

STAGE – II ASSIGNMENT

LOOPS

1. Write a program that, for all positive integers I, J, K and L from 1 through 1000, determines all combinations of I, J, K and L such that $I+J+K=L$ and $I<J<K<L$.
 2. Write a program using nested loops to generate the following pattern:

```
z y x w v w x y z
z y x w x y z
z y x y z
z y z
z
```
 3. A perfect square is an integer, which is the square of another integer. Write a program that reads a number and computes the first perfect square larger than this number.
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ARRAY/ POINTERS

1. Write functions for the following base conversion operations:
a. Octal to Hexadecimal. b. Hexadecimal to Octal.
Take care to validate digits/characters while accepting the input.
2. Write the function replace, which finds the string from in the string string and replaces it with the string to. Be sure to test it on replacement strings, which are larger, smaller, and the same size. Should it work if the replacement string is the empty string?
3. Using pointers write your own functions for the following:
a. String comparison
b. String concatenate
c. String copy
d. String length.
Note : Do not include <string.h> in your program
4. Program to sort a number of strings using bubble sort.
Input is a number of strings and the output is the sorted list based on the length of strings. For eg: If input is jyoti, sareeka, anisha, sangeeta, savita, suja
The output is suja, jyoti, anisha, savita, sareeka, sangita
5. A magic square is a square array of positive integers such that the sum of each row, column, and diagonal is the same constant.
For Example:

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

is a magic square whose constant is 34.

Write a program to determine whether or not the given square is a magic square.

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STRUCTURE

1. Define a structure called cricket that will describe the following information
Player name
Team name
Batting average
Using cricket, declare an array player with 10 elements and write a program to read information about all 10 players and print a team wise list containing names of players with their batting average.
 2. Define a structure to represent time in hours (0-23), minutes (0-59), and seconds (0-59), and then write a function that accepts as an argument a time represented by this structure and updates it by one minute & 30 seconds.
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LINKED LIST

1. Write a program to maintain a singly linked list having the following functions :
 - a. Creation of the list.
 - b. Displaying the list.
 - c. Traverse through the linked list and subtract two consecutive nodes .The result should be inserted just before the nodes subtracted.Note: If the linked list contains the data : 5 15 8 9 2 6
The changed linked list should contain the data in the following order:
-10 5 15 -1 8 9 -4 2 6 .
Display both the original linked list as well as the changed linked list.
2. Write a program to maintain a singly linked list having the following functions:
 - a. Creation of the list.
 - b. Displaying the list.
 - c. Prompt the user for a position, then detach a node from that position. Now, ask the user for a new position and attach the detached node into the specified position.
3. Write a program to maintain a singly linked list having the following functions:
 - a. Creation of the list.
 - b. Displaying the list.
 - c. Swap all nodes at consecutive even and odd positions.Note: The node at position 1 should be swapped with node 2, node 3 with that of node 4, node 5 with 6 and so on.
4. Write a program to maintain a singly linked list having the following functions:
 - a. Creation of the list.
 - b. Displaying the list.
 - c. Traverse through the linked list and pick all the odd numbered nodes and place them in the beginning of the list and the rest will be all the even numbered nodes.Note: If the linked list contains the data : 5 15 8 9 26
The changed linked list should contain the data in the following order:
5 8 26 15 9 .

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4. Write a program to maintain a singly linked list having the following functions:
 - a. Creation of the list.
 - b. Displaying the list.
 - c. Traverse through the linked list and add contents of two consecutive nodes. The result should be inserted soon after the nodes added.
- Note: If the linked list contains the data : 5 15 8 9 2 6
The new linked list should contain the data in the following order :
5 15 20 8 9 17 2 6 8.
Display both the original linked list as well as the new linked list.
5. Write a program for creating a sorted doubly linked list.
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FILE

1. Write a function to display statistics of a text file. (No of characters, No of words, No of lines, Name of file, time stamp, location of file)
2. Create a text file using any simple editor. Write a program that will reverse each line in the input file and store it in another file.
3. Write a program that will read each line in a file and store it in another file with the sequence reversed, that is, the first line in file one should be the last line in file two and so on.
4. Create a text file using any editor. The text file contains a distinct word on each line. Read the text file into a Singly linked list and display the count of words.
5. Write a program that will reverse each word in a file and store it in another file.
6. Write a program to search a word from a text file.
7. If the word is found print a message that the word is found along with the position of the word in the file.
8. If the word is not found , print the message that the word is not found along with the total number of words in the file.
9. Write a program to remove all C comments from a file.
10. You are the owner of hardware store and need to keep an inventory that can tell you what tools you have, how many you have and the cost of each one. Write a program that initializes a file "hardware.dat" to 100 empty records, lets you input the data concerning each tool, enables you to list all your tools, lets you delete a record for a tool that you no longer have and lets you update any information in the file. The tool identification number should be the record number. Use the following information to start your file.

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Record #	Tool name	Quantity	Cost
3	Electric sander	7	57.98
17	Hammer	76	11.99
24	Jig Saw	21	11.00
39	Lawn Mower	3	79.50
56	Power saw	18	99.99
65	Screwdriver	106	6.99
77	Sledge hammer	11	21.50
83	Wrench	34	7.50

- 11 Write statements that accomplish each of the following. Assume that the structure
- ```
struct person {
 char lastName[15];
 char firstName[15];
 char age[4];
};
```
- has been defined and that the file is already open for writing.
- Initialize the file "nameage.dat" so that there are 100 records with  
lastName="unassigned" FirstName="" and age="0".
  - Input 10 last names first names and ages, and write then to the file.
  - Update a record: if there is no information in the record, tell the user "No  
info"
- Delete a record that has information by re-initializing that particular record
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**TREE**

- Write a complete C program that will allow you to enter and maintain a computerized version of your family tree. Begin by specifying the number of generations (i.e. the number of level within the tree). then enter the names and nationalities in a hierarchical fashion, beginning with our own name and nationality. Include a provision for displaying the entire tree automatically after each update. Test the program, including at least three generations if possible ( you, your parents and your grandparents ). Obviously, the tree becomes more interesting as the number of generations increases.
  - Write a program to read a character from file and add it to binary tree and traverse the tree using inorder traversal
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