

Write your answers on another sheet of paper. Homework assignments are to be completed **individually**. Hand-written submissions are fine, but they must be readable. Due at the beginning of class. Total points: 20

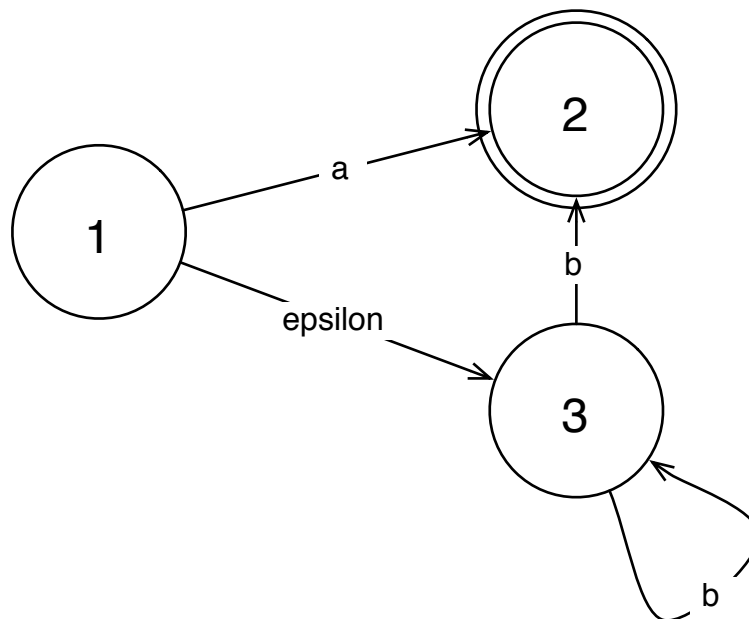
1. [5 Points] Regular Expressions.

Describe the set of strings generated by the following regular expression:

$$(a \mid b)^+ c^*$$

2. [5 Points] NFA to DFA conversion

Convert the following non-deterministic finite automata into the equivalent deterministic finite automata. Also, write the equivalent regular expression.



3. [5 Points] Context free grammar

Write the context-free grammar for balanced parentheses.

4. [5 Points] Run-time stack

Given the following definition of the function fact():

```
int fact( int x ) {  
    if ( x == 1 ) { return 1; }  
    else { return x * fact(x-1); }  
}
```

draw the run-time stack at its deepest during the call fact(3).