

- i. Create the above tables by properly specifying the primary keys and the foreign keys
- ii. Enter at least five tuples for each relation
- iii. Find all the customers who have at least two accounts at the *Main* branch.
- iv. Find all the customers who have an account at *all* the branches located in a specific city.
- v. Demonstrate how you delete all account tuples at every branch located in a specific city.
- vi. Generate suitable reports.
- vii. Create suitable front end for querying and displaying the results.

Instructions:

1. The exercises are to be solved in an RDBMS environment like Oracle or DB2.
2. Suitable tuples have to be entered so that queries are executed correctly.
3. Front end may be created using either VB or VAJ or any other similar tool.
4. The student need not create the front end in the examination. The results of the queries may be displayed directly.
5. Relevant queries other than the ones listed along with the exercises may also be asked in the examination.
6. Questions must be asked based on lots.

**SYSTEM SOFTWARE & OPERATING SYSTEMS
LABORATORY**

Subject Code: 10CSL58	L.A. Marks : 25
Hours/Week : 03	Exam Hours: 03
Total Hours : 42	Exam Marks: 50

PART - A

LEX and YACC Programs:

Design, develop, and execute the following programs using LEX:

1. a) Program to count the number of characters, words, spaces and lines in a given input file.

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- b) Program to count the numbers of comment lines in a given C program. Also eliminate them and copy the resulting program into separate file.
2. a) Program to recognize a valid arithmetic expression and to recognize the identifiers and operators present. Print them separately.
- b) Program to recognize whether a given sentence is simple or compound.
3. Program to recognize and count the number of identifiers in a given input file.

Design, develop, and execute the following programs using YACC:

4. a) Program to recognize a valid arithmetic expression that uses operators +, -, * and /.
- b) Program to recognize a valid variable, which starts with a letter, followed by any number of letters or digits.
5. a) Program to evaluate an arithmetic expression involving operators +, -, * and /.
- b) Program to recognize strings 'aaab', 'abbb', 'ab' and 'a' using the grammar ($a^n b^n, n \geq 0$).
6. Program to recognize the grammar ($a^n b, n \geq 10$).

PART B

UNIX Programming:

Design, develop, and execute the following programs:

7. a) Non-recursive shell script that accepts any number of arguments and prints them in the Reverse order, (For example, if the script is named rargs, then executing rargs A B C should produce C B A on the standard output).
- b) C program that creates a child process to read commands from the standard input and execute them (a minimal implementation of a shell – like program). You can assume that no arguments will be passed to the commands to be executed.
8. a) Shell script that accepts two file names as arguments, checks if the permissions for these files are identical and if the permissions



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are identical, outputs the common permissions, otherwise outputs each file name followed by its permissions.

- b) C program to create a file with 16 bytes of arbitrary data from the beginning and another 16 bytes of arbitrary data from an offset of 48. Display the file contents to demonstrate how the hole in file is handled.
9. a) Shell script that accepts file names specified as arguments and creates a shell script that contains this file as well as the code to recreate these files. Thus if the script generated by your script is executed, it would recreate the original files (This is same as the "bundle" script described by Brian W. Kernighan and Rob Pike in "The Unix Programming Environment", Prentice - Hall India).
- b) C program to do the following: Using `fork()` create a child process. The child process prints its own process-id and id of its parent and then exits. The parent process waits for its child to finish (by executing the `wait()`) and prints its own process-id and the id of its child process and then exits.

Operating Systems:

- 10. Design, develop and execute a program in C / C++ to simulate the working of Shortest Remaining Time and Round-Robin Scheduling Algorithms. Experiment with different quantum sizes for the Round-Robin algorithm. In all cases, determine the average turn-around time. The input can be read from key board or from a file.
- 11. Using OpenMP, Design, develop and run a multi-threaded program to generate and print Fibonacci Series. One thread has to generate the numbers up to the specified limit and another thread has to print them. Ensure proper synchronization.
- 12. Design, develop and run a program to implement the Banker's Algorithm. Demonstrate its working with different data values.

Instructions:

In the examination, a combination of one LEX and one YACC problem has to be asked from Part A for a total of 30 marks and one programming exercise from Part B has to be asked for a total of 20 marks.



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