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BT-6/J-25 46173

UNIX AND LINUX PROGRAMMING

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Explain the evolution of Unix, highlighting key milestones. Describe the layered structure of the Unix operating system, including the kernel, shell and utilities. 7

   (b) Explain the significance of user accounts in Unix/Linux. Discuss the files (/etc/passwd, /etc/shadow, /etc/group) involved in user management and their structure. 8

2. (a) Compare and contrast the following commands with examples : 7

   (i) zip *vs* unzip

   (ii) compress *vs* uncompress

   (iii) pack *vs* unpack.

(b) Explain the Unix file system hierarchy and the role of i-nodes. How are files and directories managed using i-nodes ? 8

Unit II

3. (a) Explain the basic syntax of regular expressions (regex) with examples. Discuss the use of metacharacters, character classes and quantifiers in pattern matching. Provide examples for each. 7

(b) Compare the features of sed (Stream Editor) and vi (Visual Editor). Explain, how each is used for text manipulation, with examples of common operations (substitution, deletion, insertion). 8

4. (a) Explain the key features of PERL for text processing. Compare it with AWK in terms of regex support, file handling, and scripting capabilities. 7

(b) Explain delta compression and its advantages over traditional compression techniques. Provide an example where delta compression is more efficient. 8

Unit III

5. (a) Explain the various modes of the vi editor with examples. How do you perform the following tasks in vi ? 7

   (i) Inserting and deleting text

   (ii) Searching and replacing text

   (iii) Saving and quitting a file

   (iv) Copying, cutting and pasting text

   (b) Explain the different types of C Shell operators with examples. How do the following operators work ? 8

   (i) Arithmetic operators (+, -, *, /, %)

   (ii) Logical operators (&&, ||, !)

   (iii) Redirection operators (>, >>, <, |)

   (iv) Comparison operators (-eq, -ne, -lt, -gt)

6. (a) What is a Makefile ? Explain its structure with an example. How does it help in dependency calculation and keeping programs up-to-date ? Write a Makefile for a C project with multiple source files, headers, and libraries. 7

   (b) Compare static and shared libraries in Unix/Linux. Explain : 8

   (i) How to create and use both types of libraries ?

   (ii) Advantages and disadvantages of each

   (iii) How dynamic linking works at runtime ?

Unit IV

7. (a) Explain the lifecycle of a process in Linux, including creation, execution, and termination. Discuss the role of fork(), exec() and wait() system calls. 7

   (b) Explain, how cron, at and batch commands are used for job scheduling in Linux. Provide examples of cron job syntax and discuss security considerations. 8

8. (a) Discuss the role of networking tools like ping, telnet, ftp and ssh in Linux. Why is telnet considered insecure and what are its modern alternatives ? 7

   (b) Compare tar, cpio and dd utilities for backup and restore operations in Linux. Provide command examples for creating and extracting backups. 8

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