problem 25

Find (by inspection) a regular expression for the set of binary strings containing exactly one occurrence of 01.

solution 25

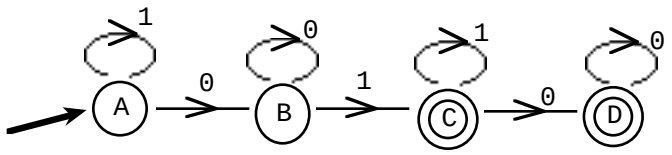
A regular expression is 1* 0* 0 1 1* 0*

1* 0 0* 1 1* 0* works also because 00* is the same set of strings as 0*0.

Why?
Must include a 01.
Before the 01 there can be 1's followed by 0's
(in that order only, to make sure you don't get another 01)

After the 01 there can be 1's followed by 0's (in that order)
Hence 1* 0* 0 1 1* 0*

Also you can look at the FSM from #24



Here's how a string reaches one of the two accepting states:

Can start out by hanging around in A. So string can begin with 1*
Must get to B but then can hang around in B.
String continues with 00* (or 0*0)

Must get to C. String continues with a 1
Can hang around in C Continue with a 1*
Can continue on to D and hang around there 0*

Put it together and you get 1* 00* 1 1* 0*