SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMKUR-3

DEPARTMENT OF COMPUTER SCIENCE & ENGG.

**Even Semester 2019-20**

**Subject : Unix Shell Programming**

**IV Sem. B.E.(CSE)**

**Question Bank**

**Unit 1**

1. With a neat diagram write the architecture of Unix Operating System. 6 marks
2. How do the kernel and shell share the load of the unix operating system. 5 marks
3. Distinguish between internal and external commands with suitable examples. 4 marks
4. Describe the following features of bc: 6 marks
   1. basic mathematical operations
   2. floating point operations
   3. handling of mathematical operations using different number systems.
5. Identify the unix commands for the following: 4 marks
   * 1. display date and time
     2. list the users logged into the unix os
     3. record a unix session
     4. change the keystrokes for eof and backspace.
6. List the general rules followed in unix for framing a filename 4 marks
7. List the file types supported in unix. How do you identify the file type in ls -l output. 6 marks
8. With a neat diagram, describe the unix file system implementation. 6 marks
9. What does read, write and execute permission mean for a directory? 6 marks
10. With relevant syntax and examples discuss any two commands under each category:
11. commands unique to files 9 marks
12. commands unique to directories
13. commands common to files and directories
14. How is the find command useful? Give any 3 examples to demonstrate the same. 6 marks
15. Discuss the security levels provided in Unix.. How are the permission codes used.

8 marks

1. What are the default permissions for files and directories? How can they be modified?

6 marks

1. How are the file and directory permissions changed? With suitable examples discuss symbolic and octal notations used. 8 marks
2. How can the ownership of files and directories be changed? Demonstrate with suitable commands. 6 marks

**Unit 2**

1. With a neat flowchart demonstrate the role of Shell in an Unix session. 4 marks
2. What are standard stream? Why there is need for redirection? How id redirection achieved. 8 marks
3. With relevant examples demonstrate input, output and error redirection. 9 marks
4. What is role of ">|" and ">&" operators in redirection? Give examples to demonstrate their usage. 8 marks
5. What is the advantage of using pipes with commands? Give examples.

4 marks

1. Discuss any 3 ways to execute multiple commands in command line.

6 marks

1. When should backslash, double quotes and single quotes be used with echo statement? Give examples. 6 marks
2. Justify that Single quote is more powerful than double quote. 5 marks
3. With suitable examples demonstrate how commands can be customized using aliases. 5 marks
4. With a neat diagram, discuss the job control support in unix. 8 marks
5. Discuss the need for PATH and CDPATH variables with suitable scenarios demonstrate the setting of PATH and CDPATH variables. 8 marks
6. List any 6 predefined variables used? Also, state their importance and the possible values. 6 marks
7. Answer the following w.r.t. Job control: 6 marks
8. to start a job in background
9. to suspend a foreground job0
10. to terminate a foreground job
11. to suspend a background job
12. to move a background job to foreground.
13. to terminate a background job
14. How does shell support the following: 5 marks
15. to send output to both terminal and a file
16. command substitution in echo statement
17. Answer the following w.r.t redirection: 4 marks
18. redirect output and error to single file
19. send output of commands to a single file

16. Discus the features of cat with correct syntax other than displaying the contents of the file. 6 marks

17. Write syntax and importance of the following filters: 5 marks

1. head
2. tail
3. cut
4. uniq
5. tr

18. Identify the filters for the following 5 marks

1. to display the initial part of the file
2. to display selected columns from a file
3. to replace one character by another character
4. to count the number of sentences from a file
5. to count the number of questions in a given content

19. Write suitable filter sequence to achieve the following: 10 marks

1. Given a file with student name and CGPA, count the number of students getting the highest CGPA.
2. Given a student database file with the fields as USN, NAME, SEMESTER, CGPA, MOBILE NO., display only names of 10 toppers of the class.
3. Given an employee database file with the fields as EMP-ID, NAME, DESIGNATION, DOJ, GROSS-SALARY,MOBILE NO., display only names of 10 highest paid employees.
4. Given an employee database file with the fields as EMP-ID, NAME, DESIGNATION, DOJ, DEPARTMENT,MOBILE NO., count the number of departments in the organization
5. Given a file with 50 lines content, extract lines 20 to 30 from the file.

20. List the filters useful for comparing files. Write the syntax, importance of such filters with suitable examples. 6 marks

21. Justify that wc is a filter. 4 marks

22. How is sort used in the following cases? Write commands assuming suitable data.

1. sort on any two columns in a file 6marks
2. cheque whether the file is sorted on a specific field
3. perform numeric sort
4. reverse the sort order
5. perform dictionary sort
6. remove duplicates

23.With suitable examples demonstrate any 4 options and its importance used with sort

command 8 marks

**Unit 3**

1. What is an atom w.r.t. a Regular Expression? List the 5 types of atoms with suitable examples to demonstrate their usage. 10 marks

2. What is an operator in a Regular Expression? Demonstrate the use of the following operators with relevant examples: 8 marks

1. Sequence
2. Alternation
3. Repetition
4. Group

3. Differentiate among \*,+ and ? operators with suitable examples. 6 marks

4. What is Greedy pattern matching? Demonstrate the same with an example. 6 marks

5. Demonstrate the use of save operator and back reference with an example. 6 marks

6. Write Regular Expressions to match the following: 10 marks

1. date in mm/dd/yy format
2. numbers between 20-30
3. a mobile no.
4. a five digit palindrome
5. a line with exactly 3 characters
6. a line with atleast 3 characters
7. a line with atmost 3 characters
8. a blank line
9. a non blank line
10. every line

7. With a neat diagram, demonstrate the working of grep. Also, list 4 major features of grep. 8 marks

8. List the 3 utilities in grep family. Also, distinguish among the three utilities. 6 marks

9. How do you achieve the following using GREP:**1 mark each**

1. Remove the blank lines from the file
2. List the 5 character palindromes
3. Simulate wc -l command using grep
4. Select lines that have exactly 5 characters
5. Select the lines with leading or trailing zeros
6. Simulate cat file1 file2 command using grep
7. Number the lines of text in the file
8. Display the content of file by deleting the blank lines.
9. Simulate cp file1 file2 command using grep
10. Select lines that do not start with A to K.
11. Determine whether a person with login CSE has logged in or not.
12. List the dates available in mon/dd/yyyy

10. With a neat flowchart, demonstrate the working of sed. 6marks

11. With relevant syntax, discuss the script formats used in sed. 6 marks

12. With suitable examples demonstrate the use of the following addresses 8 marks

1. single line address
2. set of line addresses
3. range addresses
4. nested address

13. With suitable commands demonstrate how sed performs basic editing such as insert, append, change and delete. 8 marks

14. With suitable examples differentiate between whole pattern substitution and numbered buffer substitution. 6 marks

15. With suitable examples demonstrate the use of various flags along with the substitute command. 8 marks

16. How are the n and N commands used in sed? Explain with suitable example scripts

6 marks

17. How are the r and w commands used in sed? Explain with suitable example scripts

8 marks

18. Differentiate between branch and branch on substitution commands with suitable example scripts. 8 marks

19. Discuss the hold and space commands used in sed. 8 marks

20. How do you achieve the following using SED:  **1 mark each**

**Assume suitable content in the file**

1. Replace all Read with Retrieve
2. Delete the blank line that follows the line that starts with an alphabet.
3. Double space the file
4. Extract the first word of each line
5. Replace the second occurrence of chairs with tables
6. Delete any integer in each line.
7. Insert header info “ Summary sheet” available in the file new.txt
8. Display file list in 4 column format.
9. Change the name Behrouz A Forouzan toForouzan ABehrouz
10. Print the lines that do not contain the word Read
11. Delete all lines except 5th line
12. Merge the odd numbered line and even numbered line. Eg. Merge 1st and 2nd line, 3rd and 4thline , ………………
13. Extract the year from the date in mm/dd/yyyy format
14. Append !! at the end of each line
15. Delete multiple spaces in the file
16. Print the line following a pattern match
17. Surround capital letters with parenthesis
18. print the first and third word of a line
19. Swaps the first character and last character in each line
20. Print each line three times

**Unit 4**

1. Discuss the methods to execute a shell script with different shells 6 marks
2. How do you make a shell script interactive. Demonstrate with a suitable script.

4 marks

1. With a suitable script demonstrate passing command line arguments to a shell script.

5 marks

1. What is the importance of the following to a shell: 6 marks

$#,$0,$\*,$@, $? and $1...$n

1. What is the importance of /dev/null and /dev/tty in shell scripting.. Demonstrate with a suitable shell script. 5 marks
2. Demonstrate with a suitable script the use of if conditional in shell scripting. 5 marks
3. Demonstrate with suitable code, the use of test in 9 marks
4. Numeric comparison
5. String comparison
6. File tests
7. Write the case construct and demonstrate the same with a suitable shell script.

5 marks

1. How does expr support String handling? Discuss with suitable examples.

8 marks

1. Write the while construct and demonstrate the same with a suitable shell script.

5 marks

1. With a suitable script demonstrate how a script can be called by different names.

6 marks

1. Write a shell script to wait for a text file to be created and later display the content of the same. 4 marks
2. With a suitable shell script demonstrate how an infinite loop can be set up in background. 4 marks
3. Demonstrate the for loop structure with a suitable shell script. 6 marks
4. List the possible sources of list that can be used in for loop. Demonstrate with suitable scripts for any two sources of list. 8 marks
5. How is basename used in shell scripting? Give suitable examples. 4 marks
6. With suitable shell script demonstrate the use of set and shift in shell scripting.

6 marks

1. Discuss any two situations in which set is required to be replaced by set --.

6 marks

1. How can data be provided in the script itself, rather than in a file. Demonstrate with a suitable example. 5 marks
2. How can an interactive program made non interactive without changing the script.

Explain with a suitable script. 6marks

1. How do you achieve the following: 4 marks
2. Display "Program interrupted" and exit whenever the interrupt key is pressed during the execution of the script.
3. Debug a shell script
4. An organisation has 6 departments. Each department has a department code, name, a manager and location. Provide this data in the script itself. The script is required to accept department code in a loop, search for the code in the department data. If found, department data must be displayed, else "Invalid Code" must be displayed.

5 marks

1. How do you achieve the following: 4 marks
2. execute commands in sub shell
3. execute commands in current shell
4. use defined variables across multiple shells
5. execute a shell script without creating a sub shell
6. Why let is preferred over expr for integer handling? With suitable examples demonstrate how let is used in command line. 4 marks
7. Write a shell script to validate a date. 5 marks
8. Using the build in string handling facility, determine the following: 5 marks
9. length of the string
10. Shortest segment that matches the pattern at beginning of string
11. Longest segment that matches the pattern at beginning of string
12. Shortest segment that matches the pattern at end of string
13. Longest segment that matches the pattern at end of string
14. What is conditional parameter substitution? How are the +,-,=,? operator used? Give suitable examples. 9 marks
15. Why is there a need for merging streams ? Give suitable examples. 4 marks
16. How are shell functions defined and called in the script? Give example 4 marks
17. In what all places shell functions can be defined? Explain with examples. 8 marks
18. Write shell functions for the following: 6 marks
19. generate a filename from system date
20. validate username and password
21. What is the purpose of using eval in shell scripting? Give example. 4 marks
22. How is exec used to create additional file descriptors. Explain with a suitable script.

8 marks

**Unit 5**

1. List and discuss any 4 major features of awk. 6 marks
2. How does awk achieve filtering of required data? Demonstrate with relevant syntax and an example. 6 marks
3. Demonstrate with suitable examples the use of NR, $0, $1...$n in awk. 6 marks
4. How does one match regular expressions in awk? Explain with suitable examples.

6 marks

1. What is the importance of BEGIN, processing and END section in an awk program. Demonstrate with a suitable program.

8 marks

1. List any 6 built in variables used in awk? With examples, demonstrate how they are used in awk.

6 marks

1. What are the features of arrays used in awk? Write an awk script to demonstrate the use of arrays in awk. 8 marks
2. List any 6 built in functions used in awk? With examples, demonstrate how they are used in awk. 6 marks
3. With suitable examples, demonstrate the following constructs used in awk:
4. if 9 marks
5. for
6. while
7. Discuss the two forms of for loop used in awk with suitable code. 6 marks
8. Write awk script to assign the grades for the marks scored by students available in a "Student"file. Make suitable assumptions. The output should be well formatted.

"Student " file

Ravi 67 89 45 78

Anil 78 80 65 48

Jeevan 69 58 64 63

Keerthi 85 45 67 67

Chandan 96 79 85 83 8 marks

1. Lets assume that you have a directory with various types of files owned by users.

Consider atleast 3 types of files with varying permissions.

Prepare a formatted report using awk showing the type of file, permissions, count of files having similar permissions and total number of files owned by the user.

8 marks

1. Lets assume that you are required to prepare the result analysis of I Year students. Write an awk script to determine the branch-wise performance of students in each course and the over-all performance of students in each course. Also display the name of the highest scorer in each subject . Consider atleast 3 branches and 4 courses.

8 marks

1. Lets assume that you want to process fruits yield data for Karnataka state. The data available is name of the city, name of the month and name of fruits grown in kgs (assume any 4 fruits). Prepare a formatted report using awk showing the name of the city with the total yield in kgs for each fruit for the entire year. Also, display the total yield for each fruit for the entire state along with the name of the city giving the highest yield for each fruit (Report must contain atleast 8 entries).

8 marks

1. Write an awk script to display department name and the total number of projects in each department. Consider the following fields:

Project-id, Project-Name, Department-name 6 marks

1. Why perl is considered as a master manipulator? Write a small perl script and demonstrate how it is executed. 6 marks
2. What is the importance of the following in perl scripting: 8 marks
3. chop function
4. dot operator
5. x operator
6. range operator
7. How are the following variables used in perl 6 marks
8. $\_
9. $.

Write a perl script to demonstrate the same.

1. How are scalar lists used in perl? Demonstrate with a suitable script. 8 marks
2. How are the following functions used to modify the array contents: 10 marks
3. shift
4. unshift
5. push
6. pop
7. splice
8. With a suitable script demonstrate how for each construct helps to loop through the list. 6 marks
9. Given a string how can it be split into multiple variables. Demonstrate with an example 6 marks
10. Given a string how can it be split into an array. Demonstrate with an example

6 marks

1. How can array elements be combined to form a string.. Give an example.

6 marks

1. How do you achieve the following in perl: 8 marks
2. read a file into an array
3. search an array for a pattern
4. substitution in an array
5. translate lower case to upper case
6. Write a perl script that takes as input, last two digits of birth year and then selects lines from a file where the year of birth in mm/dd/yyyy format available as 5th field.

6 marks

1. Write perl script for the following : Given a database file of 6 records with the fields, SSN, Name (FnameMnane, Lname), Designation, Department, DOB, DOJ, emailid, Mobileno, Address 6 marks
2. Change the department name from Computer Science to Computer Science &Engg.
3. Delete multiple spaces in the name field
4. Give the count of employees for ECE department
5. Write perl script for the following : Given a database file of 6 records with the fields, SSN, Name (FnameMnane, Lname), Designation, Department, DOB, DOJ, emailid, Mobileno, Address 6 marks
6. Change the delimiter from / to – for date fields.
7. Modify the SSN by prefixing 3 to the 4 digit number
8. Give the count of employees under E1 designation
9. Write perl scripts for the following : Given a database file with 6 records with the fields, USN, Section, Name (FnameMname, Lname), Semester, DOB (dd/mm/yy), emailid, Mobileno, Address 6 marks
10. Modify the DOB from mm/dd/yy to Mon-dd-yyyy format for “A” Section students
11. Count the number of students who have joined in 2017.
12. Convert all vowels in the file to uppercase
13. Write perl scripts for the following : Given a database file with 6 records with the fields, USN, Section, Name (FnameMnane, Lname), Semester, DOB, emailid, Mobileno, Address 6 marks
14. Modify the name to Name ( Lname, FnameMname)
15. Modify the USN to 1SI17CSA001 format, where A is the section
16. Change all content from lower case to upper case for A section students