Lab Exercise – 7

(1) //Program to simulate a Turing Machine for language L = {0^n1^n | n >= 1}

```
#include<stdio.h>
#include<string.h>
int head=0;
char str[20];
void q0(char);
void q1(char);
void q2(char);
void q3(char);
void q4(char);
void q0(char c)
{
        if(c =='0') {
                str[head]='X';
                head=head+1;
                q1(str[head]);
        }
        else if(c =='Y')
        {
                head=head+1;
                q3(str[head]);
        }
```

```
        else
          printf("String Not Accepted");
}
void q1(char c)
{
        if(c =='0')
        {
                head=head+1;
                while(str[head]=='0')
                {
                        head++;
                }
                q1(str[head]);
        }
        else if(c =='1')
        {

                str[head]='Y';
                head=head-1;
                q2(str[head]);
        }
        else if(c =='Y' )
        {
                head=head+1;
```

```
            while(str[head]=='Y')
            {
                head++;
            }
            q1(str[head]);
        }

        else printf("String Not Accepted");
}
void q2(char c)
{
        if(c =='X' )
        {
            head=head+1;
            q0(str[head]);
        }
        else if (c =='Y')
        {
            head=head-1;
            while(str[head]=='Y')
            {
                head--;
            }
            q2(str[head]);
```

```
	}
	else if (c =='0')
	{
		head=head-1;
		while(str[head]=='0')
		{
			head--;
		}
		q2(str[head]);
	}

	else printf("String Not Accepted");
}
void q3(char c)
{
	if (c =='Y')
	{
		head++;
		while(str[head]=='Y')
		{
			head++;
		}
		q4(str[head]);
	}
```

```
        else if(c =='B')
        {
                printf("String Accepted ");
        }
        else
                printf("String Not Accepted");

}
void q4(char c)
{
        if(c =='B')
        {
                printf("String Accepted ");
        }
        else printf("String Not Accepted");
}
int main()
{
   char c;
   int i;
        printf("Enter your string: ");
        scanf("%s",&str);
        str[strlen(str)]='B';
        q0(str[head]);
```

```
    return 0;
}
```

(2) /*Program to simulate a Turing Machine that finds one's compliment of input string*/

```
#include<stdio.h>
#include<string.h>
int head=0;
char str[20];
void q0(char c)
{
    if(c =='0')
    {
        str[head]= '1';
        head++;
        q0(str[head]);
     }
    else if(c =='1')
    {
        str[head]='0';
        head++;
        q0(str[head]);
    }
    else
    {
```

```
                printf("Turing Machine Halts");
        }
}

int main()
{
        char c;
        int i;
        printf("Enter your string: ");
        scanf("%s",&str);
        str[strlen(str)]='B';
        q0(str[head]);
        printf("\nOne's complement: ");
        for(i = 0; i < strlen(str)-1; i++)
        {
                printf("%c", str[i]);
        }
        return 0;
}
```