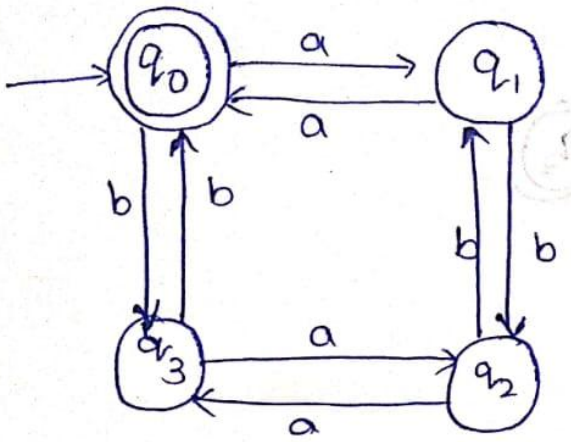
Week 1: Language recognizer

1. Write a program in C that recognizes the following languages.

a. Set of all strings over binary alphabet containing even number of 0's and even number of 1's.

CD Lab

a)



$M = (Q, \Sigma, \delta, q_0, f)$

$Q = \{q_0, q_1, q_2, q_3\}$

$\Sigma = \{a, b\}$

$q_0 = q_0$ – initial state

$f = q_0$ – final state

δ	a	b
$\rightarrow q_0$	q_1	q_3
q_1	q_0	q_2
q_2	q_3	q_1
q_3	q_2	q_0

b)

Code:

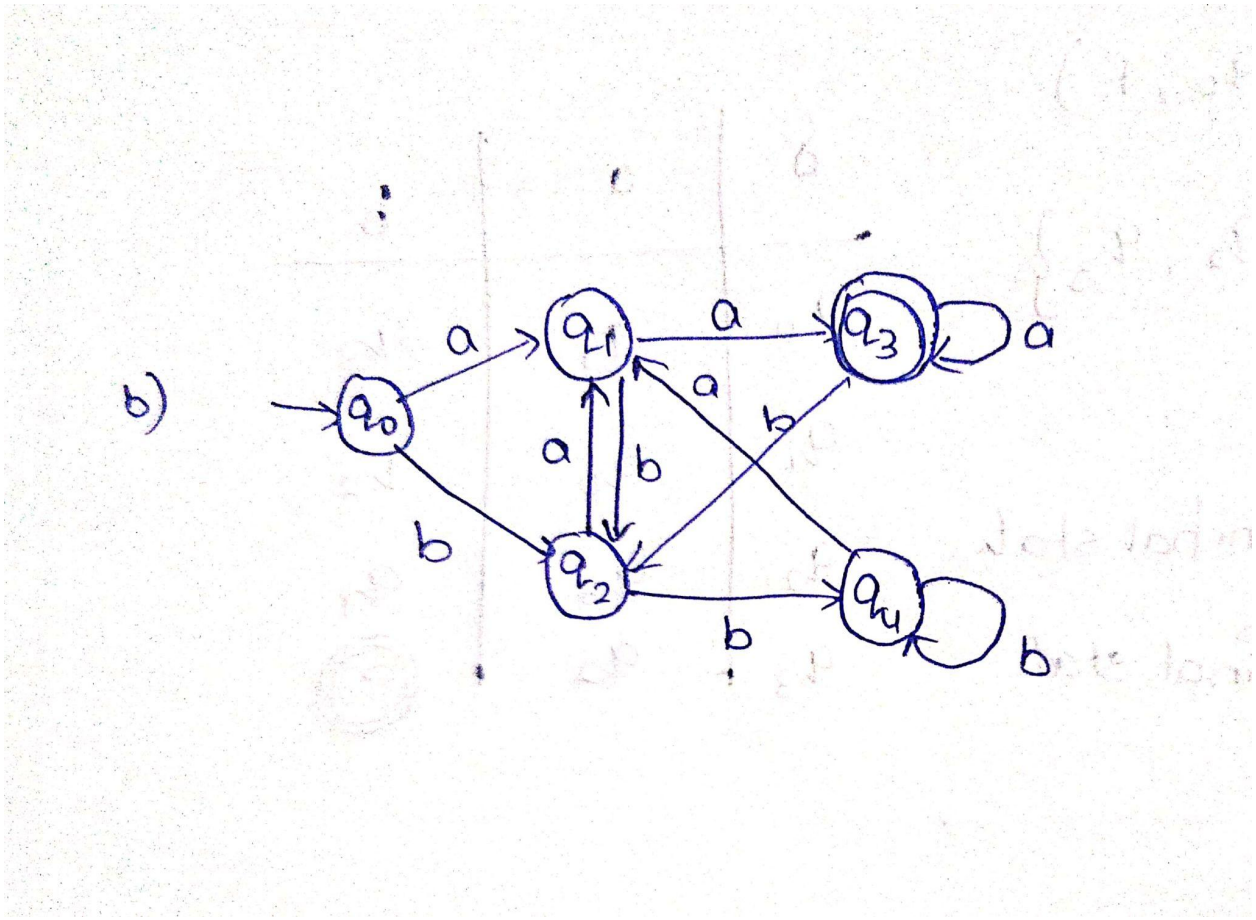
```
#include<stdio.h>
void main()
{
```

```
int state=0,i=0;
char token,input[20];
printf("Enter input string \t :");
scanf("%s",input);
//printf("Given string is : %s");

while((token=input[i++])!='\0')
{
  // printf("current token : %c \n",token);
   switch(state)
   {
      case 0: if(token=='a')
                 state=1;
              else if(token=='b')
                 state=2;
              else
              {
                 printf("Invalid token");
                 exit(0);
              }
              break;
      case 1: if(token=='a')
                 state=0;
              else if(token=='b')
                 state=3;
              else
              {
                 printf("Invalid token");
                 exit(0);
              }

              break;
      case 2: if(token=='a')
                 state=3;
              else if(token=='b')
                 state=0;
              else
              {
                 printf("Invalid token");
                 exit(0);
              }
              break;
      case 3: if(token=='a')
                 state=2;
```

```
                else if(token=='b')
                    state=1;
                else
                {
                    printf("Invalid token");
                    exit(0);
                }
                break;
        }
       // printf("state = %d  ",state);
    }
    if(state==0)
        printf("\n\nString accepted\n\n");
    else
        printf("\n\nString not accepted\n\n");
}
```

Input	Expected Output
aabb	String accepted
abab	String accepted
aaabb	String not accepted
aaa	String not accepted
abcd	Invalid token

b. Lab Assignment: Set of all strings ending with two symbols of same type.



Code:

```
#include<stdio.h>
#include<stdlib.h>
void main()
{
   int state=0,i=0;
   char token,input[20];
   printf("Enter input string \t :");
   scanf("%s",input);
   while((token=input[i++])!='\0')
   {
      switch(state)
      {
         case 0: if(token=='a')
                    state=1;
                 else if(token=='b')
                    state=2;
                 else
```

```
        {
            printf("Invalid token");
            exit(0);
        }
        break;
case 1: if(token=='a')
            state=3;
        else if(token=='b')
            state=2;
        else
        {
            printf("Invalid token");
            exit(0);
        }

        break;
case 2: if(token=='a')
            state=1;
        else if(token=='b')
            state=4;
        else
        {
            printf("Invalid token");
            exit(0);
        }
        break;
case 3: if(token=='a')
            state=3;
        else if(token=='b')
            state=2;
        else
        {
            printf("Invalid token");
            exit(0);
        }
        break;
case 4: if(token=='a')
            state=1;
        else if(token=='b')
            state=4;
        else
        {
            printf("Invalid token");
            exit(0);
```

```
                }
                break;
        }
    }
    if(state==3 || state==4)
        printf("\n\nString accepted\n\n");
    else
        printf("\n\nString not accepted\n\n");
}
```

Input	Expected Output
aabb	String accepted
abab	String not accepted
aaabb	String accepted
ababaa	String accepted
abcd	Invalid token