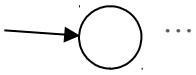
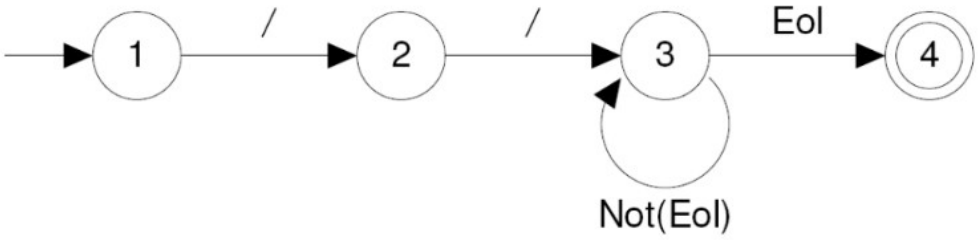
1. Given a partial regular expression (RE) for the new language to be designed, please draw the finite automaton (FA) for the following RE, which is commonly used to represent the single-line comment in Java and C++. **Note:** EOL refers to ***end of the line*** character, Not(), and * are the RE meta-characters/operations. You can use EOL in your drawn FA. (2pt)

   RE for single-line comment: //Not(EOL)*EOL



Solution:



State	Character				
	/	Eol	a	b	. . .
1	2				
2	3				
3	3	4	3	3	3
4					

2. Is your drawn FA a deterministic or non-deterministic FA? Why?
   NOTE: Please use the knowledge that you learned in our course (i.e., Chapter 3. Theory and Practice of Scanning, Crafting a Compiler; our textbook) to answer this question. (1pt)

Solution:

Yes. It is DFA since FAs that contain no λ transitions and that always have unique successor states for **any symbol** are deterministic.

3. Please write the pseudo-code of the **explicit control based scanner** to recognize the RE defined in Problem 1. (2pt)

Solution:

```
/* Assume CurrentChar contains the first character to be scanned */
if CurrentChar = '/'
then
    CurrentChar ← READ( )
    if CurrentChar = '/'
    then
        repeat
            CurrentChar ← READ( )
        until CurrentChar ∈ { Eol, Eof }
    else /* Signal a lexical error */
else /* Signal a lexical error */
if CurrentChar = Eol
then /* Finished recognizing a comment */
else /* Signal a lexical error */
```