Birla Institute of Technology & Science, Pilani, Hyderabad Campus

First Semester 2020-2021
Computer Programming [CS F111] Lab 11

Practice Programs:

1. Write a C program to sort an array using function. Make a function return an array and print the elements of sorted array in the main function. You may utilize the Bubble sort approach discussed in previous labs.

Code:

```c
#include<stdio.h>
int* sort(int arr[],int n)
{
        int i, j, t;
        for(i=1; i<n; i++)
        {
                for(j=0;j<n-i;j++)
                {
                        if(arr[j]>arr[j+1])
                        {
                                t=arr[j];
                                arr[j]=arr[j+1];
                                arr[j+1]=t;
                        }
                }
        }
        return arr;
}

int main()
{
        int i, n, *ans;
        printf("\nEnter the count of numbers: ");
        scanf("%d",&n);
        int arr[n];
        printf("\nEnter the numbers: ");
        for(i=0;i<n;i++)
                scanf("%d",&arr[i]);
        ans=sort(arr,n);
        printf("\nThe sorted numbers: ");
        for(i=0;i<n;i++)
                printf("%d ",ans[i]);
        printf("\n");
}
```

Sample Input/Output:

```
Enter the count of numbers: 5

Enter the numbers: 6 7 8 4 2

The sorted numbers: 2 4 6 7 8
```

2. Write a C program to check whether a string is palindrome or not, using recursion.

Code:

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

int palindrome(char s[], int f, int b)
{
        if(f-b == 0 || f-b == 1)
        {
                if(s[f] == s[b])
                        return 1;
                else
                        return -1;
        }
        else
        {
                if(s[f] == s[b])
                        return palindrome(s,f+1,b-1);
                else
                        return -1;
        }
}
int main()
{
        char s[1000];
        int ans;
        printf("\nEnter a string: ");
        scanf("%s",s);
        ans = palindrome(s,0,strlen(s)-1);
        printf("\nOUTPUT: ");
        if(ans == 1)
                printf("Palindrome");
        else
                printf("Not a palindrome");
        return 0;
}
```

Sample Input/Output:

```
Enter a string: MALAYALAM

OUTPUT: Palindrome
```

3. Write a recursive C-program to compute the result of the following function for given x and n.

$f(x,n) = x - x^3/3! + x^5/5! - x^7/7! + \ldots$ **n** terms

Code:

```c
#include <stdio.h>
#include <math.h>
int fact(int p)
{
        if(p == 1)
                return 1;
        else
                return p*fact(p-1);
}
float calc(float x, int n, int p, int sign)
{
        if(p == n)
                return sign*(pow(x,p)/fact(2*p-1));
        else
                return sign*(pow(x,p)/fact(2*p-1)) + calc(x,n,p+1,-sign);
}
int main()
{
        float x, ans;
        int n; // number of terms
        printf("\nEnter the values of x and n: ");
        scanf("%f%d",&x,&n);
        ans = calc(x,n,1,1);
        printf("\nOUTPUT:\nf(%f, %d) = %f", x, n, ans);
}
```

Sample Input/Output:

```
Enter the values of x and n: 1 2

OUTPUT:
f(1.000000, 2) = 0.833333
```

Exercise Problems:

1. Write a C program to swap the values of two integers using functions. Use call by reference method of passing arguments to a function.

2. The following code is intended to reverse a given string of characters. Please fill in the balnks to achieve the same and submit the whole program with example input/output.
   Code:

```c
#include<stdio.h>
#include<string.h>
void reverse(char arr[],int n,int i)
{
        if(i==n/2)
                _____;
        int t;
        t=arr[i];
        arr[i]=arr[n-i-1];
        arr[n-i-1]=t;
        reverse(arr, _____);
}
int main()
{
        int i=0,n=0;
        char str[3000];
        char ch;
        printf("\nEnter the string of characters: ");
        scanf("%c",&ch);
        while(ch!='\n'){
                str[i]=ch;
                scanf("%c",&ch);
                n++;
                i++;
        }
        reverse(str,n,0);
        printf("\nOUTPUT: ");
        for(i=0;i<n;i++)
                printf("%c",str[i]);
        printf("\n");
}
```

   Sample Input/Output:

```
Enter the string of characters: BITS PILANI

OUTPUT: INALIP STIB
```

3. Write the non-recursive equivalent of the practice program-3.

   *************ALL THE BEST*************

NOTE: Upload the screenshots of the Practice programs and Exercise programs along with the displayed results into your corresponding Google Classroom.