DS LAB
Lab 5

Q1)

Source Code:

“charstack.h”

```
# define MAX 10
# define true 1
# define false 0
/* Structure definition */
typedef struct
{
        char item[MAX];
        int top;
}stack;

void push(stack *ps, char x);
void display(stack *);
char pop(stack *ps);
int isEmpty(stack *ps);
int isFull(stack *ps);

void push(stack *ps, char x) {
        if (!isFull(ps))
        {
                ps->top++;
                ps->item[ps->top] = x;
        }
        printf("After push: \n");
        display(ps);
}

char pop(stack *ps)
{
        if(!isEmpty(ps)){
                ps->top--;
                printf("After pop: \n");
                display(ps);
          return(ps->item[ps->top]);
        }
}

int isEmpty(stack *ps)
{
        if (ps->top==-1)
                return(true);
        else
                return(false);
}
```

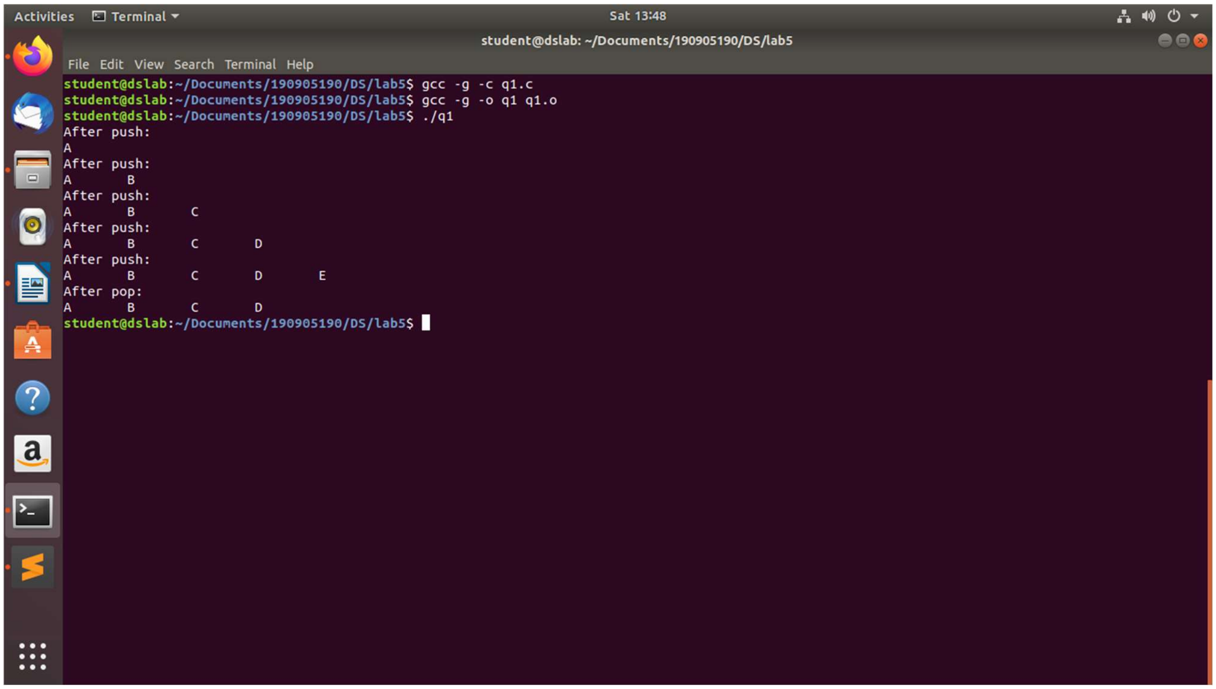
```
int isFull(stack *ps)
{
        if(ps->top == MAX-1)
                return 1;
        return 0;
}

void display(stack *ps)
{
        for (int i = 0; i <= ps->top; ++i)
        {
                printf("%c\t", ps->item[i]);
        }
        printf("\n");
}
```

“q1.c”

```
#include <stdio.h>
#include <stdlib.h>
#include "charstack.h"
int main()
{
        stack *ps;
        ps = (stack *)malloc(sizeof(stack));
        ps->top = -1;
        // printf("Hello\n");
        push(ps, 'A');
        push(ps, 'B');
        push(ps, 'C');
        push(ps, 'D');
        push(ps, 'E');
        char ch = pop(ps);
        return 0;
}
```

Output:


Activities
Terminal
Sat 13:48
student@dslab: ~/Documents/190905190/DS/lab5
File Edit View Search Terminal Help

```
student@dslab:~/Documents/190905190/DS/lab5$ gcc -g -c q1.c
student@dslab:~/Documents/190905190/DS/lab5$ gcc -g -o q1 q1.o
student@dslab:~/Documents/190905190/DS/lab5$ ./q1
After push:
A
After push:
A       B
After push:
A       B       C
After push:
A       B       C       D
After push:
A       B       C       D       E
After pop:
A       B       C       D
student@dslab:~/Documents/190905190/DS/lab5$ 
```

Q2)

Source Code:
“binstack.h”

```
# define MAX 30
# define true 1
# define false 0
/* Structure definition */
typedef struct
{
        int item[MAX];
        int top;
}stack;

void push(stack *ps, int x);
void display(stack *);
int pop(stack *ps);
int isEmpty(stack *ps);
int isFull(stack *ps);

void push(stack *ps, int x) {
        if (!isFull(ps))
        {
                ps->top++;
                ps->item[ps->top] = x;
        }
}

int pop(stack *ps)
{
        if(!isEmpty(ps)){
                ps->top--;
          return(ps->item[ps->top]);
```

```
    }
}

int isEmpty(stack *ps)
{
    if (ps->top==-1)
        return(true);
    else
        return(false);
}

int isFull(stack *ps)
{
    if(ps->top == MAX-1)
        return 1;
    return 0;
}

void display(stack *ps)
{
    for (int i = ps->top; i >= 0; i--)
    {
        printf("%d", ps->item[i]);
    }
    printf("\n");
}
```

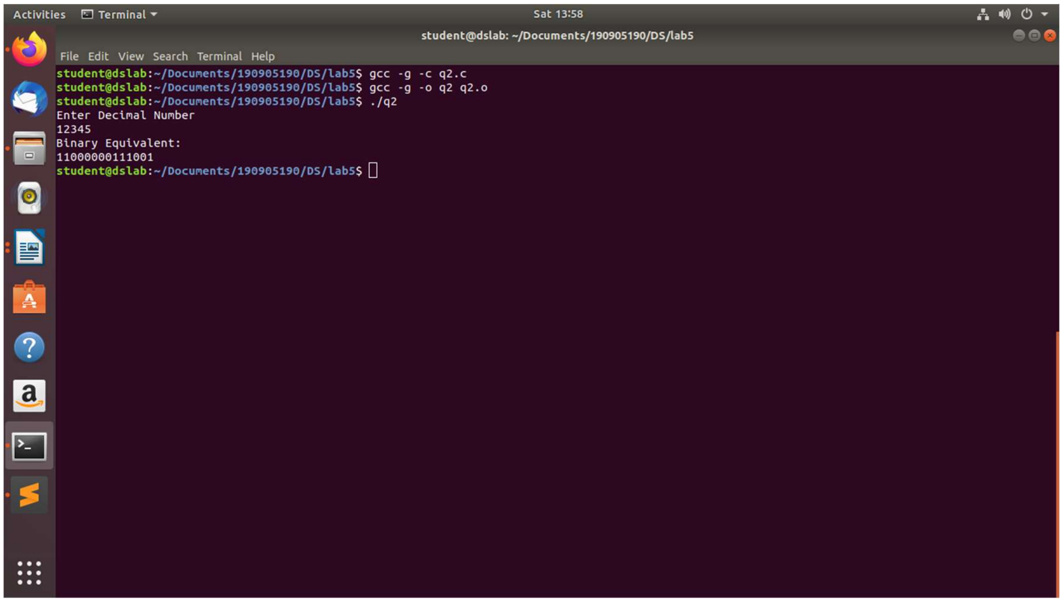
“q2.c”

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

int main()
{
    int N;
    printf("Enter Decimal Number\n");
    scanf("%d", &N);
    stack * bin;
    bin = (stack *)malloc(sizeof(stack));
    bin->top = -1;

    while(N!=0)
    {
        int d = N%2;
        push(bin, d);
        N = N/2;
    }
    printf("Binary Equivalent: \n");
    display(bin);
    return 0;
}
```

Output:



Activities
Terminal
Sat 13:58
student@dslab: ~/Documents/190905190/DS/lab5
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```
student@dslab:~/Documents/190905190/DS/lab5$ gcc -g -c q2.c
student@dslab:~/Documents/190905190/DS/lab5$ gcc -g -o q2 q2.o
student@dslab:~/Documents/190905190/DS/lab5$ ./q2
Enter Decimal Number
12345
Binary Equivalent:
11000000111001
student@dslab:~/Documents/190905190/DS/lab5$ 
```

Q3)
Source Code:

“palinstack.h”

```
# define MAX 100
# define true 1
# define false 0
/* Structure definition */
typedef struct
{
	char item[MAX];
	int top;
}stack;

void push(stack *ps, char x);
void display(stack *);
char pop(stack *ps);
int isEmpty(stack *ps);
int isFull(stack *ps);

void push(stack *ps, char x) {
	if (!isFull(ps))
	{
		ps->top++;
		ps->item[ps->top] = x;
	}
}

char pop(stack *ps)
{
	if(!isEmpty(ps)){
		ps->top--;
	  return(ps->item[ps->top]);
	}
}

int isEmpty(stack *ps)
{
	if (ps->top==-1)
		return(true);
	else
		return(false);
}

int isFull(stack *ps)
{
	if(ps->top == MAX-1)
		return 1;
	return 0;
}

void display(stack *ps)
```

```
{
	for (int i = 0; i <= ps->top; ++i)
	{
		printf("%c\t", ps->item[i]);
	}
	printf("\n");
}

int checkPalin(stack *ps)
{
	for (int i = 0; i <= ps->top; ++i)
	{
		if(ps->item[i] != ps->item[ps->top - i])
			return 0;
	}
	return 1;
}
```

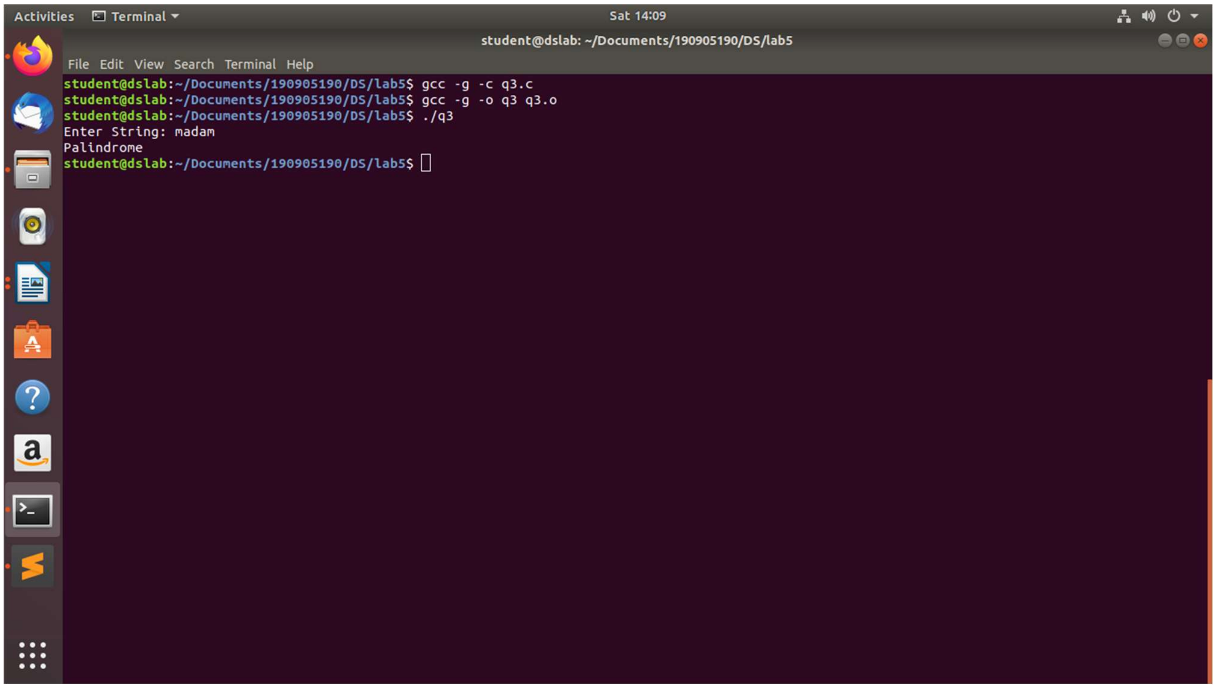
“q3.c”

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

int main()
{
	char str[MAX];
	stack * strs;
	strs = (stack *)malloc(sizeof(stack));
	strs->top = -1;

	printf("Enter String: ");
	scanf("%s", str);
	for(int i = 0; i < strlen(str); i++)
	{
		push(strs, str[i]);
	}
	int f = checkPalin(strs);
	if(f == 0)
		printf("Not a Palindrome\n");
	else
		printf("Palindrome\n");
	return 0;
}
```

Output:



Activities
Terminal
Sat 14:09
student@dslab: ~/Documents/190905190/DS/lab5
File Edit View Search Terminal Help

```
student@dslab:~/Documents/190905190/DS/lab5$ gcc -g -c q3.c
student@dslab:~/Documents/190905190/DS/lab5$ gcc -g -o q3 q3.o
student@dslab:~/Documents/190905190/DS/lab5$ ./q3
Enter String: madam
Palindrome
student@dslab:~/Documents/190905190/DS/lab5$ 
```