

## **COMPILER DESIGN LAB**

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CSE C

### **Week 1: Implementation of Language recognizer**

**1. Implementation of Language recognizer for a set of all strings over input alphabet  $\Sigma=\{a,b\}$  containing even number of a's and even number of b's**

#### **Code:**

```
#include<stdio.h>
void main(){
int state=0,i=0;
char current,input[20];
printf("Enter input string \t :");
scanf("%s",input);
while((current=input[i++])!='\0'){
switch(state)
{
case 0: if(current=='a')
state=1;
else if(current=='b')
state=2;
else
{
printf("Invalid token");
exit(0);
}
break;
case 1: if(current=='a')
state=0;
else if(current=='b')
state=3;
```

```
else
{
printf("Invalid token");
exit(0);
}
break;
case 2: if(current=='a')
state=3;
else if(current=='b')
state=0;
else
{
printf("Invalid token");
exit(0);
}
break;
case 3: if(current=='a')
state=2;
else if(current=='b')
state=1;
else
{
printf("Invalid token");
exit(0);
}
break;
}
}
if(state==0)
printf("\n\nString accepted\n\n");
else
printf("\n\nString not accepted\n\n");
}
```

**Test Cases:**

Input	Expected Output
ababa	String is not accepted
aabb	String is accepted
aaabbb	String is not accepted
bb	String is accepted
aa	String is accepted

The screenshot shows a web browser window with the URL <https://www.programiz.com/c-programming/online-compiler/>. The page features the Programiz logo and several advertisements, including HP and Intel Core i7. The main content area displays a C program in a text editor, with a 'Run' button to the right. The output of the program is shown in a separate pane on the right.

**main.c**

```

1 #include<stdio.h>
2 void main(){
3     int state=0,i=0;
4     char current,input[20];
5     printf("Enter input string \t :");
6     scanf("%s",input);
7     while((current=input[i++]!='\0')){
8         switch(state)
9         {
10            case 0: if(current=='a')
11                    state=1;
12                    else if(current=='b')
13                        state=2;
14                    else
15                        {
16                            printf("Invalid token");
17                            exit(0);
18                        }
19                    break;
20            case 1: if(current=='a')
21                    state=0;
22                    else if(current=='b')
23                        state=3;
24                    else
25                        {
26                            printf("Invalid token");
27                            exit(0);

```

**Output**

```

/tmp/Q3wmYPUGb5.o
Enter input string :ababa
String not accepted

```

The Windows taskbar at the bottom shows the system clock as 21:26 on 30-07-2021, with a temperature of 34°C and various system icons.

The image displays two screenshots of the Programiz Online C Compiler interface, showing a C program that recognizes strings ending with two identical characters.

**Top Screenshot:**

- Code:**

```
1 #include<stdio.h>
2 void main(){
3     int state=0,i=0;
4     char current,input[20];
5     printf("Enter input string \t :");
6     scanf("%s",input);
7     while((current=input[i++])!='\0'){
8         switch(state)
9         {
10            case 0: if(current=='a')
11                    state=1;
12                    else if(current=='b')
13                    state=2;
14                    else
15                    {
16                        printf("Invalid token");
17                        exit(0);
18                    }
19            case 1: if(current=='a')
20                    state=0;
21                    else if(current=='b')
22                    state=3;
23                    else
24                    {
25                        printf("Invalid token");
26                        exit(0);
27                    }
28            case 2: if(current=='a')
29                    state=0;
30                    else if(current=='b')
31                    state=1;
32                    else
33                    {
34                        printf("Invalid token");
35                        exit(0);
36                    }
37            case 3: if(current=='a')
38                    state=2;
39                    else if(current=='b')
40                    state=0;
41                    else
42                    {
43                        printf("Invalid token");
44                        exit(0);
45                    }
46        }
47    }
```
- Output:**

```
/tmp/Q3wmYPugb5.o
Enter input string :aabb

String accepted
```

**Bottom Screenshot:**

- Code:** (Same as the top screenshot)
- Output:**

```
/tmp/Q3wmYPugb5.o
Enter input string :aaabbb
String not accepted
```

## 2. Implementation of Language recognizer for a set of all strings ending with two symbols of the same type.

Code:

```
#include<stdio.h>
void main()
{
int state=0,i=0;
char token,input[20];
printf("Enter input string: ");
scanf("%s",input);
while((token=input[i++])!='\0')
{
switch(state)
{
case 0: if(token=='a')
state=1;
else if(token=='b')
state=3;
else
{
printf("token is invalid");
exit(0);
}
break;
case 1: if(token=='a')
state=2;
else if(token=='b')
state=3;
else
{
printf("token is invalid");
exit(0);
}
break;
case 2: if(token=='a')
state=2;
else if(token=='b')
state=3;
else
{
```

```

printf("token is invalid");
exit(0);
}
break;
case 3: if(token=='a')
state=1;
else if(token=='b')
state=4;
else
{
printf("token is valid");
exit(0);
}
break;
case 4: if(token=='a')
state=1;
else if(token=='b')
state=4;
else
{
printf("token is invalid");
exit(0);
}
break;
}
}
if(state==2 || state==4)
printf("\nString is accepted");
else
printf("String is not accepted");
}

```

### Test Cases:

Input	Expected Output
-------	-----------------

aaba	String is not accepted
aaa	String is accepted
bb	String is accepted
bbab	String is not accepted
aacd	Token is valid

Online C Compiler

https://www.programiz.com/c-programming/online-compiler/

Programiz C Online Compiler

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main.c

```

43 state=1;
44 else if(token=='b')
45 state=4;
46 else
47 {
48 printf("token is valid");
49 exit(0);
50 }
51 break;
52 case 4: if(token=='a')
53 state=1;
54 else if(token=='b')
55 state=4;
56 else
57 {
58 printf("token is invalid");
59 exit(0);
60 }
61 break;
62 }
63 }
64 if(state==2 || state==4)
65 printf("\nString is accepted");
66 else
67 printf("String is not accepted");
68 }
69

```

Run

Output

Clear

```

/tmp/Q3wmYPugb5.o
Enter input string: abcd
token is valid

```

Type here to search

34°C

21:30

30-07-2021

Online C Compiler x +

https://www.programiz.com/c-programming/online-compiler/

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Learn Python App

main.c

```
43 state=1;
44 else if(token=='b')
45 state=4;
46 else
47 {
48 printf("token is valid");
49 exit(0);
50 }
51 break;
52 case 4: if(token=='a')
53 state=1;
54 else if(token=='b')
55 state=4;
56 else
57 {
58 printf("token is invalid");
59 exit(0);
60 }
61 break;
62 }
63 }
64 if(state==2 || state==4)
65 printf("\nString is accepted");
66 else
67 printf("String is not accepted");
68 }
69 }
```

Run

Output

Clear

/tmp/Q3wmYPugb5.o  
Enter input string: aaba  
String is not accepted

Type here to search

34°C 21:30 30-07-2021

Online C Compiler x +

https://www.programiz.com/c-programming/online-compiler/

Programiz C Online Compiler

Hewlett Packard Enterprise INTELLIGENT DATA PLATFORM FROM HPE UNLOCK AGILITY UNLEASH THE POWER OF DATA. Learn Python App

main.c

```
43 state=1;
44 else if(token=='b')
45 state=4;
46 else
47 {
48 printf("token is valid");
49 exit(0);
50 }
51 break;
52 case 4: if(token=='a')
53 state=1;
54 else if(token=='b')
55 state=4;
56 else
57 {
58 printf("token is invalid");
59 exit(0);
60 }
61 break;
62 }
63 }
64 if(state==2 || state==4)
65 printf("\nString is accepted");
66 else
67 printf("String is not accepted");
68 }
69 }
```

Run

Output

Clear

/tmp/Q3wmYPugb5.o  
Enter input string: aaa  
String is accepted

Type here to search

34°C 21:30 30-07-2021