

//1. Construct DFA over {a,b} that accepts the strings ending with abb.

```
#include<stdio.h>

#include<stdlib.h>

#define max 100

int main()
{
    char str[max];

    char c;

    int i;

    int f='1';

    printf("the initial states are : q0 =1 ,q1 = 2,q2 = 3 ");

    printf("\nthe final state is : q3 = 4 ");

    do
    {
        printf("\nEnter the string :");

        scanf("%s",str);

        for(i=0;str[i]!='\0';i++)
        {
            switch(f)
            {
                case '1':
                    if (str[i]=='a')
                    {
                        f='2';
                    }
                    else if(str[i]=='b')
                    {
                        f='1';
                    }
                }
```

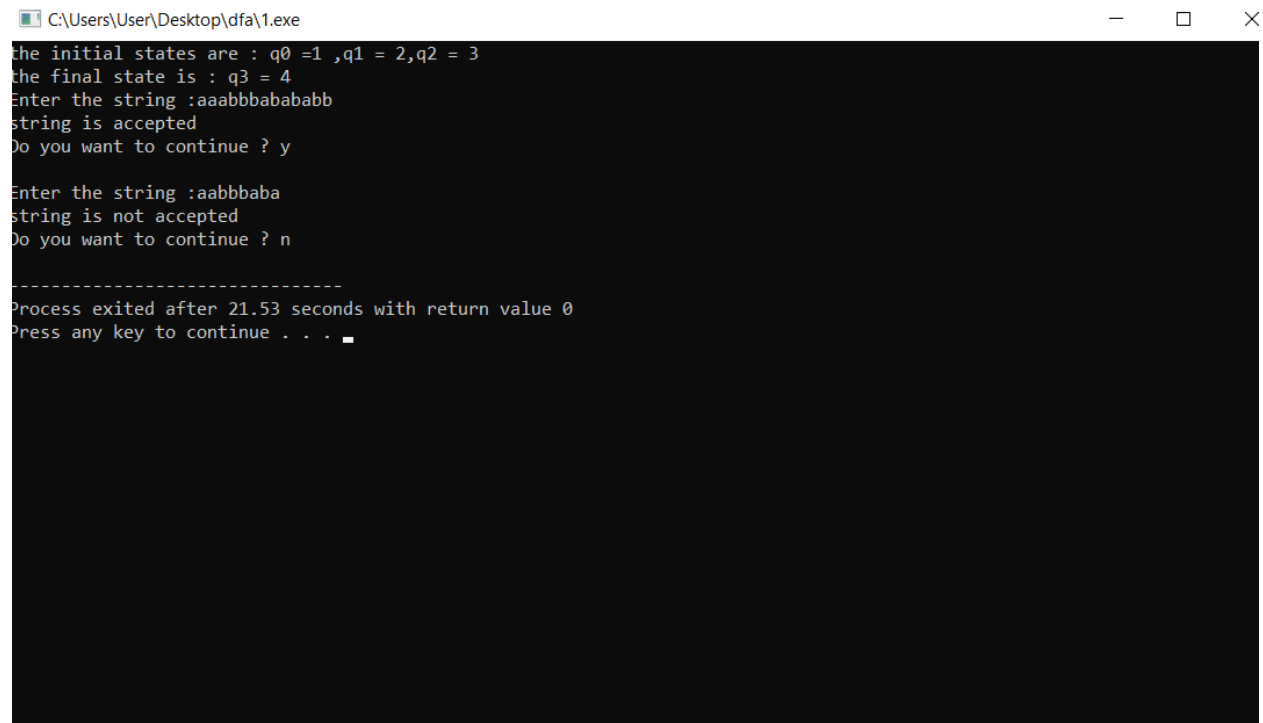
```
        break;
case '2':
    if (str[i]=='a')
    {
        f='2';
    }
    else if(str[i]=='b')
    {
        f='3';
    }
    break;
case '3':
    if(str[i]=='a')
    {
        f='2';
    }
    else if(str[i]=='b')
    {
        f='4';
    }
    break;
case '4':
    if(str[i]=='a')
    {
        f='2';
    }
    else if(str[i]=='b')
    {
        f='1';}
```

```

        break;
    }
}
if(f=='4')
{
    printf("string is accepted",f);
}
else
{
    printf("string is not accepted",f);
}
printf("\nDo you want to continue ? ");
scanf("%s",&c);
}while(c=='y' || c=='Y');
return 0;}

```

#### OUTPUT:



```

C:\Users\User\Desktop\dfa\1.exe
the initial states are : q0 =1 ,q1 = 2,q2 = 3
the final state is : q3 = 4
Enter the string :aaabbbabababb
string is accepted
Do you want to continue ? y

Enter the string :aabbbaba
string is not accepted
Do you want to continue ? n

-----
Process exited after 21.53 seconds with return value 0
Press any key to continue . . .

```

//2. Construct DFA over {a,b} accepting strings that do not end with ab.

```
#include<stdio.h>

#include<stdlib.h>

#define max 100

int main()
{
    char str[max];
    char c;
    int i;
    int f = '1';

    printf("the initial state is : q2 = 3 ");
    printf("\nthe final states are : q0 = 1,q1 = 2 ");

    do
    {
        printf("\nEnter the string :");
        scanf("%s",str);
        for(i=0;str[i]!='\0';i++)
        {
            switch(f)
            {
                case '1':
                    if (str[i]=='a')
                    {
                        f='2';
                    }
                    else if(str[i]=='b')
                    {
                        f='1';
                    }
                }
```

```

        break;
    case '2':
        if (str[i]=='a')
        {
            f='2';
        }
        else if(str[i]=='b')
        {
            f='3';
        }
        break;
    case '3':
        if(str[i]=='a')
        {
            f='2';
        }
        else if(str[i]=='b')
        {
            f='1';
        }
        break;
    }
}
if(f=='1' || f=='2')
{
    printf("string is accepted",f);

}
else

```

```

    {
        printf("string is not accepted",f);
    }

    printf("\nDo you want to continue ? ");
    scanf("%s",&c);
}

while(c=='y' || c=='Y');

return 0;
}

```

OUTPUT:

```

C:\Users\User\Desktop\dfa\2.exe
the initial state is : q2 = 3
the final states are : q0 = 1,q1 = 2
Enter the string :babbab
string is not accepted
Do you want to continue ? y

Enter the string :aaabbbbabba
string is accepted
Do you want to continue ? n

-----
Process exited after 20.34 seconds with return value 0
Press any key to continue . . .

```

//3. Construct DFA over {a,b} that contains 'aba' as substring.

```
#include <stdio.h>
#include <string.h>
#define max 100
void checkValidDFA(char s[max] )
{
    int i;
    int initial_state = 0;
    int previous_state = initial_state;
    int final_state;
    for( i = 0; i < strlen(s); i++)
    {
        if((previous_state == 0 && s[i] == 'a') ||
            (previous_state == 1 && s[i] == 'a'))
        {
            final_state = 1;
        }
        if((previous_state == 0 && s[i] == 'b') ||
            (previous_state == 2 && s[i] == 'b'))
        {
            final_state = 0;
        }
        if(previous_state == 1 && s[i] == 'b')
        {
            final_state = 2;
        }
        if((previous_state == 2 && s[i] == 'a') ||
```

```

        (previous_state == 3))
    {
        final_state = 3;
    }

    previous_state = final_state;
}

if(final_state == 3)
{
    printf("Accepted");
}
else
{
    printf("Not Accepted");
}
}

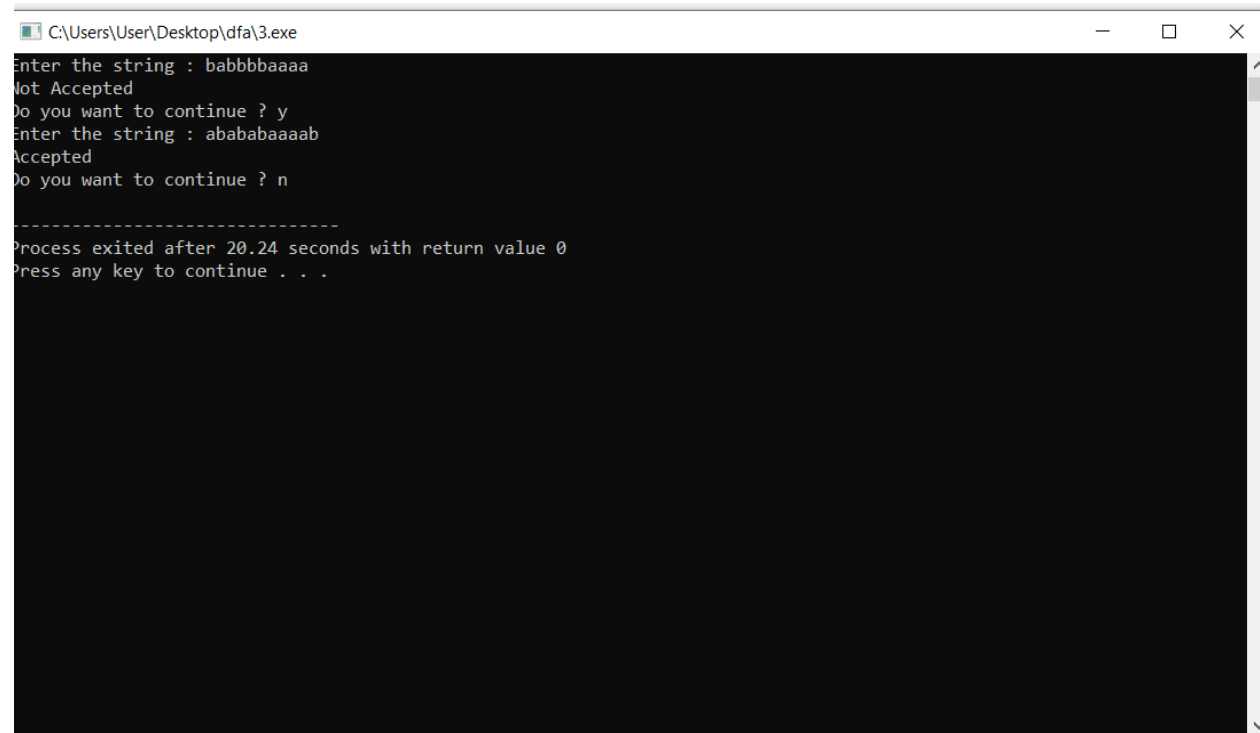
int main()
{
    char c;
    char s[max];
    do
    {
        printf("Enter the string : ");
        scanf("%s",s);
        checkValidDFA(s);
        printf("\nDo you want to continue ? ");
        scanf("%s",&c);
    }

```



```
while(c=='y');  
  
return 0;  
  
}
```

OUTPUT:



```
C:\Users\User\Desktop\dfa\3.exe  
Enter the string : babbbbaaaa  
Not Accepted  
Do you want to continue ? y  
Enter the string : abababaaaab  
Accepted  
Do you want to continue ? n  
  
-----  
Process exited after 20.24 seconds with return value 0  
Press any key to continue . . .
```

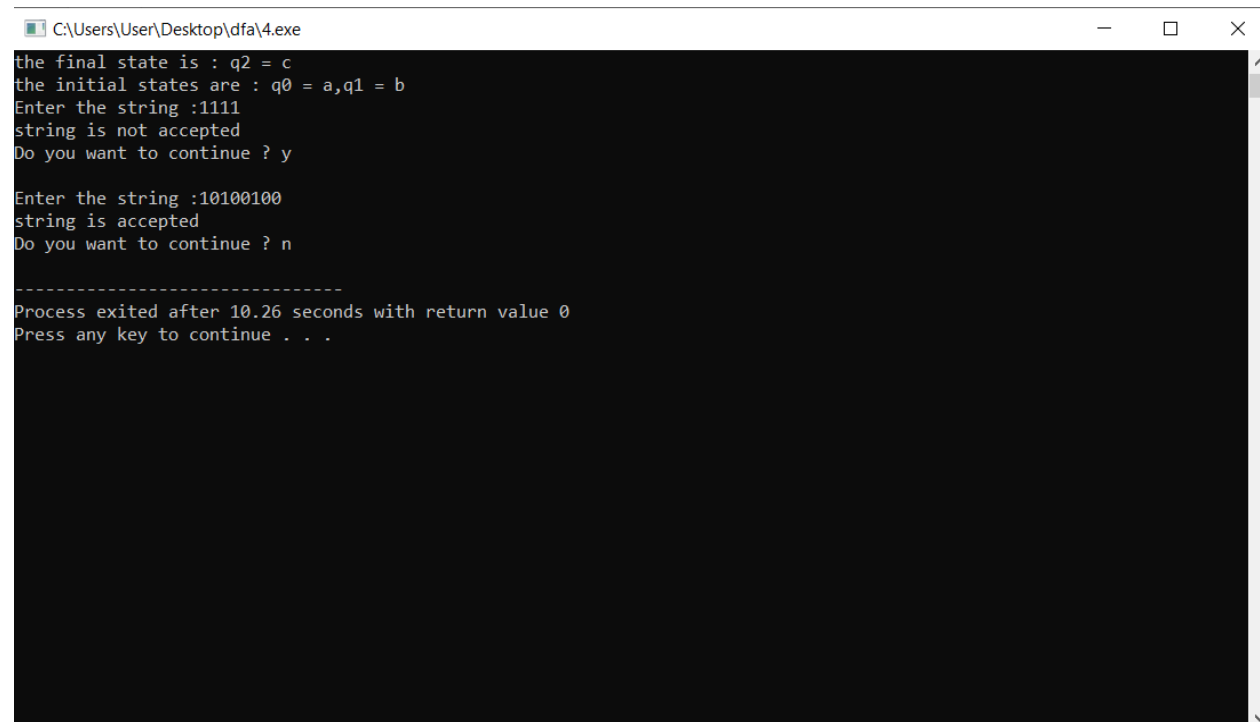
//4. Construct a DFA over {0,1} that accepts a set of all strings ending with '00'.

```
#include<stdio.h>
#include<stdlib.h>
#define max 100
int main()
{
char str[max];
char c;
int i;
char f='a';
printf("the final state is : q2 = c ");
printf("\nthe initial states are : q0 = a,q1 = b ");
do
{
printf("\nEnter the string :");
scanf("%s",str);
for(i=0;str[i]!='\0';i++)
{
switch(f)
{
case 'a':
if (str[i]=='0')
{
f='b';
}
else if(str[i]=='1')
{
```

```
f='a';  
}  
break;  
case 'b':  
if (str[i]=='0')  
{  
f='c';  
}  
else if(str[i]=='1')  
{  
f='a';  
}  
break;  
case 'c':  
if(str[i]=='0')  
{  
f='c';  
}  
else if(str[i]=='1')  
{  
f='a';  
}  
break;  
}  
}  
if(f=='c')  
{  
printf("string is accepted",f);
```

```
}  
else  
{  
printf("string is not accepted",f);  
}  
printf("\nDo you want to continue ? ");  
scanf("%s",&c);  
}  
while(c=='y' || c=='Y');  
return 0;  
}
```

OUTPUT:



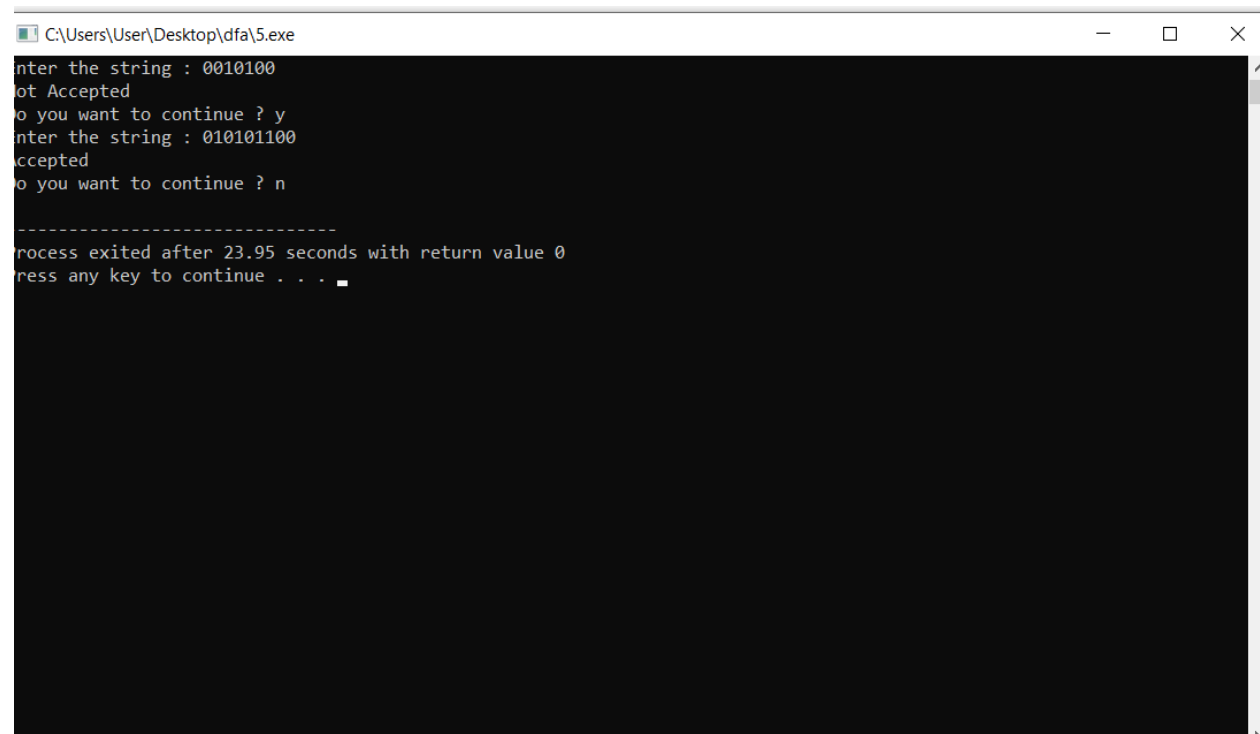
```
C:\Users\User\Desktop\dfa\4.exe  
the final state is : q2 = c  
the initial states are : q0 = a,q1 = b  
Enter the string :1111  
string is not accepted  
Do you want to continue ? y  
  
Enter the string :10100100  
string is accepted  
Do you want to continue ? n  
  
-----  
Process exited after 10.26 seconds with return value 0  
Press any key to continue . . .
```

//5. Construct a DFA over {0,1} that accepts a set of strings with '011' as a substring.

```
#include <stdio.h>
#include <string.h>
#define max 100
void checkValidDFA(char s[max] )
{
    int i;
    int initial_state = 0;
    int previous_state = initial_state;
    int final_state;
    for( i = 0; i < strlen(s); i++)
    {
        if((previous_state == 0 && s[i] == '0') || (previous_state == 1 && s[i] == '0') || (previous_state == 2 && s[i] == '0'))
        {
            final_state = 1;
        }
        if(previous_state == 0 && s[i] == '1')
        {
            final_state = 0;
        }
        if(previous_state == 1 && s[i] == '1')
        {
            final_state = 2;
        }
        if((previous_state == 2 && s[i] == '1') || (previous_state == 3))
        {
            final_state = 3;
        }
    }
}
```

```
}  
    previous_state = final_state;  
}  
  
if(final_state == 3)  
{  
    printf("Accepted");  
}  
else  
{  
    printf("Not Accepted");  
}  
}  
  
int main()  
{  
    char c;  
    char s[max];  
    do  
    {  
        printf("Enter the string : ");  
        scanf("%s",s);  
        checkValidDFA(s);  
        printf("\nDo you want to continue ? ");  
        scanf("%s",&c);  
    }  
    while(c=='y');  
    return 0;  
}
```

OUTPUT:



```
C:\Users\User\Desktop\dfa5.exe
Enter the string : 0010100
Not Accepted
Do you want to continue ? y
Enter the string : 010101100
Accepted
Do you want to continue ? n

-----
Process exited after 23.95 seconds with return value 0
Press any key to continue . . .
```

//6. Construct a DFA over {0,1} accepting only {10,1,110}.

```
#include <stdio.h>

#include <string.h>

#define max 100

void checkValidDFA(char s[max] )
{
    int i;
    int initial_state = 0;
    int previous_state = initial_state;
    int final_state;

    for( i = 0; i < strlen(s); i++)
    {
        if(previous_state == 0 && s[i] == '0')
        {
            final_state = 4;
        }
        if(previous_state == 0 && s[i] == '1')
        {
            final_state = 1;
        }
        if(previous_state == 1 && s[i] == '0')
        {
            final_state = 2;
        }
        if(previous_state == 1 && s[i] == '1')
        {
            final_state = 3;
        }
    }
}
```



```
if((previous_state == 2 && s[i] == '0') || (previous_state == 2 && s[i] == '1' ))
{
    final_state = 4;
}

if(previous_state == 3 && s[i] == '1')
{
    final_state = 4;
}

if(previous_state == 3 && s[i] == '0')
{
    final_state = 2;
}

if((previous_state == 4 && s[i] == '0') || (previous_state == 4 && s[i] == '1' ))
{
    final_state = 4;
}

previous_state = final_state;
}

if((final_state == 1) || (final_state == 2))
{
    printf("Accepted");
}
else
{
    printf("Not Accepted");
}
}
```

```

int main()
{
    char c;

    char s[max];

    do
    {
        printf("Enter the string : ");

        scanf("%s",s);

        checkValidDFA(s);

        printf("\nDo you want to continue ? ");

        scanf("%s",&c);

    }

    while(c=='y');

    return 0;
}

```

OUTPUT:

```

C:\Users\User\Desktop\dfa\6.exe
Enter the string : 00
Not Accepted
Do you want to continue ? y
Enter the string : 11
Not Accepted
Do you want to continue ? y
Enter the string : 1
Accepted
Do you want to continue ? y
Enter the string : 101
Not Accepted
Do you want to continue ? y
Enter the string : 110
Accepted
Do you want to continue ? y
Enter the string : 01
Not Accepted
Do you want to continue ? y
Enter the string : 10
Accepted
Do you want to continue ? n

-----
Process exited after 45.31 seconds with return value 0
Press any key to continue . . .

```