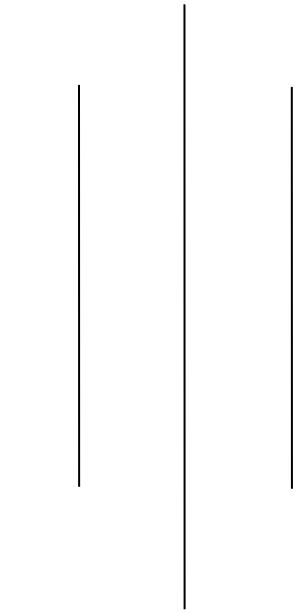

National College of Computer Studies

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Lab 3

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BSc. CSIT 4th Semester

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NCCS

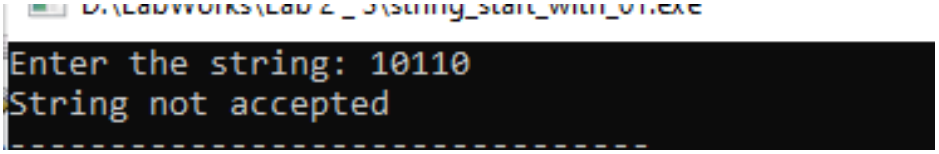
1. **WAP to design a DFA for the language of string over {0,1} such that each string start with 01**

```
#include <iostream>
#include <string>
using namespace std;
int main(){
   string str;     // string to be checked
   char state = 0; // initial state (q0)
   cout << "Enter the string: ";
   cin >> str;
   for (int i = 0; i < str.length(); i++)
   {
      if (str[i] != '0' && str[i] != '1')
      {
         cout << "String not accepted.\nPlease enter a string over {0,1}" <<
endl;
         return 0;
      }

      if (state == 0 && str[i] == '0')
         state = 1;
      else if (state == 0 && str[i] == '1')
         state = 3;
      else if (state == 1 && str[i] == '0')
         state = 3;
```

```
        else if (state == 1 && str[i] == '1')
            state = 2;
        else if (state == 2 && str[i] == '0')
            state = 2;
        else if (state == 2 && str[i] == '1')
            state = 2;
        else if ((state == 3 && str[i] == '0') || (state == 3 && str[i] == '1'))
            state = 3;
    }
    if (state == 2)
        cout << "String accepted";
    else
        cout << "String not accepted";


    return 0;
}
```



2. **WAP to design a DFA for the language of string over {0,1} such that set of all string ending in 00**

```
#include <iostream>
#include <string>
using namespace std;

int main()
{
   string str;
   char state = 0; // initial state (q0)
   cout << "Enter the string: ";
   cin >> str;
   for (int i = 0; i < str.length(); i++) {

      if (str[i] != '0' && str[i] != '1')
      {
         cout << "String not accepted.\nPlease enter a string over {0, 1}"
<< endl;
         return 0;
      }
      // dfa transition check
      if (state == 0 && str[i] == '0')
         state = 1;
      else if (state == 0 && str[i] == '1')
         state = 0;
      else if (state == 1 && str[i] == '0')
         state = 2;
      else if (state == 1 && str[i] == '1')
         state = 0;
      else if (state == 2 && str[i] == '0')
         state = 2;
      else if (state == 2 && str[i] == '1')
         state = 0;
   }
```

```
    if (state == 2)
        cout << "String accepted";
    else
        cout << "String not accepted";

    return 0;
}
```

```
Enter the string: 0010001
String not accepted
--------------------------------
```

```
Enter the string: 1000100
String accepted
```

3. **WAP to design a DFA for the language of string over {0,1} such that set of strings with 011 as a substring.**

```
#include <iostream>
#include <string>
using namespace std;
int main(){
    string str;
    char state = 0;
    cout << "Enter the string: ";
    cin >> str;
    for (int i = 0; i < str.length(); i++) {
        if (str[i] != '0' && str[i] != '1') {
            cout << "String not accepted.\nPlease enter a string over {0,1}" << endl;
            return 0;
        }
        if (state == 0 && str[i] == '0')
            state = 1;
        else if (state == 0 && str[i] == '1')
            state = 0;
        else if (state == 1 && str[i] == '0')
            state = 1;
```

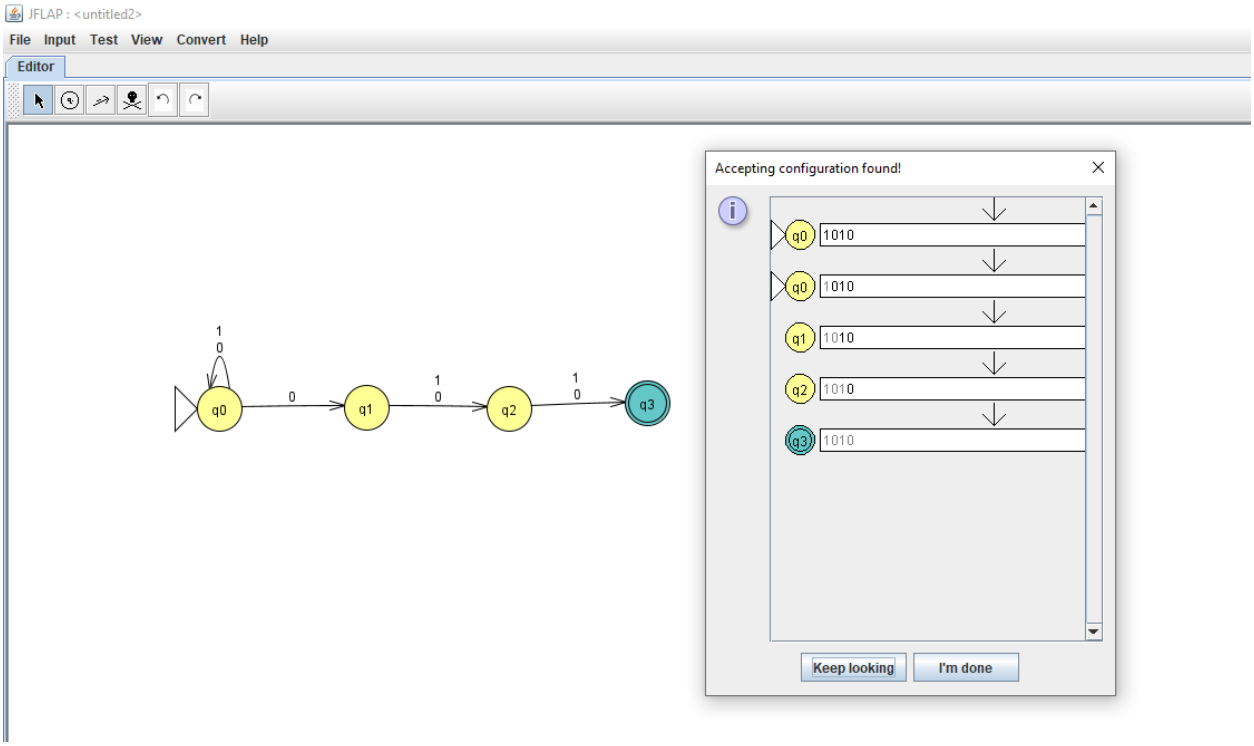
```
        else if (state == 1 && str[i] == '1')
            state = 2;
        else if (state == 2 && str[i] == '0')
            state = 1;
        else if (state == 2 && str[i] == '1')
            state = 3;
        else if (state == 3 && str[i] == '0')
            state = 3;
        else if (state == 3 && str[i] == '1')
            state = 3;  }
    if (state == 3)
        cout << "String accepted";
    else
        cout << "String not accepted";


    return 0;
}
```

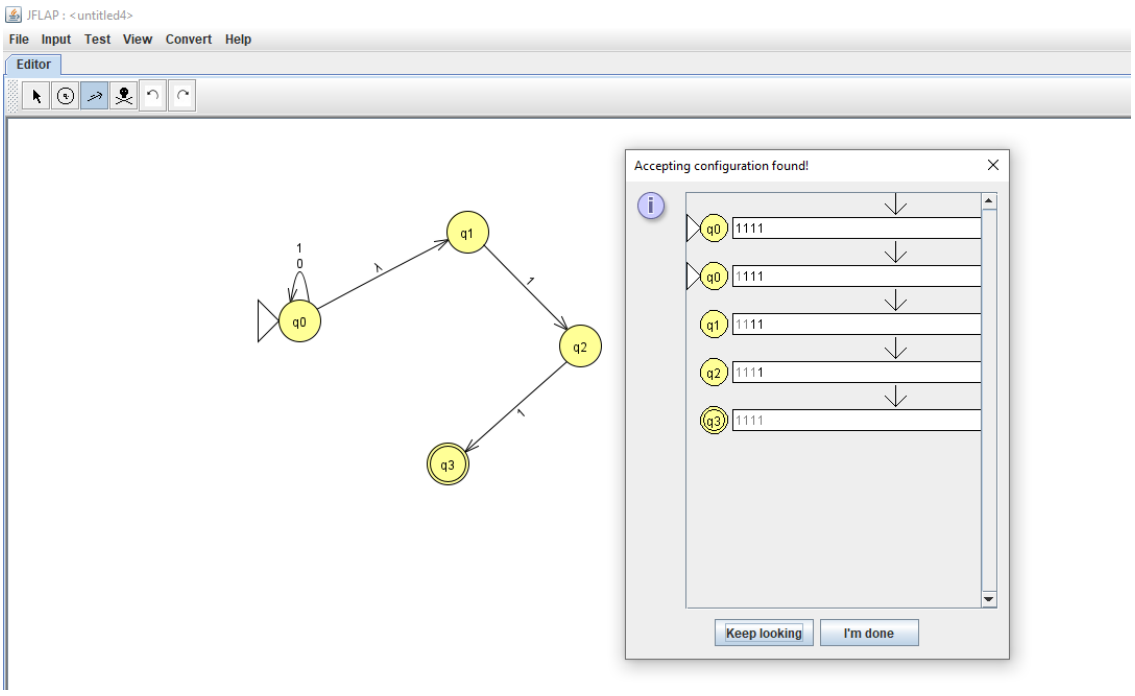
```
Enter the string: 1011011
String accepted
```

```
Enter the string: 111101
String not accepted
--------------------------------
```

4 Construct a nfa over alphabet ∑={0,1} that accepts string whose 3rd last element is 0.



5 Construct E-NFA over alphabet ∑={0,1} that accepts string ending with 11.



6

Construct E-NFA over alphabet ∑={0,1} that accepts string that has substring bb.