DSA Lab

LAB 2 Submission

NAME: SWAMIRAJU SATYA PRAVEEN VARMA

REGISTRATION NO. : 200905044

SECTION: CSE-B

ROLL No.: 10

BATCH: B1

Questions for LAB-2 :

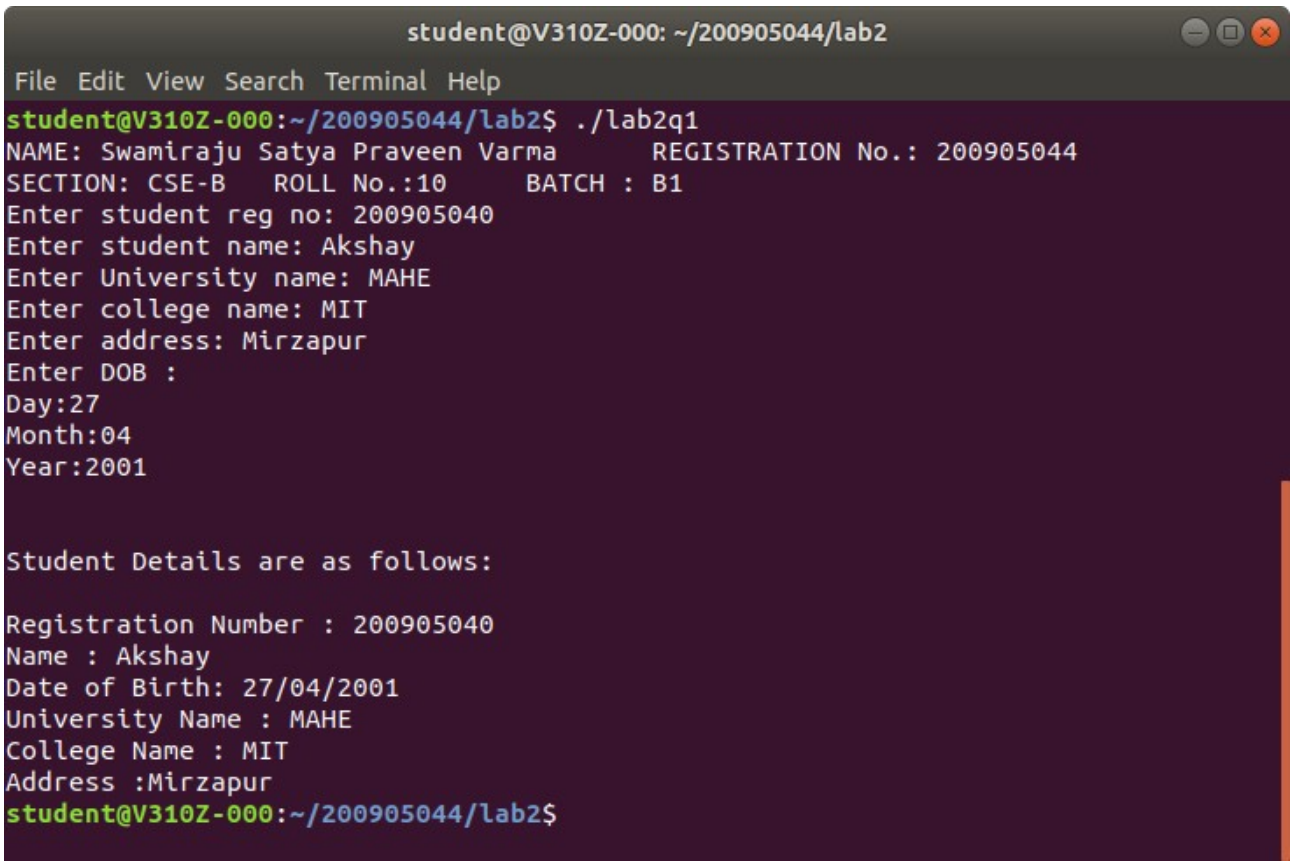
1. Create a structure STUDENT consisting of variables of structures:
i. DOB {day, month (use pointer), year},
ii. STU_INFO {reg_no, name(use pointer), address},
iii. COLLEGE {college_name (use pointer), university_name}
where structure types from i to iii are declared outside the STUDENT independently. Show how to read and display member variables of DOB type if pointer variable is created for DOB inside STUDENT and STUDENT variable is also a pointer variable. The program should read and display the values of all members of STUDENT structure.

Code:

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

 struct DOB {
  int day;
  char* mth;
  int year;
};


struct STU_INFO {
  int reg_no;
  char* name;
  char adrs[20] ;
};


struct COLLEGE {
 char *clg_name;
 char univ_name[20];
};

struct STUDENT
{
  struct DOB *dob;
```

```
  struct STU_INFO stu_info;
  struct COLLEGE clg;
};


int
main ()
{
  printf ("NAME: Swamiraju Satya Praveen Varma \t REGISTRATION No.: 200905044\n");
  printf ("SECTION: CSE-B \t ROLL No.:10 \t BATCH : B1\n");
  struct STUDENT *student, student1;
  student = &student1;
  struct DOB dob;
  student->dob = &dob;
  student->stu_info.name = (char *) malloc (sizeof (char));
  student->clg.clg_name = (char *) malloc (sizeof (char));
  student->dob->mth = (char *) malloc (sizeof (char));
  printf ("Enter student reg no: ");
  scanf ("%d", &(student->stu_info.reg_no));
  printf ("Enter student name: ");
  scanf ("%s", student->stu_info.name);
  printf ("Enter University name: ");
  scanf ("%s", student->clg.univ_name);
  printf ("Enter college name: ");
  scanf ("%s", student->clg.clg_name);
  printf ("Enter address: ");
  scanf ("%s", student->stu_info.adrs);
  printf ("Enter DOB :\n");
  printf ("Day:");
  scanf ("%d", &(student->dob->day));
  printf ("Month:");
  scanf ("%s", student->dob->mth);
  printf ("Year:");
  scanf ("%d", &(student->dob->year));
  printf ("\n\n");
  //Output
  printf("Student Details are as follows:\n\n");
  printf("Registration Number : %d \n",student->stu_info.reg_no);
  printf("Name : %s \n",student->stu_info.name);
  printf("Date of Birth: %d/%s/%d \n",student->dob->day,student->dob->mth,student->dob->year);
  printf("University Name : %s \n",student->clg.univ_name);
  printf("College Name : %s \n",student->clg.clg_name);
  printf("Address :%s\n",student->stu_info.adrs);

  return 0;


   }
```

Sample input/output:



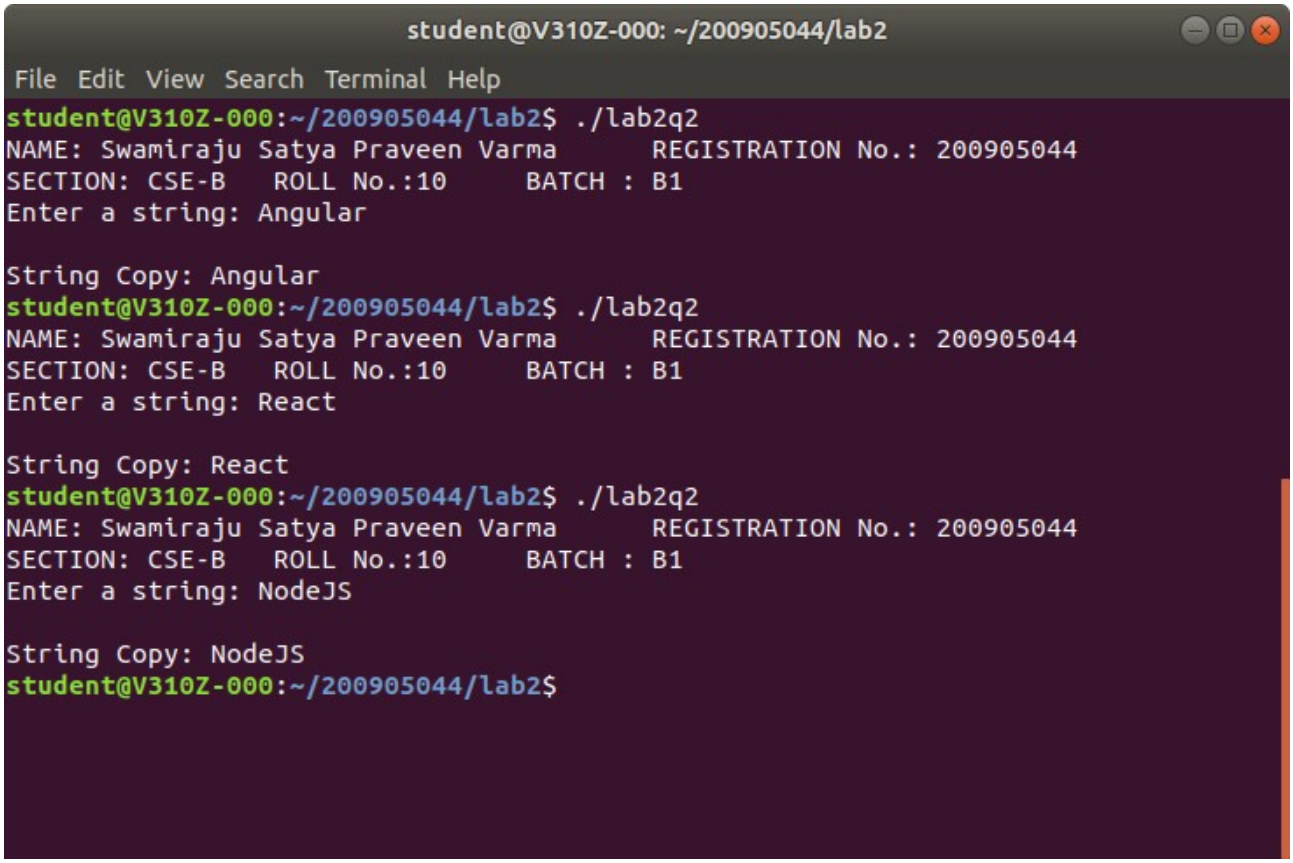
2. Write C programs using recursion to copy one string to another using Recursion.

Code:

```
#include<stdio.h>

void rStrCopy(char str[], char copy[], int index)
{
        if(str[index]=='\0')
                return;

    else {
        copy[index]=str[index];
     rStrCopy(str,copy,index+1);

       }

}


int main() {


printf ("NAME: Swamiraju Satya Praveen Varma \t REGISTRATION No.: 200905044\n");
printf ("SECTION: CSE-B \t ROLL No.:10 \t BATCH : B1\n");
char str[50],copy[50];
```

```
printf("Enter a string:\t");
scanf("%s",str);
rStrCopy(str,copy,0);

printf("\nString Copy: %s\n",copy);

return 0;


  }
```

Sample input/output:



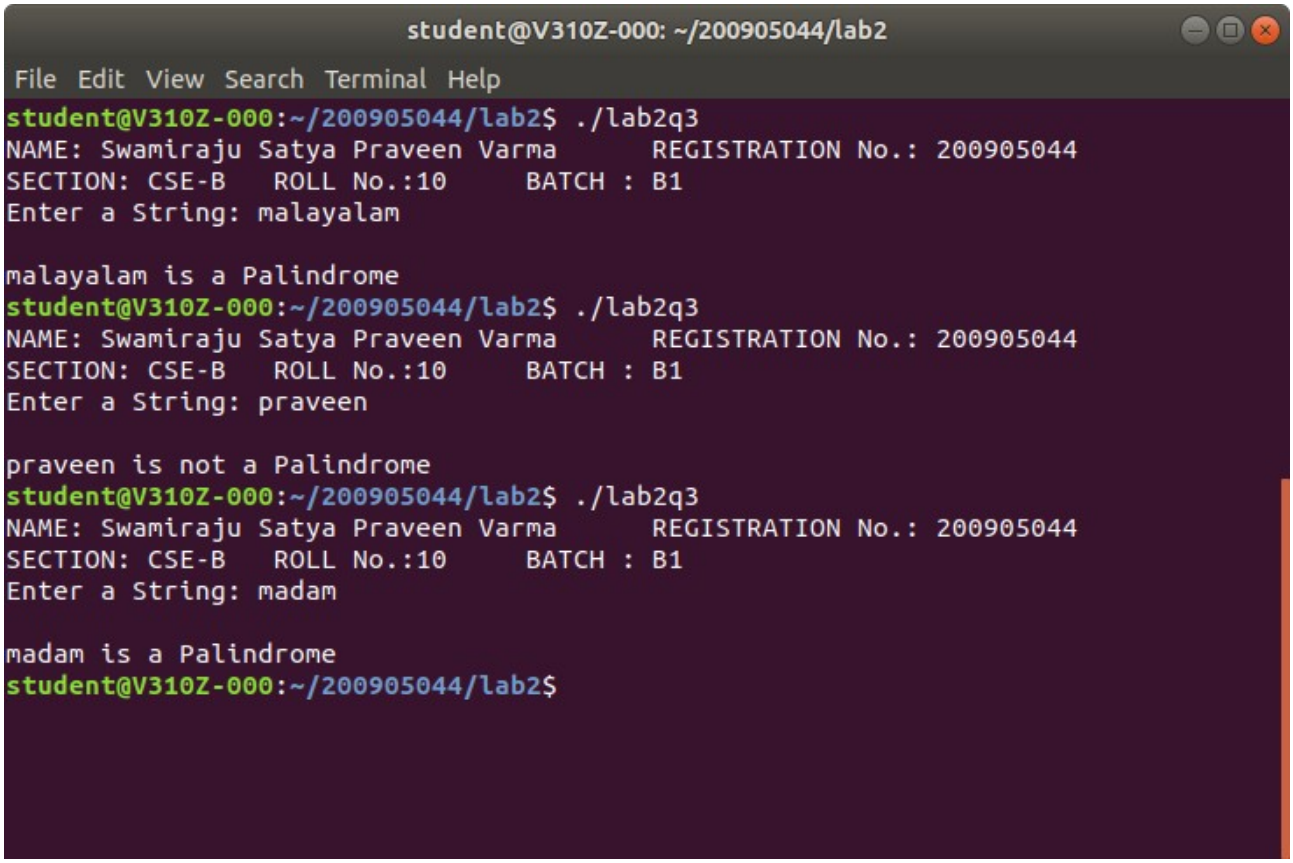
3. Write C programs using recursion to check whether a given String is Palindrome or not, using Recursion

Code:

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

int isPalindrome(char *str, int leftIndex, int rightIndex)
 {

        if(leftIndex >= rightIndex)
                return 1;
        if(str[leftIndex]==str[rightIndex])
```

```
                return isPalindrome(str,leftIndex + 1,rightIndex - 1);

}


int main() {

printf ("NAME: Swamiraju Satya Praveen Varma \t REGISTRATION No.: 200905044\n");
printf ("SECTION: CSE-B \t ROLL No.:10 \t BATCH : B1\n");

char str[25];
printf("Enter a String:\t");
scanf("%s",str);
if(isPalindrome(str,0,strlen(str)-1)==1)
   printf("\n%s is a Palindrome \n",str);
else
   printf("\n%s is not a Palindrome \n",str);
return 0;


}
```

Sample input/output:

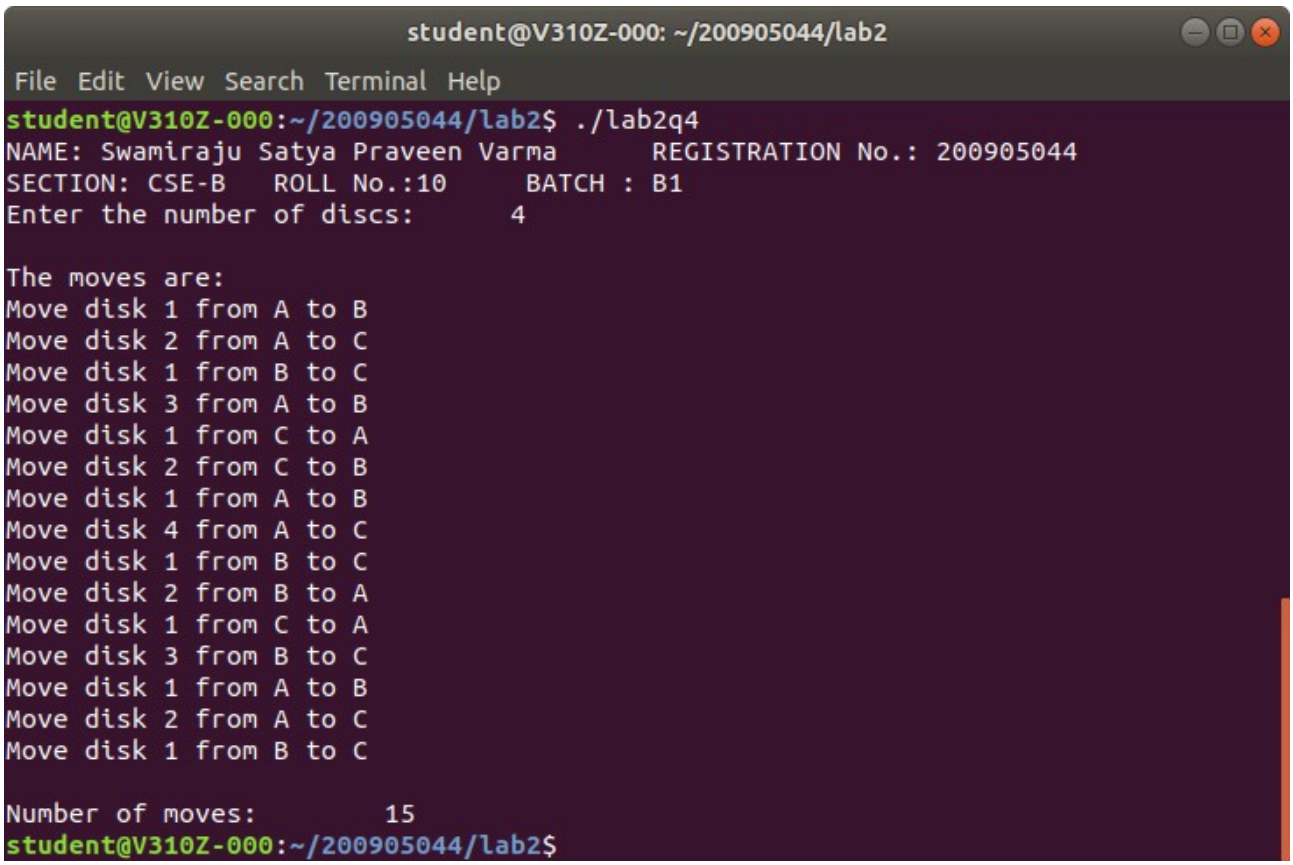


4. Write C programs using recursion to simulate the working of Tower of Hanoi for n disks. Print the number of moves.

Code:

```
#include<stdio.h>
int tower(int number, char source, char auxillary, char destination) {
        static int count =0;

        if(number==1)
                {
                        printf("Move disk 1 from %c to %c\n",source,destination);
                         count++;
                }


    else{

      tower(number-1,source,destination,auxillary);
      printf("Move disk %d from %c to %c\n",number,source,destination);
      count++;
      tower(number-1,auxillary,source,destination);
                }
        return count;

        }

int main()
        {

        printf ("NAME: Swamiraju Satya Praveen Varma \t REGISTRATION No.: 200905044\n");
        printf ("SECTION: CSE-B \t ROLL No.:10 \t BATCH : B1\n");

        int number;
        printf("Enter the number of discs:\t");
        scanf("%d",&number);
        printf("\nThe moves are:\n");
        int count = tower(number,'A','B','C');
        printf("\nNumber of moves:\t%d\n",count);

       return 0;


   }
```

Sample input/output:


student@V310Z-000: ~/200905044/lab2
File Edit View Search Terminal Help
student@V310Z-000:~/200905044/lab2$ ./lab2q4
NAME: Swamiraju Satya Praveen Varma REGISTRATION No.: 200905044
SECTION: CSE-B ROLL No.:10 BATCH : B1
Enter the number of discs: 4
The moves are:
Move disk 1 from A to B
Move disk 2 from A to C
Move disk 1 from B to C
Move disk 3 from A to B
Move disk 1 from C to A
Move disk 2 from C to B
Move disk 1 from A to B
Move disk 4 from A to C
Move disk 1 from B to C
Move disk 2 from B to A
Move disk 1 from C to A
Move disk 3 from B to C
Move disk 1 from A to B
Move disk 2 from A to C
Move disk 1 from B to C
Number of moves: 15
student@V310Z-000:~/200905044/lab2$

THANK YOU!