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Roll No.

MCA-502

M. C. A. (Fifth Semester) EXAMINATION, June, 2008

UNIX AND SHELL PROGRAMMING

(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any two parts from each question. All questions carry equal marks.

Unit-I

1. (a) Describe the architecture of UNIX operating system.
10
- (b) What is buffer cache ? Discuss all possible conditions to manage buffer cache.
10
- (c) Describe the various scenarios that can happen in algorithm breada. What happens on the next invocation of bread or breada when the current read-ahead block will be read ?
10

Unit-II

2. (a) What is Inodes and In-core inodes ? Write an algorithm for conversion of a path name to an Inode.
10

P. T. O.

- (b) What is link system call ? Discuss the algorithm for linking a file. 10
- (c) What is mount table ? Discuss the algorithm for mounting a file system. 10

Unit - III

3. (a) What is μ -area ? Explain the complete transition rules and state information of a process. 10
- (b) Explain the operation performed by the kernel when a process is created. Discuss "fork" system call. 10
- (c) What is IPC ? Explain the system V-IPC packages. 10

Unit - IV

4. (a) What are basic functions of shell ? Discuss different types of shell used in UNIX OS. 10
- (b) When the shell creates a new process to execute a command, how does it know that the file is executable ? If it is executable, how does it distinguish between a shell script and a file produced by a compilation ? What is the correct sequence for checking the above cases ? 10
- (c) Write a menu driven program which has the following options (using case statement) : 10
- (i) Contents of /etc/ passwd
 - (ii) Present working directory
 - (iii) List of users who have currently logged in
 - (iv) Exit

5. (a) What is the utility of awk programming ? Explain different control structures supported by awk programming language. 10
- (b) Discuss various flavours and features of linux operating system. 10
- (c) What is perl programming ? Write a perl script to convert a binary number (supplied as argument) to decimal number. 10

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MCA-502

M. C. A. (Fifth Semester)
EXAMINATION, Nov.-Dec., 2007
UNIX AND SHELL PROGRAMMING
(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Discuss in brief UNIX file system structure. 6
(b) What is BUFFER CACHE ? How it improves the performance of a system ? 8
(c) What should happen if the kernel attempts awaken all processes sleeping on an event, but no processes are asleep on the event at the time of the wake up ? 6
2. (a) What is In-Core Inode ? Discuss an algorithm for allocation of In-Core Inode. 10
(b) Write an algorithm to convert a path name to an Inode. 10
3. (a) What is super block ? Discuss the fields associated with super block. 4
(b) What is context switch ? Where it is used ? 4
(c) Discuss Directory structure of UNIX file system. Write an algorithm for conversion of byte offset to block number in file system. 12

P. T. O.

4. (a) What is link system call ? Discuss the algorithm for linking a file. 10
 (b) Describe the mounting and unmounting of file system. 10
5. (a) Differentiate between named and unnamed pipes. Discuss the pipe system call. 12
 (b) What is U-area ? 4
 (c) Describe all conditions where the reference count of an inode can be greater than 1. 4
6. (a) Discuss the algorithm for "fork" system call. 10
 (b) What is IPC ? Explain the system-V IPC packages. 5
 (c) What is UNIX Zombic process and why is the concept necessary ? 5
7. (a) Discuss different features of LINUX operating system. 5
 (b) What are awk built in variables ? 5
 (c) Write a program that prints the owner, file type, access permissions and access times of files supplied as parameters. If a file is a directory, the program should read the directory and print the above information for all files in the directory. 10
8. Write short notes on any *four* of the following : 5 each
 - (i) The SHELL
 - (ii) Memory Management
 - (iii) STAT and FSTAT
 - (iv) File permissions
 - (v) Process states transitions

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MCA-502

M. C. A. (Fifth Semester)
EXAMINATION, May/June, 2006
UNIX AND SHELL PROGRAMMING
(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Discuss briefly UNIX file system structure. 8
(b) What is buffer cache ? Draw the diagram of buffer header. Write down advantages and disadvantages of buffer cache. 12
2. (a) Discuss the Scenarios for retrieval of a buffer. 10
(b) What is Inodes and In-Core Inodes ? Discuss the algorithm for allocation of In-Core Inodes. 10
3. (a) Discuss directory structure of UNIX file system. 6
(b) Write an algorithm for conversion of a path name to an Inode. 8
(c) What is super block ? Discuss the fields associated with super block. 6

R. T. O.

4. (a) What is Link System Call ? Discuss the algorithm for linking a file. 10
 (b) Differentiate between named and unnamed pipes. Discuss the pipe system call. 10
5. (a) When executing the command ls -ld on a directory, the number of links of the directory is never 1. Why ? 4
 (b) Briefly discuss crossing of mount point ? 4
 (c) Write an algorithm for un-mounting a file system. 12
6. (a) What are the components of the context of process ? What are the steps for a context switch ? 8
 (b) What is IPC ? Explain the system-V IPC Packages ? 8
 (c) What is U-area ? 4
7. (a) What is the useful permission setting for a file and a directory ? Write the syntax for the following : 8
 (i) Cut
 (ii) Umask
 (iii) Chmod
 (b) Write a shell script that would pick up all 'C' program files from the current directory and add the Extension '.CPP' at the end of each such file. 8
 (c) What are awk built in variables ? 4
8. Write short notes on any *four* of the following : 5 each
 (i) Open system call
 (ii) LINUX security features
 (iii) STAT and FSTAT
 (iv) Fork system call
 (v) Daemon process

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MCA-502

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2005

UNIX AND SHELL PROGRAMMING

(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) What is kernel ? Draw block diagram of the system kernel. Explain it. 10
(b) What is directory execute permission ? Compare and contrast interrupts and exceptions. 10
2. (a) What is buffer cache ? Draw the diagram of buffer header. Write down advantages and disadvantages of buffer cache. 10
(b) Describe in detail the *i*-node directory file structure of Unix Operating System. How is it different from tree file directory structure ? 10
3. (a) What is system call ? Under what circumstances is it important to know if a call to a library function results in a system call. 10
(b) Consider the following code fragment in Unix :

```
Pid_t    Pid = fork ( );  
..... more code .....
```

P. T. O.

Explain how the code label "more code" would determine whether the code being executed is in the parent process or the child process. 10

4. (a) Describe the mounting and unmounting of file system. 10
 (b) What is buffer cache ? Draw the diagram of buffer header ? Write down advantages and disadvantages of buffer cache. 10
5. (a) What is Unix zombie process and why is the concept necessary ? 10
 (b) Write an algorithm for conversion of a path name to an I node. 10
6. (a) What is context switch ? Where is it used ? 5
 (b) What is IPC ? Explain the system-V IPC packages. 5
 (c) Write the shell program to calculate factorial of a number. 10
7. (a) Design a directory structure that improves the efficiency of searching for path names by avoiding the linear search using techniques of hashing. 10
 (b) What is the utility of awk programming ? Explain different control structures supported by awk programming language. 10
8. Write short notes on the following : 5 each
 - (a) Socket problems
 - (b) Semaphores
 - (c) STAT and FSTAT
 - (d) Pipes in Unix O. S.

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MCA-502

M. C. A. (Fifth Semester) EXAMINATION, June, 2005

UNIX AND SHELL PROGRAMMING

(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Describe briefly the architecture of UNIX operating system. 8
(b) What is buffer cache ? Explain in brief the structure of buffer pool. 12
2. (a) Write an algorithm to convert a path name to an Inode. 10
(b) Write an algorithm for conversion of byte offset to block number in file system. 6
(c) Describe the structure of Inode. 4
3. (a) Write an algorithm for reading a file. 10
(b) Discuss the algorithm for changing current directory. 6
(c) What could happen if the kernel would allow the process to mount the same file system simultaneously at two mount points ? 4

P. T. O.

4. (a) Explain the following shell statements taking suitable shell script : 10
- (i) For
 - (ii) Expr
 - (iii) Test
 - (iv) Case
- (b) The length and breadth of a rectangle and radius of a circle are input through the keyboard. Write a shell script to concatenate the area and perimeter of the rectangle and the area and circumference of the circle. 10
5. (a) Write an algorithm for linking files. 10
- (b) Discuss deadlock scenario for link system call. 6
- (c) What should happen if a process attempts to unmount a file system and another process is simultaneously attempting to create a new file on that file system ? 4
6. (a) What is process state transition ? 8
- (b) Discuss the algorithm for fork system call. 8
- (c) Briefly discuss Inter-Process communication. 4
7. (a) Write a shell script which displays a list of all files in the current directory to which you have read, write and execute permissions ? 10
- (b) What are awk built-in variables ? 4
- (c) Write an Interactive script that asks for a word and a filename and then tells how many times that word occurred in the file, using awk programming. 6

8. Write short notes on any *four* of the following : 20
- (a) Context of a process
 - (b) LINUX Security features
 - (c) Pipe System cell
 - (d) Compress and Peak command
 - (e) Memory Management

MCA-502

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2004

UNIX AND SHELL PROGRAMMING

(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Discuss briefly UNIX file system structure. 8
(b) What is buffer cache ? Discuss the scenario for retrieval of a buffer. 12
2. (a) What is In-Core Inode ? Explain an algorithm for allocation of In-Core Inodes. 10
(b) A file system should never contain a free inode whose inode number is less than the remembered inode used by ialloc. How is it possible for this assertion to be false ? 10
3. (a) Differentiate between named and unnamed pipes. Discuss the pipe system call. 8
(b) Describe the conditions where the reference count of an inode can be greater than 1. 5
(c) What is mount table ? Discuss an algorithm for mounting a file system. 7
4. (a) What is link system call ? Discuss the algorithm for unlinking a file. 10

P. T. O.

- (b) What is U-area ? 4
- (c) What are the steps for a context switch ? Explain it. 6
5. (a) What Kernel does for process creation ? Discuss an algorithm for fork system call. 10
- (b) Compare and contrast messages, shared memory and semaphore mechanisms. 10
6. (a) Explain the following shell statement taking suitable shell script : 10
- (i) While
- (ii) Until
- (iii) Test
- (iv) If else
- (b) Write a shell script to find the Greatest Common Divisor (GCD) for the given number 120 and 9. 10
7. (a) What are awk built in variables ? 4
- (b) Write a shell script which receive filename as argument. Check whether it is a file or directory ? If it is a filename then name of the file as well as the number of lines present in it ? Should be reported. 10
- (c) Write an Interactive script that ask for a word and a filename and then show how many times that word occurred in the file (using awk) ? 6
8. Write short notes on any *four* of the following : 20
- (i) File types in UNIX
- (ii) State Transition
- (iii) Interprocesses Communication
- (iv) Open System Call
- (v) LINUX Security Features

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MCA-502

M. C. A. (Fifth Semester) EXAMINATION, June, 2004

UNIX AND SHELL PROGRAMMING

(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any five questions.

1. (a) Describe architecture of UNIX Operating System. 10
(b) Describe a scenario where the buffer data is already valid in algorithm that reads a disk block. 5
(c) Write down the strengths of UNIX Operating System. 5
2. (a) Explain in brief the structure of a regular file. Write down an algorithm for the inode assignment to a new file. 10
(b) Design a directory structure that improves the efficiency of searching for path names by avoiding the linear search. 10
3. (a) Describe any five systems calls for file system. 10
(b) Describe various states and their transitions during the life time of a process. 10
4. (a) Write down the algorithm for 'sleep'. 10
(b) Discuss "process creation" in detail. 10

P. T. O.

5. (a) What do you understand by process tracing ? What are the drawbacks of using 'ptrace' ? 10
- (b) Briefly discuss Master and Hare process. 5
- (c) Discuss various meta characters of shell. 5
6. (a) Briefly discuss various types of shells. 6
- (b) Write down a shell script which deletes all lines containing the word 'unix' in the files supplied as arguments to this shell script. 10
- (c) Explain the case control structure. 4
7. (a) Write any *five* awk built in function. 5
- (b) Explain through a suitable example how 'awk' handles array. 5
- (c) Write a note on various linux flavours. 10
8. Write short notes on any *four* of the following : 20
 - (a) Super block
 - (b) Pipes in Unix
 - (c) Delayed write of a block
 - (d) Kernel data structures
 - (e) Multiprocessor systems



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MCA-502

M. C. A. (Fifth Semester) EXAMINATION, Dec., 2003

UNIX AND SHELL PROGRAMMING

(MCA-502)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any five questions. All questions carry equal marks.

1. (a) Differentiate between user mode and kernel mode. 5
(b) Discuss in brief file system structure. 5
(c) What should happen if kernel attempts to awaken all processes sleeping on an event, but no process are asleep on the event at the time of wake up ? 10
2. (a) Discuss the scenarios in detail for retrieval of a buffer. 10
(b) Discuss upon advantages and disadvantages of buffer cache. 10
3. (a) What are the fields contained in inodes ? Briefly describe the need of each of these fields. 8
(b) Write algorithm to convert a pathname to an inode. 8
(c) Enumerate the file types supported by UNIX. 4
4. (a) Describe all conditions where reference count of an inode can be greater than 1. 8

P. T. O.

- (b) Differentiate between named and unnamed pipes.
Discuss the pipe system call. 8
- (c) Briefly discuss crossing of mount point. 4
5. (a) What are the components of the context of process ?
What are steps for a context switch ? 8
- (b) What do you understand by raising the processor
execution level ? Write algorithm for wakeup. 8
- (c) What is U area ? 4
6. (a) Compare and contrast messages, shared memory and
semaphore mechanisms. 10
- (b) Explain following shell statements taking suitable shell
scripts : 10
- (i) Case
- (ii) While
- (iii) Until
7. (a) What are awk built in variables ? 5
- (b) Write a shell script so that distance between two cities
is entered in kilometers through keyboard and it is
printed in meters. 8
- (c) Explain the use of BEGIN and END section in awk
programming. 7
8. Write short notes on any *four* of the following : 20
- (a) State transition
- (b) Link system call
- (c) GUI and other features of LINUX
- (d) Background process
- (e) UNIX security features