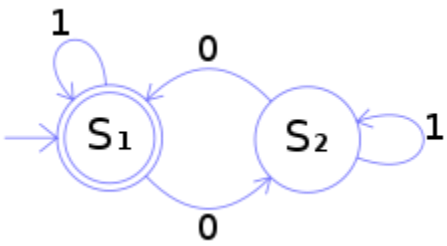
Deterministic Finite Automaton: a finite-state machine that accepts or rejects a given string of symbols, by running through a state sequence uniquely determined by the string.[wiki]

Example: Imagine a program that checks whether text consisting of either 1s or 0s has an even or odd number of zeros.



We begin in State 1 as having an even count of zeros (zero is an even number).

If while in State 1 we read-in a zero, we switch states to State 2.
If while in Sate 1 we read in a 1, we keep our state as State 1.

If while in State 2 we read in a 1 we keep our current state.
If while in State 2 we read in a zero, we switch our state to State 1.

Once the file has been completely read, If we finish in State 1, there was an even number of zeros, otherwise if we finish in State 2, there was an odd number of zeros.

We may use case construct to put together a DFA and I have shared the code to do so in the three languages of Turing, Java and Python.

Case construct Turing:

```
% dfa

var c : char
var inputFileNo : int

open : inputFileNo, "input.txt", get

var state : string := "even"

loop
   exit when eof (inputFileNo)
   get : inputFileNo, c

   case state of
      label "even" :
         if c = '0' then
            state := "odd"

         elsif (c = '1') then
            state := "even"
         end if
      label "odd" :
         if (c = '0') then

            state := "even"
         elsif (c = 'Z') then
            state := "odd"
         end if
   end case
end loop

if state = "even" then
   put "even"
else
   put "odd"
end if
```

#Case Construct Python[1]

```
fileVar = open("input.txt", "r")
f = open("output.txt", "a")
# f.write("Now the file has more content!")

def even(c):
   global state
   if (c== '0'):
      state = 2
   elif (c=='1'):
      state = 1
   return
def odd(c):
   global state
   if (c=='0'):
      state = 1
   elif (c=='1'):
      state = 2
   return

def unknownAction(c):
   print("unknownAction")
   return

myCases = {1: even, 2: odd}

state = 1 #to start things off
def switch(state):
   return myCases.get(state, unknownAction)

for line in fileVar:
   for char in line:
      switch(state)(char)

      #jupyter notebook
if (state == 1):
   print("even")
else:
   print("odd")
fileVar.close()
f.close()
```

[1] https://replit.com/@andrewJJimenez/sourcePython#main.py

```
//Java[2]
import java.io.File;
import java.io.FileReader;
import java.io.FileWriter;
import java.io.IOException;

public class jan3 {

   public static void main(String[] args) {
      String state = "even";
      File file = new File("input.txt");

      try (FileReader fr = new FileReader(file)) {

         int character;
         char c;

         while ((character = fr.read()) != -1) {

            c = (char) character;

            switch (state) {
               case "even":
                  if (c == '0') {
                     state = "odd";
                  }//if
                  else if (c == '1') {
                     state = "even";
                  }//else if
                  break;
               case "odd":
                  if (c == '0') {

                     state = "even";
                  }//if
                  else if (c == '1') {
                     state = "odd";
                  }//else if
                  break;

               default: //state = "Invalid";
                  break;
               }//case (switch)

            }//while loop
         } catch (IOException e) {
            e.printStackTrace();//this is for the file
read-in (try FileReader)
         }

         if (state == "even") {
            System.out.println("even");
         } //if stmt
         else
            System.out.println("odd");


      }//main

}//class
```

[2] https://replit.com/@andrewJJimenez/javaSource#input.txt