CS 442/542 Fall 2020 Quiz 2   Name:_____

1. Systems that implement regular expressions (such as flex) often have operators that make writing regular expressions easier. In the following are some examples of these operations. For each item write a regular expression that uses only the basic operations I showed in the lecture (concatenation RS, union R|S and closure R*) as translations of the operations shown below. In the following the alphabet is {0,1,2,3,4,5,6,7,8,9}

a. 1+ is a regular expression that specifies the language {x | x is a sequence one or more 1s}

b. [2-5] is a regular expression that specifies the language {2, 3, 4, 5}.

c. [1-3]{2,} is a regular expression that specifies the language {x | x is a string consisting of any combination of 1, 2 or 3s that is at least 2 characters long}. Some example strings are 11, 232, 3333, 12, 321, ...

d. [^1-5]+ is a regular expression that specifies the language {x | x is a string containing characters 6, 7, 8 or 9 that is at least 1 character long}

2. Create an NFA for the regular expression (1*01*0)*.