**Data structure & Algorithms**

**Assignment-3 (Structure, Dynamic Array and Recursion)**

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**Lab Assignment: 03**

1. Write a program in C to check a given string is palindrome or not by using a dynamic array of n characters.

**Sample Input:**

String = MADAM

**Sample Output:**

Madam is a Palindrome

Code:-  
*#include*<stdio.h>

*#include*<stdlib.h>

*int* palindrome(*char* \*str,*int* n){

*int* i=0,j = n-1;

*while*(j>i){

*if* (str[i++] != str[j--]) *return* 0;

    }

*return* 1;

}

*void* main(){

*int* n,x;

    printf("Enter the size of the word:- ");

    scanf("%d",&n);

*char*\* s = (*char* \*)malloc(n\*sizeof(*char*)+1);

    printf("Enter the word:- ");

    scanf("%s",s);

    x = palindrome(s,n);

*if* (x) printf("Palindrome");

*else* printf("Not palindrome");

}

Output:-  
Enter the size of the word:- 5

Enter the word:- aditya

Not palindrome

1. Write a program in C to arrange the elements of a dynamic array such that all even numbers are followed by all odd numbers

**Sample Input:**

**Sample Output:**

Code:-  
*#include* <stdio.h>

*#include* <stdlib.h>

*void* even\_odd(*int*\* arr, *int* n){

*int* count=0;

*for*(*int* i=0;i<n;i++){

*if*(arr[i]%2==0){

*int* temp=arr[count];

            arr[count]=arr[i];

            arr[i]=temp;

            count++;

        }

    }

}

*int* main(){

*int* n=0;

    printf("Enter the size of array: ");

    scanf("%d", &n);

*int*\* arr=(*int*\*) malloc(n \* sizeof(*int*));

    printf("Enter the Elements of Array: ");

*for*(*int* i=0;i<n;i++){

        scanf("%d", &arr[i]);

    }

   even\_odd(arr, n);

*for*(*int* i=0;i<n;i++){

        printf("%d ", arr[i]);

    }

    free(arr);

*return* 0;

}

Output:-  
Enter the size of array: 5

Enter the Elements of Array: 1 2 3 4 5

2 4 3 1 5

1. Write a recursive program in C to print percentages from 1% to 50% of a integer number. User will ask to enter a number.

**Sample Input:**

N = 10

**Sample Output:**

10\*1/100, 10\* 2/100, 10\*3/100, 10\*50/100

0.1,0.2, 0.3, …., 5

Code:-  
*#include*<stdio.h>

*void* percent(*int* n,*int* i){

*if* (i<=50){

*float* x = n\*i\*0.01;

        printf("%d %.2f\n",i,x);

        percent(n,++i);

    }

}

*void* main(){

*int* n;

    printf("Enter a number:- ");

    scanf("%d",&n);

    percent(n,1);

}

Output:-  
Enter a number:- 5

1 0.05

2 0.10

3 0.15

4 0.20

5 0.25

6 0.30

7 0.35

8 0.40

9 0.45

10 0.50

11 0.55

12 0.60

13 0.65

14 0.70

15 0.75

16 0.80

17 0.85

18 0.90

19 0.95

20 1.00

40 2.00

41 2.05

42 2.10

43 2.15

44 2.20

45 2.25

46 2.30

47 2.35

48 2.40

49 2.45

50 2.50

1. Write a recursive program in C to find the GCD of two integer numbers.

Code:-  
*#include*<stdio.h>

*int* hcf(*int* n1, *int* n2){

*if* (n2!=0) *return* hcf(n2,n1%n2);

*else* *return* n1;

}

*void* main(){

*int* n1,n2,r;

    printf("Enter two numbers:- ");

    scanf("%d %d",&n1,&n2);

    r = hcf(n1,n2);

    printf("GCD of %d and %d is %d!!\n",n1,n2,r);

}

Output:-  
Enter two numbers:- 2 4

GCD of 2 and 4 is 2!!