

Operating System Study and
Unix System Programming

2009 April

Science Computer Science

TYBSc

University Exam

University of Mumbai

- N.B.** (1) All questions are compulsory.
(2) Figures to the right indicate marks.
(3) Answers to two sections must be written and submitted separately and mixing of subsections is not allowed.
(4) Symbols have their usual meaning unless otherwise stated.
(5) Illustrations, in-depth answers and diagrams will be appreciated.

Section I

1. (a) Explain the features of any one of the following :— 6
(i) Distributed Systems
(ii) Real-Time Systems
- (b) Explain the activities of Operating system in any one of the following :— 6
(i) Process Management
(ii) File Management
- (c) Describe any one of the following :— 5
(i) Operating system Services
(ii) Categories of System Programs
- OR**
1. (p) Explain any one method of Inter Process Communication :— 6
(i) Buffering
(ii) Direct Communication
- (q) Describe any one :— 6
(i) CPU I/O burst cycle
(ii) Short, Medium and Long term scheduler
- (r) Explain any one :— 5
(i) Process and Context switch
(ii) Contents of Process Control block
2. (a) Answer any one :— 6
(i) Solution to mutual exclusion using semaphore.
(ii) Requirements to the solution of critical section problem.
- (b) Describe the structure of any one synchronization problem :— 6
(i) Bounded Buffer
(ii) Readers Writers.
- (c) Describe the four necessary conditions for deadlock to occur. 5
- OR**
2. (p) Explain the resource allocation graph technique of deadlock avoidance. 6
- (q) Answer any one :— 6
(i) Mutual Exclusion
(ii) Criteria for determining best cpu scheduling algorithm
- (r) **Process** : 1 2 3 4 5 5
Burst Time : 350 125 475 250 75
- For the above process calculate and find the average waiting time and the average turnaround time using Shortest job first algorithm and First in first out method. Compare and comment on the result.
3. (a) Explain any one :— 6
(i) Overlay
(ii) Swapping
- (b) Answer any one :— 5
(i) Basic segmentation technique
(ii) Dynamic partitioning
- (c) Explain any one disk scheduling algorithm with an example. 5
- OR**

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3. (p) Explain the simple paging mechanism. 6
 (q) Explain any one :— 5
 (i) Tree structured Directory
 (ii) Polling technique in handling I/O.
 (r) Describe any one :— 5
 (i) Characteristics of I/O device
 (ii) Basic File Attributes.

Section II

4. (a) Explain any three commands that can be used only by the super user with example. 6
 (b) Explain all the entries in the output of the command ls-l with an example. 6
 (c) Explain the cut command with any three options. 5

OR

4. (p) State any two differences between a kernel and shell. Explain any 4 shell environment (system) variables. 6
 (q) What is a filter ? Explain any two filter commands with syntax and example. 6
 (r) A file "patient.txt" contains details of patients. Give commands for the query given below — 5

```
Code:Name:Age:Bloodgroup
P001:abcd:42:A+
P004:lmno:23:B-
P005:xyza:25:AB-
```

- (i) Show the patient details in the descending order of age
 (ii) Give the total no of patients whose blood group is 'A+'
 (iii) List the line number of patients whose blood group is 'AB-'
 (iv) Show only the Code and Bloodgroup of patient
 (v) Display the patients whose blood group is not 'B-'
5. (a) What are shell meta characters ? Explain the purpose of following meta characters— 6
 (i) ? (ii) * (iii) [] (iv) [!]
 (b) Write a shell script to accept numbers as command line arguments. If no argument is passed, display message 'No Arguments passed'. If number of arguments passed is odd then display the sum of the arguments. If number of arguments passed is even then display the product of the arguments. 6
 (c) Explain the characteristics of a good password. 5

OR

5. (p) Explain the two types of links in Linux and their advantages. Show the relation between a linked files and its i-node number. 6
 (q) Describe the purpose of the following commands with example :— 6
 (i) chown (ii) chgrp
 (r) Give the syntax of the for loop construct in Linux. Write a shell script to input a number n and generate the following output using for loop :— 5

N	Square	Cube
1	1	1
2	4	8
N		

6. (a) Explain the process of creating, deleting and maintain users in a Linux system. 6
 (b) Describe the startup and shutdown process in linux. 5
 (c) Explain any three commands related to disk free space management 5

OR

6. (p) Explain the purpose of find command with syntax and selection criteria (any four). 6
 (q) Describe the function of the file system check utility in linux. 5
 (r) Write a short note on Network addressing system. 5