Marks)**

b. What are Event Control Blocks (ECBs)? Explain the fields contained in ECBs. Also explain event handling actions of kernel with diagram. **(08 Marks)**

c. What is a process? Explain with a neat diagram process states and state transitions in Unix. **(08 Marks)**

4 a. Give the difference between static and dynamic memory allocation. **(04 Marks)**

b. Explain with diagram merging free areas using bounding tags. **(08 Marks)**

c. Explain slab allocator used in solaris as one of kernel memory allocator. **(08 Marks)**

PART – B

5 a. What is demand paging? With a diagram explain the following with respect to demand paging: (i) Page faults (ii) Page in and page out operations (iii) Page replacement. **(12 Marks)**

b. Discuss memory mapping of a file by a process with diagram. Give its advantages. **(08 Marks)**

6 a. Discuss the various attributes of a file. **(04 Marks)**

b. List the various operations carried out on directories. Explain mounting of a file system. **(08 Marks)**

c. Describe file system actions at open, close and at file operations. **(08 Marks)**

7 a. With a neat schematic diagram, explain the concept of scheduling. **(05 Marks)**

b. Discuss the following non-preemptive scheduling policies:
(i) FCFS scheduling (ii) Shortest request next (SRN) (iii) Highest Response ratio next **(15 Marks)**

8 a. Explain Interprocess Message Control Block (IMCB). **(04 Marks)**

b. Write a note on mailboxes. Give the advantages of mailboxes. **(07 Marks)**

c. Explain the three interprocess communication features supported by unix. **(09 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC65

Sixth Semester B.E. Degree Examination, June/July 2016
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: *Answer FIVE full questions, selecting at least TWO questions from each part.*

PART – A

1 a. Define OS. What are the common tasks performed by an operating system? **(08 Marks)**

b. Explain briefly, the different classes of operating system, with primary concern and key concepts. **(08 Marks)**

c. What are the operations performed by Kernel when an interrupt occurs? **(04 Marks)**

2 a. Explain : (i) Monolithic OS and (ii) Microkernal OS
Specifying advantages and dis-advantages in each case. **(08 Marks)**

b. Define the following with respect to an operating system:
(i) Policies and mechanisms. (ii) Portability and Extensibility **(08 Marks)**

c. Briefly explain the concept of VMOS, with an example. **(04 Marks)**

3 a. Briefly explain four kinds of process interaction. **(06 Marks)**

b. With state transition diagram, explain the state transition for a process. **(06 Marks)**

c. What are the advantages of threads? Explain briefly Kernel-level and user-level threads, specifying advantages and disadvantages. **(08 Marks)**

4 a. Explain Kernel memory allocator methods. **(10 Marks)**

b. What are the key features in static and dynamic memory allocation? **(06 Marks)**

c. Explain briefly memory compaction with an example. **(04 Marks)**

PART – B

5 a. With reference to virtual memory, explain the following:
(i) Demand paging (ii) Page replacement policies. **(10 Marks)**

b. Explain UNIX virtual memory. **(10 Marks)**

6 a. Explain file operations performed by processes. **(08 Marks)**

b. What are the facilities provided by file-system and IOCS? Write the layered architecture of the system. **(06 Marks)**

c. Explain (i) Sequential file organization (ii) Direct file access organization. **(06 Marks)**

7 a. Define Turn-around-time. Compare average Turn-Around-Time, for the following set of process for FCFS and SRN scheduling. **(08 Marks)**

Process	P_1	P_2	P_3	P_4	P_5
Arrival time	0	2	3	5	9
Service time	3	3	2	5	3

b. Briefly explain process scheduling methods for real time applications. **(06 Marks)**

c. Explain briefly, scheduling in UNIX. **(06 Marks)**

8 a. How interprocess communication is achieved through mail-box? What are its advantages? **(08 Marks)**

b. Explain the following:
(i) Synchronous and asynchronous message passing.
(ii) Data – access synchronization.
(iii) Control synchronization. **(12 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC65

Sixth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Operating System

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. List the different tasks in an operating system. Describe the different computational structures used in an operating system. **(06 Marks)**

b. With a suitable timing diagrams, explain the priority assignment rule in a multiprogramming systems. **(06 Marks)**

c. Define the following :
i) System call
ii) Throughput
iii) Turn–around time
iv) Response time
With a suitable curve, explain the key features and concerns of different operating system classes. **(08 Marks)**

2 a. With a neat diagram, explain the layered design of operating systems. **(08 Marks)**

b. Explain the structure of microkernel based operating system. **(06 Marks)**

c. Write an explanatory note on virtual machine operating system. **(06 Marks)**

3 a. With a state transition diagram, explain the different states of a process and its transitions. **(06 Marks)**

b. With a neat diagram, explain the threads used in Solaris. **(06 Marks)**

c. Discuss the problem of race condition with a suitable example. Explain the method to overcome this problem. **(08 Marks)**

4 a. Discuss the methods used to achieve the memory protection with a suitable diagram. **(08 Marks)**

b. Describe the memory allocation methods for the program controlled data. **(08 Marks)**

c. Differentiate between contiguous and non-contiguous memory allocation methods. **(04 Marks)**

PART – B

5 a. What is demand paging? Explain the mechanism of address translation buffers with a neat diagram. **(08 Marks)**

b. Explain the FIFO page replacement policy and LRU page replacement policy. Find the number of page faults for the following page reference string using these two policies.
Reference string : 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5
Assume page frames = 3. **(12 Marks)**

6 a. With a neat diagram, explain the facilities provided by the file system and IOCS layers. **(08 Marks)**

b. Describe the organization of sequential access and direct access files. **(06 Marks)**

c. Write an explanatory note on FCB. **(06 Marks)**

7 a. Explain the long term, short term and medium term schedulers. Explain how these schedulers work in case of time sharing system. **(10 Marks)**

b. Explain the operation of preemptive scheduling policies and its performance for the data given below :

Process	P_1	P_2	P_3	P_4	P_5
Arrival time	0	2	3	5	9
Service time	3	3	2	5	3

(10 Marks)

8 a. Explain the Kernel actions to implement message passing using symmetric naming and blocking sends. **(06 Marks)**

b. Write an explanatory note on mailboxes. **(06 Marks)**

c. Explain how inter-process communication can be done in UNIX. **(08 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC65

Sixth Semester B.E. Degree Examination, June/July 2015
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Discuss the common tasks performed by an operating system (OS). **(05 Marks)**

b. Explain the resource preemption, resource allocation strategies of an OS. **(07 Marks)**

c. What is a distributed system? Discuss the key concepts, techniques and benefits of distributed OS. **(08 Marks)**

2 a. Explain the functions of an OS. **(04 Marks)**

b. Explain the kernel based operating system with a structure of time sharing system. **(08 Marks)**

c. Explain the following: i) System generation; ii) Configuration tools; iii) Dynamic configuration of supervisor. **(08 Marks)**

3 a. Discuss the primary concerns/reasons for process termination. **(05 Marks)**

b. List the events occur during the operation of OS. With a diagram discuss the event handling actions of kernel. **(08 Marks)**

c. With a diagram, explain the relationship between threads and processes. Discuss the advantages of threads. **(07 Marks)**

4 a. Explain the lazy buddy allocator and slab allocator. **(08 Marks)**

b. With a diagram, explain the merging of free memory areas using boundary tag. **(08 Marks)**

c. Compare between contiguous and non-contiguous memory allocation. **(04 Marks)**

PART – B

5 a. With a diagram explain the following:
   i) Practical page replacement policy.
   ii) Page replacement policy using clock algorithms. **(09 Marks)**

b. Explain with a diagram, the copy_on_write for shared pages. **(04 Marks)**

c. With a diagram, explain the virtual memory manager's actions in demand loading of a page. **(07 Marks)**

6 a. Explain the following write a diagram:
   i) Linked allocation
   ii) File allocation table
   iii) Indexed allocation. **(10 Marks)**

b. Explain the operations performed on files. **(05 Marks)**

c. Discuss with a diagram the directory trees of a file system. **(05 Marks)**

7 a. With a neat diagram, explain the event handling and scheduling. **(08 Marks)**

b. Determine the mean turn around time and mean weighted turn around for LCN and STG scheduling for the following table: **(08 Marks)**

Processes	Arrival time (sec.)	Execution time (sec.)	Dead line time (sec.)
P_1	0	03	04
P_2	2	03	14
P_3	3	02	06
P_4	5	05	11
P_5	8	03	12

c. Discuss the two fundamental techniques of scheduling. **(04 Marks)**

8 a. Explain the following:

i) Inter process message control block.

ii) Exceptional conditions on message passing. **(07 Marks)**

b. Explain the message queues and sockets for inter process communication in unix. **(08 Marks)**

c. Explain a mail box with its features and advantages. **(05 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC65

Sixth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What is O.S.? What are the common tasks performed by O.S. and when they are performed? **(07 Marks)**

b. Explain turn around time in batch processing system. **(06 Marks)**

c. Define distributed system. Give the key concepts and techniques used in distributed O.S. **(07 Marks)**

2 a. Explain with basic structure used for system generation in configuring and installing supervisor. **(07 Marks)**

b. Explain with a figure the working of a two layered O.S. structure. **(06 Marks)**

c. With a neat diagram, explain the working of a microkernel based O.S. **(07 Marks)**

3 a. Define a process. List the different fields of a process control block. **(06 Marks)**

b. Explain the four fundamental states of a process with state transition diagram. **(07 Marks)**

c. What are the advantages of threads over process? Explain kernel level threads. **(07 Marks)**

4 a. Explain the working of a buddy system allocator. **(06 Marks)**

b. Give the comparison of contiguous and non-contiguous memory allocation. **(06 Marks)**

c. Explain first fit and best fit technique used to perform a fresh allocation from a free list. **(08 Marks)**

PART – B

5 a. Explain what are the functions performed by paging hardware. **(06 Marks)**

b. What are the functions performed by VM handler? Give the data structures of VM handler. **(06 Marks)**

c. Consider the page reference string 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5. How many page faults would occur for the following page replacement policies assuming 3 frames?
i) FIFO ii) LRU **(08 Marks)**

6 a. What are the facilities provided by the file system and the input-output control system? **(06 Marks)**

b. With a figure explain the working of a linked allocation of disk space. **(07 Marks)**

c. Explain the interface between file system and IOCS. **(07 Marks)**

7 a. With diagram explain the working of a long, medium and short term scheduling in a time sharing system. **(10 Marks)**

b. For the following given process for scheduling.

Process	P_1	P_2	P_3	P_4	P_5
Admission time	0	2	3	4	8
Service time	3	3	5	2	3

Calculate mean turn around time and mean weighted turn around for the (i) FCFS scheduling (ii) Round-Robin scheduling with time slicing (δ) for 1 second. **(10 Marks)**

8 a. Explain the primary issues in implementing message passing. **(06 Marks)**

b. Explain the working of a blocking and non-blocking delivery protocols. **(07 Marks)**

c. Explain mailboxes. Give the advantages of mailboxes. **(07 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC65

Sixth Semester B.E. Degree Examination, June/July 2014

Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the goals of an operating system. **(06 Marks)**
b. Explain the designer's view of operating system. **(04 Marks)**
c. Explain modes of performing I/O operations. **(05 Marks)**
d. Explain the benefits/features of distributed operating system. **(05 Marks)**

2 a. Explain the functions of an operating system. **(05 Marks)**
b. Explain the layered design of operating system. **(08 Marks)**
c. Explain the concept of VMOS with example. **(07 Marks)**

3 a. Explain the contents of process control block. **(06 Marks)**
b. List the different types of process interaction and explain them in brief. **(06 Marks)**
c. Explain with a neat diagram, the different states of process in UNIX operating system. **(08 Marks)**

4 a. Describe static and dynamic memory allocation. **(04 Marks)**
b. Compare the contiguous and non-contiguous memory allocation. **(04 Marks)**
c. What is boundary tag? Explain merging of free areas using boundary tags? **(08 Marks)**
d. Explain the lazy buddy allocator. **(04 Marks)**

PART – B

5 a. Explain the important concepts in the operation of demand paging. **(12 Marks)**
b. Find the number of page faults for following page reference string, using the FIFO and LRU page replacement policies.
Reference string: 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5. (Assume page frames = 3) **(08 Marks)**

6 a. Describe the different operations performed on files. **(08 Marks)**
b. Explain the organization of sequential access and direct access files. **(08 Marks)**
c. Describe file system actions during a file operation. **(04 Marks)**

7 a. Compute mean turn around time and mean weighted turn around time for following set of processes, using FCFS and SRN scheduling. **(10 Marks)**

Processes	P_1	P_2	P_3	P_4	P_5
Arrival time	0	2	3	5	8
Service time	3	3	2	5	3

b. Explain the process schedule with a neat schematic diagram. **(05 Marks)**
c. Summarize the approaches to real time scheduling. **(05 Marks)**

8 a. Explain Buffering of interprocess messages. **(06 Marks)**
b. Describe the delivery of interprocess messages. **(06 Marks)**
c. Write a short note on mailbox. **(08 Marks)**

* * * * *

USN | | | | | | | | | | | **10EC65**

Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Define an operating system. What are the different facets of user convenience? **(06 Marks)**
b. Explain partition based and pool based resource allocation strategies. **(06 Marks)**
c. Explain time sharing operating system with respect to, i) Scheduling and ii) Memory management. **(08 Marks)**

2 a. What are the functions of an operating system? Explain. **(06 Marks)**
b. Explain virtual machine operating system (VMOS). What are the advantages of using virtual machines? **(08 Marks)**
c. In a batch processing system, the results of 1000 students are to be printed. Reading a card or printing a result needs 100 msec whereas read/write operation in a disck needs only 20 msec. Processing a record needs only a 10 msec of CPu time. Compute the program elapsed time and CPu idle time with and without spooling. **(06 Marks)**

3 a. What is a process? What are the components of a process? Explain. **(04 Marks)**
b. Explain with neat diagrams, i) User threads ii) Kernel level threads. **(08 Marks)**
c. With a neat diagram, explain different states of a process and state transitions in the UNIX operating system. **(08 Marks)**

4 a. Explain the techniques used to perform memory allocation by using a free list. **(10 Marks)**
b. Explain internal and external fragmentation with examples. **(06 Marks)**
c. Compare contiguous and non-contiguous memory allocation methods. **(04 Marks)**

PART – B

5 a. What are the functions performed by the virtual memory manager? Explain. **(08 Marks)**
b. For the following page reference string, calculate the number of page faults with FIFO and LRU page replacement policies when i) Number of page frames are three ii) Number of page frames are four.
Page reference string : 5 4 3 2 1 4 3 5 4 3 2 1 5
Reference time string : $t_1, t_2, t_3, \ldots\ldots\ldots, t_{13}$ **(12 Marks)**

6 a. With a neat diagram, explain the facilities provided by the file system and IOCS layers. **(08 Marks)**
b. Explain the index sequential file organization with an example. **(08 Marks)**
c. What is a link? With an example, illustrate the use of a link in an acyclic graph structure directory. **(04 Marks)**

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

7 a. Compare : i) Preemptive and non-preemptive scheduling ii) Long term and short term schedulers. **(08 Marks)**

b. Describe the shortest request next (SRN) and highest response ratio next (HRN) scheduling policies and determine the average turn around time and weighted turn around time for the following set of processes shown in Table Q7 (b). **(12 Marks)**

Table Q7 (b)

Processes	P_1	P_2	P_3	P_4	P_5
Arrival time	0	2	3	4	8
Service time	3	3	5	2	3

8 a. Explain i) Direct and indirect naming.
ii) Blocking and non blocking sends. **(06 Marks)**

b. What is a mail box? With an example, explain the features of mailboxes and its advantages. **(08 Marks)**

c. Explain pipes and message queues in UNIX. **(06 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC65

Sixth Semester B.E. Degree Examination, June/July 2013
Operating Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. What are the two goals of an operating system (OS)? Explain briefly. **(04 Marks)**

b. Describe the batch processing system and functions of scheduling and memory management for the same. **(08 Marks)**

c. Why I/O bound programs should be given higher priorities in a multiprogramming environment? Illustrate with timing diagram. **(08 Marks)**

2 a. Explain system generation operations. **(04 Marks)**

b. Compare Kernel based and microkernel based OS function. **(08 Marks)**

c. Explain layered OS structure. How is it superior compared to monolithic structure? **(08 Marks)**

3 a. Mention the three kinds of entities used for concurrency within a process in threads in Solaris, along with a diagram. **(04 Marks)**

b. With a state transition diagram and PCB structure, explain the function of the states, state transitions and the functions of a schedule. **(08 Marks)**

c. Explain the race condition in airline reservation system with an algorithm. **(08 Marks)**

4 a. Compare static and dynamic memory allocation. What are the four program components for which the memory is to be allocated? **(04 Marks)**

b. Describe: i) Best fit technique for free space allocation and ii) Variable partitioned allocation with their merits and demerits. **(08 Marks)**

c. Describe buddy system allocator for program controlled data. How does it differ from process-of-two allocator? **(08 Marks)**

PART – B

5 a. Explain "page out daemon" for handling virtual memory in UNIX OS. **(04 Marks)**

b. Describe the address translation using ATU and TLB in demand paged allocation with a block diagram. **(08 Marks)**

c. Determine the number of page faults in FIFO and LRU policies for the following page reference string. Pages: 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1. Assume that there are 3 page frames and all are initially empty and the first page loaded causes a page fault. Also compare these two techniques. **(08 Marks)**

6 a. Compare sequential and direct file organization. **(04 Marks)**

b. Describe the interface between file system and IOCS. **(08 Marks)**

c. Explain the file system actions when a file is opened and a file is closed. **(08 Marks)**

7 a. What are the functions of medium and short term schedulers? **(04 Marks)**

b. Determine mean turn around time for SJN an RR scheduling, assuming a time slice of 1 second for the following table:

Process	Arrival time in seconds	Execution time in seconds	Deadline in seconds
P_1	0	3	4
P_2	2	3	14
P_3	3	2	6
P_4	5	5	11
P_5	8	3	12

(08 Marks)

c. Describe the various blocks in a long term scheduling with JCB structure. **(08 Marks)**

8 a. Explain the primitives used for the transmission and reception of messages in an OS. **(04 Marks)**

b. Describe message delivery protocols and the exceptional conditions during message delivery with an example. **(08 Marks)**

c. Explain the interprocess communication mechanisms in UNIX OS. **(08 Marks)**

* * * * *