

DS LAB

Lab 2

Q1)

File name : “student.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;
};
```

File name : “Lab2_1.c”

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "student.h"

int main(int argc, char const *argv[])
{
    struct STUDENT student;
    char month[10];
    printf("Enter Student DOB day: ");
    scanf("%d", &student.dob.day);
    printf("Enter Student DOB month: ");
    scanf("%s", month);
    printf("Enter Student DOB year: ");
    scanf("%d", &student.dob.year);
```

```

student.dob.mth = (char*) malloc(sizeof(month));
strcpy(student.dob.mth, month);
char name[20];
printf("Enter Student Registration Number: ");
scanf("%d", &student.stu_info.reg_no);
printf("Enter Student Name: ");
scanf("%s", name);
printf("Enter Student Address: ");
scanf("%s", student.stu_info.adrs);
student.stu_info.name = (char*) malloc(sizeof(name));
strcpy(student.stu_info.name, name);
char college[30];
printf("Enter Student College Name: ");
scanf("%s", college);
printf("Enter Student University Name: ");
scanf("%s", student.clg.univ_name);
student.clg.clg_name = (char*) malloc(sizeof(college));
strcpy(student.clg.clg_name, college);
printf("Name: %s\n", student.stu_info.name);
printf("Reg No: %d\n", student.stu_info.reg_no);
printf("Address: %s\n", student.stu_info.adrs);
printf("DOB : %d %s %d\n", student.dob.day, student.dob.mth, student.dob.year);
printf("College: %s\n", student.clg.clg_name);
printf("University: %s\n", student.clg.univ_name);
return 0;
}

```

Output:

```

student@dslab: ~/Desktop/190905190/DS/Lab2
File Edit View Search Terminal Help
student@dslab:~/Desktop/190905190/DS/Lab2$ gcc Lab2_1.c -o Lab2_1
student@dslab:~/Desktop/190905190/DS/Lab2$ ./Lab2_1
Enter Student DOB day: 17
Enter Student DOB month: September
Enter Student DOB year: 2000
Enter Student Registration Number: 190905190
Enter Student Name: Abhinav
Enter Student Address: address
Enter Student College Name: MIT
Enter Student University Name: MAHE
Name: Abhinav
Reg No: 190905190
Address: address
DOB : 17 September 2000
College: MIT
University: MAHE
student@dslab:~/Desktop/190905190/DS/Lab2$ 

```

Q2)

File name: “copy.h”

```
void copy(char str1[], char str2[], int index)
{
    str2[index] = str1[index];
    if (str1[index] == '\0')
        return;
    copy(str1, str2, index + 1);
}
```

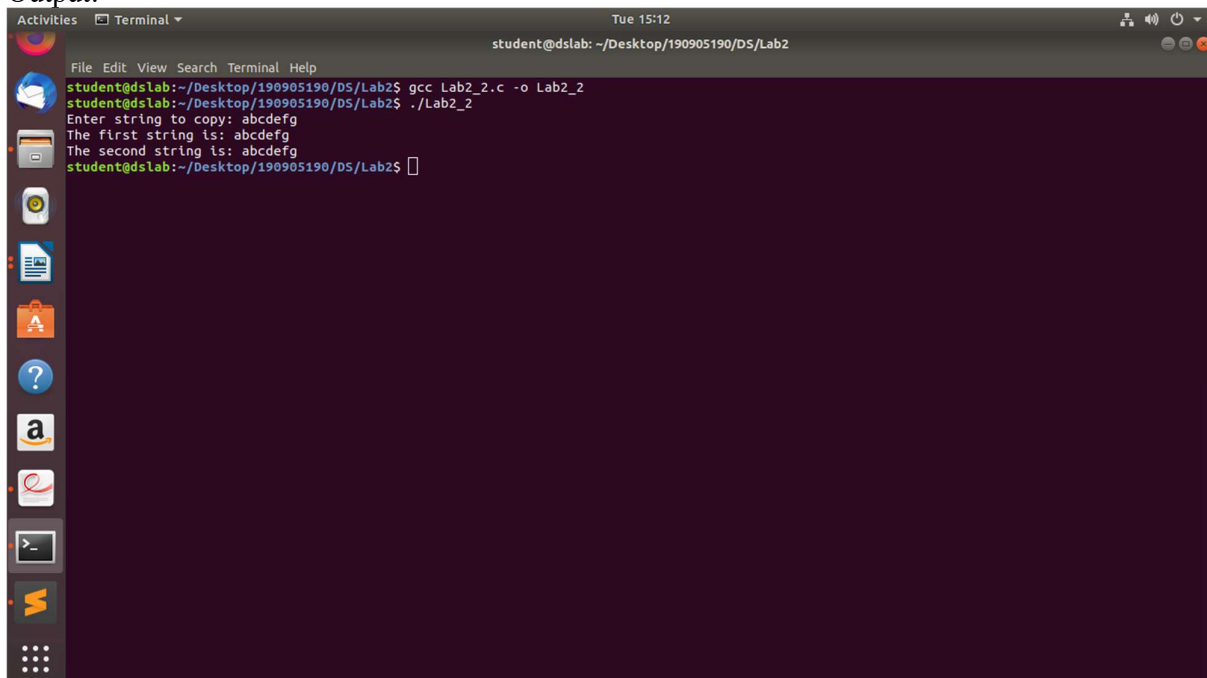
File name: “Lab2_2.c”

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "copy.h"

int main()
{
    char str1[20], str2[20];

    printf("Enter string to copy: ");
    scanf("%s", str1);
    copy_string(str1, str2, 0);
    printf("The first string is: %s\n", str1);
    printf("The second string is: %s\n", str2);
    return 0;
}
```

Output:



```
student@dslab: ~/Desktop/190905190/DS/Lab2
student@dslab:~/Desktop/190905190/DS/Lab2$ gcc Lab2_2.c -o Lab2_2
student@dslab:~/Desktop/190905190/DS/Lab2$ ./Lab2_2
Enter string to copy: abcdefg
The first string is: abcdefg
The second string is: abcdefg
student@dslab:~/Desktop/190905190/DS/Lab2$
```

Q3)

File name: “palindrome.h”

```
int checkPalin(char str[], int i, int l)
{
    if(i >= l/2)
        return 1;
    else if(str[i]!=str[l-i-1])
        return 0;
    else if(str[i]==str[l-i-1]){
        i = i+1;
        return checkPalin(str, i, l);
    }
}
```

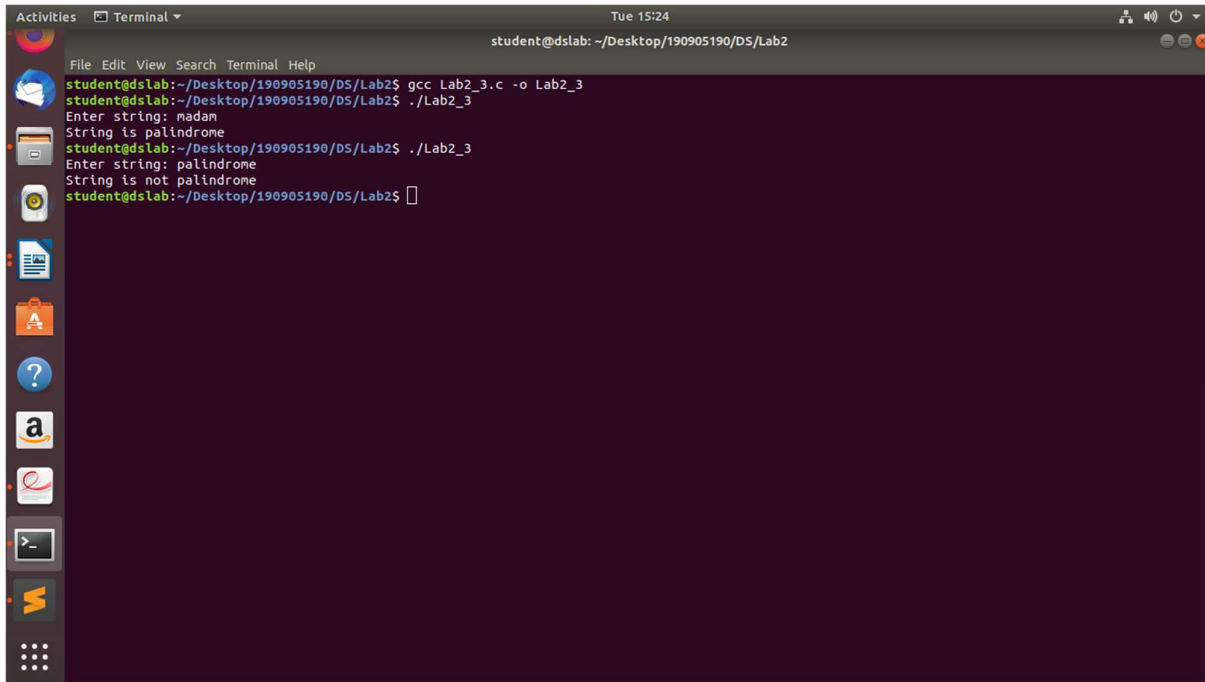
File name: “Lab2_3.c”

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "palindrome.h"

int main()
{
    char str1[20], str2[20];

    printf("Enter string: ");
    scanf("%s", str1);
    int f = checkPalin(str1, 0, strlen(str1));
    if(f == 1){
        printf("String is palindrome\n");
    }
    else
        printf("String is not palindrome\n");
    return 0;
}
```

Output:

A screenshot of a Linux terminal window. The window title is "student@dslab: ~/Desktop/190905190/DS/Lab2". The terminal shows the compilation and execution of a C program named Lab2_3. The program checks if a string is a palindrome. The first run with input "madam" returns "String is palindrome". The second run with input "palindrome" returns "String is not palindrome". The terminal has a dark purple background and a sidebar on the left with various application icons.

```
Activities Terminal
Tue 15:24
student@dslab: ~/Desktop/190905190/DS/Lab2
File Edit View Search Terminal Help
student@dslab:~/Desktop/190905190/DS/Lab2$ gcc Lab2_3.c -o Lab2_3
student@dslab:~/Desktop/190905190/DS/Lab2$ ./Lab2_3
Enter string: madam
String is palindrome
student@dslab:~/Desktop/190905190/DS/Lab2$ ./Lab2_3
Enter string: palindrome
String is not palindrome
student@dslab:~/Desktop/190905190/DS/Lab2$
```

Q4)

File name: “towerofhanoi.h”

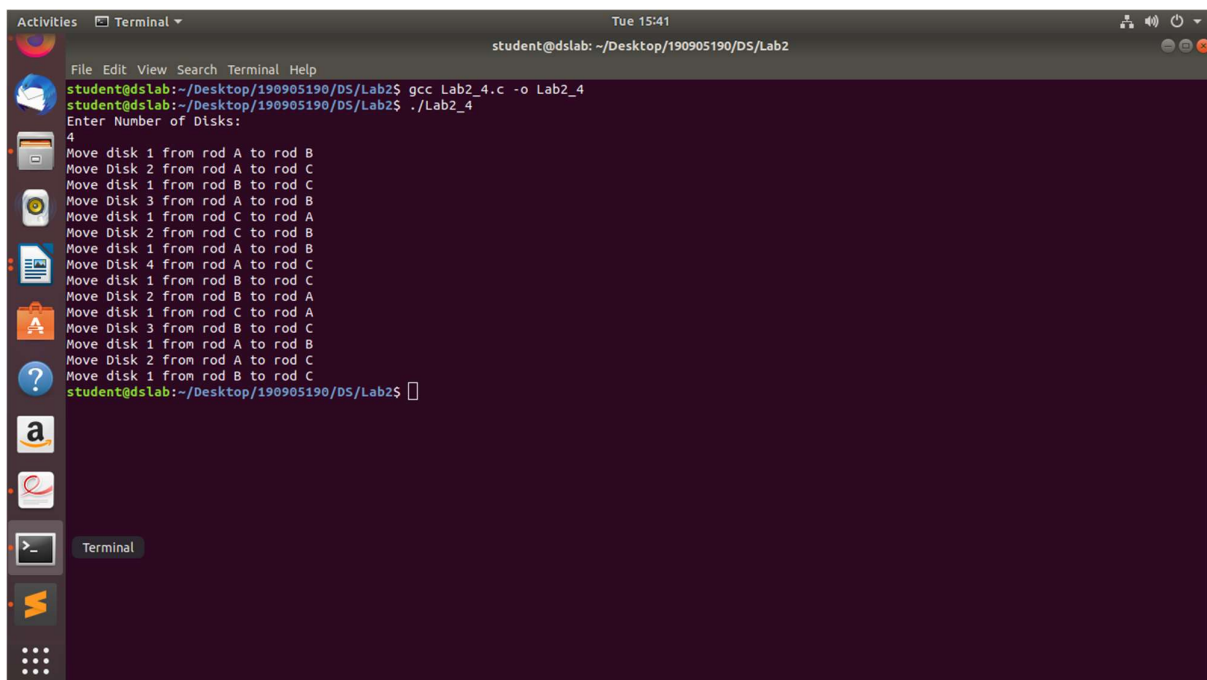
```
void towerOfHanoi(int n, char a, char c, char b)
{
    if (n == 1)
    {
        printf("Move disk 1 from rod %c to rod %c\n", a, c);
        return;
    }
    towerOfHanoi(n - 1, a, b, c);
    printf("Move Disk %d from rod %c to rod %c\n", n, a, c);
    towerOfHanoi(n - 1, b, c, a);
}
```

File name : “Lab2_4.c”

```
#include <stdio.h>
#include "towerofhanoi.h"

int main()
{
    int n;
    printf("Enter Number of Disks: \n");
    scanf("%d", &n);
    towerOfHanoi(n, 'A', 'C', 'B'); // A, B and C are names of rods
    return 0;
}
```

Output:



```
Activities Terminal Tue 15:41
student@dslab: ~/Desktop/190905190/DS/Lab2
File Edit View Search Terminal Help
student@dslab:~/Desktop/190905190/DS/Lab2$ gcc Lab2_4.c -o Lab2_4
student@dslab:~/Desktop/190905190/DS/Lab2$ ./Lab2_4
Enter Number of Disks:
4
Move disk 1 from rod A to rod B
Move Disk 2 from rod A to rod C
Move disk 1 from rod B to rod C
Move Disk 3 from rod A to rod B
Move disk 1 from rod C to rod A
Move Disk 2 from rod C to rod B
Move disk 1 from rod A to rod B
Move Disk 4 from rod A to rod C
Move disk 1 from rod B to rod C
Move Disk 2 from rod B to rod A
Move disk 1 from rod C to rod A
Move Disk 3 from rod B to rod C
Move disk 1 from rod A to rod B
Move Disk 2 from rod A to rod C
Move disk 1 from rod B to rod C
student@dslab:~/Desktop/190905190/DS/Lab2$
```