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 ∑={a,b} containing even number of a's and even number of b's

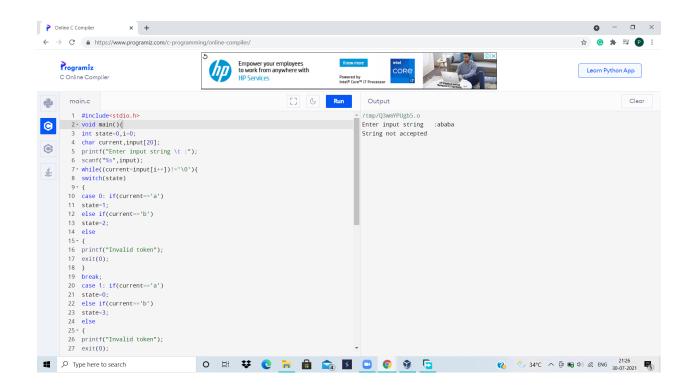**Code:**

```c
#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;
```

```c
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:

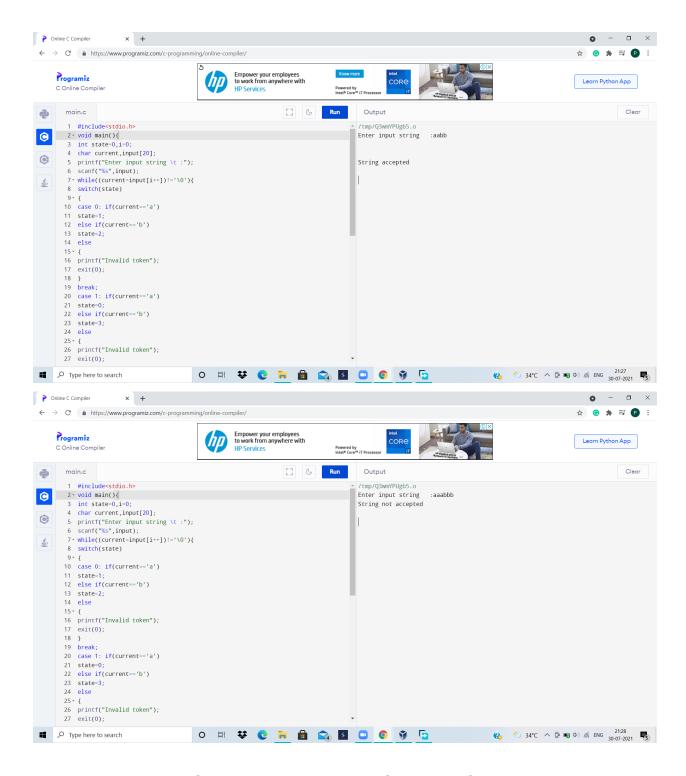| Input	Expected Output
ababa	String is not accepted
aabb	String is accepted
aaabbb	String is not accepted
bb	String is accepted
aa	String is accepted


```c
#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);
```

main.c   Run   Output   Clear

```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);
```

```
/tmp/Q3wmYPUgb5.o
Enter input string    :aabb

String accepted
```

main.c   Run   Output   Clear

```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);
```

```
/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:

```c
#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**


```
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  |
```

Output
/tmp/Q3wmYPUgb5.o
Enter input string: abcd
token is valid

main.c — Run — Output — Clear

```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
```

Output:
```
/tmp/Q3wmYPUgb5.o
Enter input string: aaba
String is not accepted
```

main.c — Run — Output — Clear

Output:
```
/tmp/Q3wmYPUgb5.o
Enter input string: aaa
String is accepted
```