**Assignment 3: Arrays, Functions and Pointers**

1. Write a function which calculates the sum of times entered by the user. E.g. if user enters 12 hrs 30 minutes and 1 hrs 45 minutes the output should be 14 hrs 15 minutes.
2. Write a program which takes the input from the user as time in 24 hours format and convert it into 12 hours format e.g. Input : 13:30 Output : 1:30.
3. A company has an offer of 5 products that are sold for 100, 50, 35, 150 and 200 the piece. There are n salespersons working for this company. Write a program that calculates the costs for each salesperson.

The program reads data from standard input: n, the number of salespersons, and then for each salesperson the number of items sold for each product.

The program should compute:

a.)Compute for each salesperson his total sales.

b.)If the sales commission is 10%, compute the income of each salesperson

c.)Find out which person is the sales-champion

d.)List the id’s of the salespersons in the decreasing order of their sales performance.

Define functions that solve specific tasks and use **global variables** to communicate between functions.

1. Write a C program for binary search using function.

a) With recursion.

b) Without recursion.

1. Write a C program to compute reverse of a string using recursion.

Input : abcdefgh

Expected Output : hgfedcba

1. Write a C program to find all the possible permutations of a given array.

Input : Array size, array.

Output : number of permutations, All possible permutations.

eg. Input : 3, {a,b,c}

output : 6, {a,b,c}, {a,c,b}, {b,a,c}, {b,c,a}, {c,a,b}, {c,b,a}

1. Given the coordinates of a triangle in euclidean plain, write a C program to find its area.
2. Write a program that reads a matrix with N rows and M columns and calculates and displays the minimum value from each row. In order to solve this problem, use (invoke) the function minimum that takes as argument a linear array with M elements and returns the minimum value from it.
3. Write a program that computes the factorial function for a number to be input by the user.  
   n! = n \* (n-1)!; 0! = 1.

1. Make sure that the user gives a non-negative integer value

2. Make a version of the program that computes and prints the factorial value as

* 1. An unsigned short
  2. An unsigned long long
  3. A float
  4. A double
  5. A long double

3. Find out how large the input value can be for each version. Now modify the part of the code that asks the user for input to also test on this upper bound.

1. A matrix *M* with *i* rows, *j* columns can be *transposed* into a matrix *N* having *j* rows and*i* columns by simply setting the value of *N a,b* equal to the value of *M b,a* for all relevant values of *a* and *b*.

Write a function transposeMatrix that takes as an argument a 4 x 5 matrix and a 5 x 4 matrix. Have the function transpose the 4 x 5 matrix and store the results in the 5 x 4 matrix.

1. Write a program such that it displays a histogram(bar graph) for given set of numbers. The numbers should range between 0 to 10. E.g if numbers entered are 5 2 6 3 then histogram looks like:

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The numbers should be entered in an array and array address should be passed as a parameter to the function for creating histogram.

1. Write a program which consist of array “ArrayPointers” of 10 integer pointers each pointing to a number in another array “ArrayNum”(unsorted) of 10 integers such that when pointers of first array are accessed, display the numbers of ArrayNum in increasing sequence.

Note: Do not sort “ArrayNum”. Display the sorted array without sorting the integer array.

1. Write a program which consist of a function taking reference to two strings as arguments and display the concatenated string such that the first string is concatenated to last n characters of 2nd string where n can be taken as input from the user.

E.g. String1 = “Hello”, String2=”World”, n=3  Output: Hellorld