RAMAKRISHNA MISSION VIVEKANANDA CENTENARY COLLEGE, RAHARA

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COURSE **: B.Sc. Computer Science (Hons.)**

SEMESTER **: 1ˢᵗ Semester**

ROLL NUMBER **: 715**

REGISTRATION NUMBER **: A01-1112-117-014-2021 of 2021-2022**

SUBJECT **: CC1 (Programming fundamentals using C/C++)**

SESSION **: 2021-2022**

Problem 1:

Date assigned: 1 October 2021

Problem Statement:
Write a program in C to get a number as input from the user. If the number is greater than 275 then reverse the number. If the number is less than 275 then add the required number with the inputted numer so that it becomes 276. Print the reversed number as output with a suitable message if the inputted number is greater than 275. Print the required number that is added with the inputted number with a suitable message as output if the number is less than 275.

Solution Code:
```c
#include <stdio.h>

int main()
{
    int n;
    printf("Enter a number: ");
    scanf("%d",&n);
    if(n>275){
        int rev_n=0;
        while(n>0){
            rev_n*=10;
            rev_n+=n%10;
            n/=10;
        }
        printf("The reversed number = %d\n",rev_n);
    }
    else if(n<275){
        int req_n=276-n;
        printf("The number added = %d\n",req_n);
    }
    return 0;
}
```

Output:

```
Enter a number: 125
The number added = 151


-----------------
(program exited with code: 0)
Press return to continue
```

```
Enter a number: 289
The reversed number = 982


-----------------
(program exited with code: 0)
Press return to continue
```

Problem 2:

Date assigned: 27 October 2021

Problem Statement:
Let's assume there are n numbers in a list (the value of n and values of the list will be given by the user). Find if a number (the number will be supplied by the user) is present in the list or not.

Solution Code:

```c
#include <stdio.h>

int main()
{
    printf("Enter the size of the array:");
    int arraySize; scanf("%d",&arraySize);
    int array[arraySize];
    printf("Enter the elements of the array:");
    for(int i = 0; i < arraySize; i++) scanf("%d",&array[i]);
    printf("Enter the number to be searched:");
    int numToBeSearched; scanf("%d",&numToBeSearched);
    int present = 0;
    for(int i = 0; i < arraySize; i++){
        if(array[i] == numToBeSearched) present = 1;
    }
    if(present) printf("Number present in array\n");
    else printf("Number not present in array\n");
    return 0;
}
```

Output:

```
Enter the size of the array:5
Enter the elements of the array:1 5 7 8 25
Enter the number to be searched:7
Number present in array


-----------------
(program exited with code: 0)
Press return to continue
```

```
Enter the size of the array:3
Enter the elements of the array:1 7 2
Enter the number to be searched:5
Number not present in array


-----------------
(program exited with code: 0)
Press return to continue
```

Problem 3:

Date assigned: 27 October 2021

Problem Statement:
Write a C program to find he mid of a given list and print the mid-value of the list along with before mid-value and after mid-value of the list.

Solution Code:

```c
#include <stdio.h>

int main()
{
    printf("Enter the size of the list: ");
    int n; scanf("%d",&n);
    int arr[n];
    printf("Enter the numbers in the list: ");
    for(int i = 0; i < n; i++) scanf("%d",&arr[i]);
    int midIndex = (n-1)/2;
    int left = midIndex-1;
    int right = midIndex+1;
    printf("Mid value = %d\n",arr[midIndex]);
    printf("Value before midValue = %d\n",arr[left]);
    printf("Value after midValue = %d\n",arr[right]);
    return 0;
}
```

Output:

```
Enter the size of the list: 5
Enter the numbers in the list: 1 7 5 2 3
Mid value = 5
Value before midValue = 7
Value after midValue = 2



------------------
(program exited with code: 0)
Press return to continue
```

Problem 4:

Date assigned: 18 November 2021

Problem Statement:
Write a C program to add all the values of each column and store them in an array then display the array.

Solution Code:
```c
#include <stdio.h>
#include <stdlib.h>

int main() {
    int n, m;
    printf("Enter the number of rows of the matrix:\n");
    scanf("%d", &n);
    printf("Enter the number of columns of the matrix:\n");
    scanf("%d", &m);
    int** arr = (int**) malloc(sizeof(int*) * n);
    for (int i = 0; i < n; i++) arr[i] = (int*) malloc(sizeof(int) * m);
    printf("Enter the elements of the matrix:\n");
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < m; j++) {
            printf("Enter the value of matrix[%d][%d]\n", i, j);
            scanf("%d", &arr[i][j]);
        }
    }
    int* column_sum = (int*) malloc(sizeof(int) * m);
    for (int i = 0; i < n; i++) {
        for (int j = 0; j < m; j++) {
            column_sum[j] += arr[i][j];
        }
    }
    printf("The sum of elements for each column are:\n");
    for (int i = 0; i < m; i++) {
        printf("Column %d = %d\n", i, column_sum[i]);
    }
    return 0;
}
```

Output:

```
Enter the number of rows of the matrix:
2
Enter the number of columns of the matrix:
3
Enter the elements of the matrix:
Enter the value of matrix[0][0]
1
Enter the value of matrix[0][1]
5
Enter the value of matrix[0][2]
9
Enter the value of matrix[1][0]
7
Enter the value of matrix[1][1]
5
Enter the value of matrix[1][2]
6
The sum of elements for each column are:
Column 0 = 8
Column 1 = 10
Column 2 = 15


------------------
(program exited with code: 0)
Press return to continue
```

Problem 5:

Date assigned: 18 November 2021

Problem Statement:
The user will input the dimension of a square matrix. Write a program to get the left and right diagonal elements of the matrix and put them in two different arrays. Then use these two array to find the maximum element among them.

Solution Code:

```c
#include <stdio.h>
#include <stdlib.h>

int max(int x, int y) {
  if (x > y) return x;
  return y;
}

int main() {
  int n;
  printf("Enter the dimension of the square matrix:\n");
  scanf("%d", &n);
  int** matrix = (int**) malloc(sizeof(int*) * n);
  for (int i = 0; i < n; i++) matrix[i] = (int*) malloc(sizeof(int) * n);
  printf("Enter the matrix elements:\n");
  for (int i = 0; i < n; i++) {
    for (int j = 0; j < n; j++) {
      printf("Enter the value of matrix[%d][%d]\n", i, j);
      scanf("%d", &matrix[i][j]);
    }
  }
  int* left_diagonal = (int*) malloc(sizeof(int) * n);
  int* right_diagonal = (int*) malloc(sizeof(int) * n);
  for (int i = 0; i < n; i++) {
    left_diagonal[i] = matrix[i][i];
    right_diagonal[i] = matrix[i][n - 1 - i];
  }
  int max_left_diagonal = 0;
  int max_right_diagonal = 0;
  for (int i = 0; i < n; i++) max_left_diagonal = max(left_diagonal[i], max_left_diagonal);
  for (int i = 0; i < n; i++) max_right_diagonal = max(right_diagonal[i],
max_right_diagonal);
  printf("Max element in left diagonal of matrix = %d\n", max_left_diagonal);
  printf("Max element in right diagonal of matrix = %d\n", max_right_diagonal);
  return 0;
}
```

Output:

```
Enter the dimension of the square matrix:
3
Enter the matrix elements:
Enter the value of matrix[0][0]
1
Enter the value of matrix[0][1]
5
Enter the value of matrix[0][2]
7
Enter the value of matrix[1][0]
9
Enter the value of matrix[1][1]
5
Enter the value of matrix[1][2]
12
Enter the value of matrix[2][0]
36
Enter the value of matrix[2][1]
8
Enter the value of matrix[2][2]
1
Max element in left diagonal of matrix = 5
Max element in right diagonal of matrix = 36


------------------
(program exited with code: 0)
Press return to continue
```

Problem 6:

Date assigned: 25 November 2021

Problem Statement:
Write a recursive function to calculate the factorial of any number up to 12.

Solution Code:

```c
#include <stdio.h>

long factorial(long n)
{
    if(n==1) return 1;
    else return n*factorial(n-1);
}

int main()
{
    printf("Enter the number whose factorial is to be computed:\n");
    long n;
    scanf("%ld",&n);
    long answer=factorial(n);
    printf("The factorial of %ld is %ld\n",n,answer);
    return 0;
}
```

Output:

```
Enter the number whose factorial is to be computed:
7
The factorial of 7 is 5040



-----------------
(program exited with code: 0)
Press return to continue
```

Problem 7:

Date assigned: 15 December 2021

Problem Statement:
Write a C program to create a structure book. Now from user get the number of book records user wants to store. Using an array of book structure store the information of books given by the user and then display those. Use functions to get the data and display them.

Solution Code:

```c
#include <stdio.h>
#include <stdlib.h>

typedef struct Book{
    char title[50];
    char author[50];
    char publisher[50];
    float price;
    int edition;
} book;

void input(book* arr,int n){
    printf("Enter the details of %d books:\n",n);
    for(int i = 0; i < n; i++){
        printf("Enter the details of book %d:\n",i+1);
        printf("Enter the title of the book:\n");
        scanf("%s", arr[i].title);
        printf("Enter the name of the author of the book:\n");
        scanf("%s", arr[i].author);
        printf("Enter the name of the publisher of the book:\n");
        scanf("%s", arr[i].publisher);
        printf("Enter the price of the book:\n");
        scanf("%f", &arr[i].price);
        printf("Enter the edition of the book:\n");
        scanf("%d", &arr[i].edition);
        printf("------------------------------------------\n");
    }
    printf("==========================================\n");
}

void output(book* arr,int n){
    printf("The details of %d books are:\n",n);
    for(int i = 0; i < n; i++){
        printf("The details of book %d are:\n",i+1);
        printf("Title of the book = %s\n", arr[i].title);
        printf("Author of the book = %s\n", arr[i].author);
        printf("Publisher of the book = %s\n", arr[i].publisher);
        printf("Price of the book = %0.2f\n", arr[i].price);
        printf("Edition of the book = %d\n", arr[i].edition);
        printf("------------------------------------------\n");
    }
    printf("==========================================\n");
}

int main(){
    book* arr;
    printf("Enter the number of books:\n");
    int n;
    scanf("%d", &n);
    arr = (book*) malloc(sizeof(book)*n);
    input(arr,n);
    output(arr,n);
    return 0;
}
```

Output:

```
Enter the number of books:
3
Enter the details of 3 books:
Enter the details of book 1:
Enter the title of the book:
Book1
Enter the name of the author of the book:
Author1
Enter the name of the publisher of the book:
Publisher1
Enter the price of the book:
125.65
Enter the edition of the book:
1
-----------------------------------------------
Enter the details of book 2:
Enter the title of the book:
Book2
Enter the name of the author of the book:
Author2
Enter the name of the publisher of the book:
Publisher2
Enter the price of the book:
583.28
Enter the edition of the book:
5
-----------------------------------------------
Enter the details of book 3:
Enter the title of the book:
Book3
Enter the name of the author of the book:
Author3
Enter the name of the publisher of the book:
Publisher3
Enter the price of the book:
522.00
Enter the edition of the book:
4
---------------------------------------------
=================================================
The details of 3 books are:
The details of book 1 are:
Title of the book = Book1
Author of the book = Author1
Publisher of the book = Publisher1
Price of the book = 125.65
Edition of the book = 1
-----------------------------------------------
The details of book 2 are:
Title of the book = Book2
Author of the book = Author2
Publisher of the book = Publisher2
Price of the book = 583.28
Edition of the book = 5
-----------------------------------------------
The details of book 3 are:
Title of the book = Book3
Author of the book = Author3
Publisher of the book = Publisher3
Price of the book = 522.00
Edition of the book = 4
-----------------------------------------------
=================================================


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(program exited with code: 0)
Press return to continue
```