



Theoretical Computer Science
CS 395 - HBD1
Department of Physics and Computer Science
Medgar Evers College
Exam 2

Instructions:

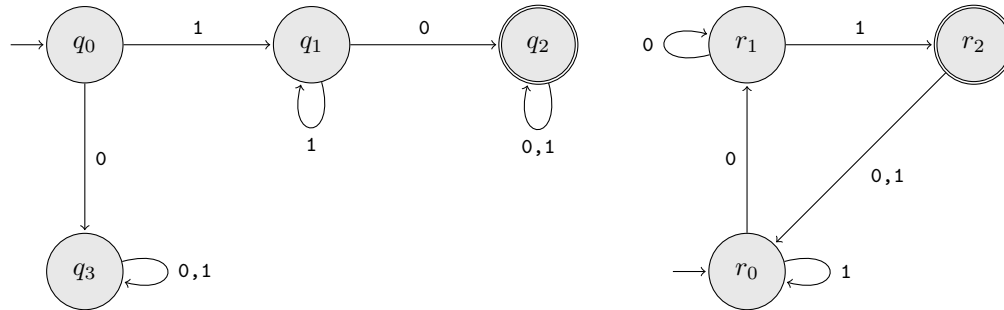
- The exam requires completing a set of tasks within 80 minutes.
- Write your solutions in the blue book provided.
- The definition of DFAs and NFAs must be formal to receive full credit when required.
- Notes are not allowed.
- Cheating of any kind is prohibited and will not be tolerated.
- Violating and/or failing to follow any of the rules will result in an automatic zero (0) for the exam.

TO ACKNOWLEDGE THAT YOU HAVE READ AND UNDERSTOOD THE INSTRUCTIONS ABOVE,
PRINT YOUR NAME AND THE DATE ON YOUR SUBMISSIONS

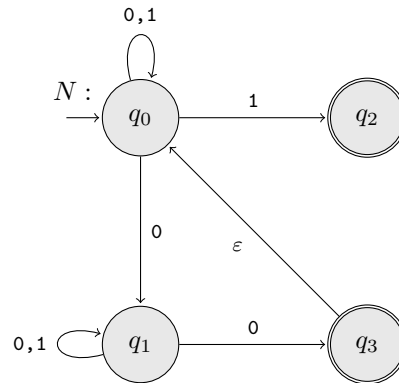
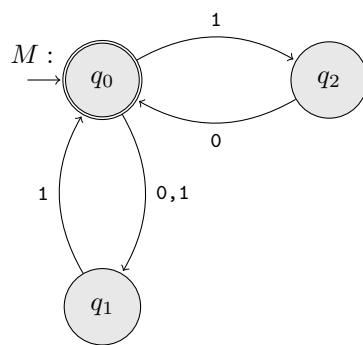
Grading

Section	Maximum Points	Points Earned
1	4	
2	4	
3	3	
4	4	
5	5	
Total	20	

1. Given that the languages, L_1 and L_2 , are recognized by the DFAs M and N below respectively, construct the NFA that recognizes the language $(L_1 \cup L_2)^*$.



2. For each string listed, determine whether each NFA accepts the string. Clearly justify your answer by providing a proof or disproof.



a. 1001

b. 11110

c. 1101

d. 11100

3. For each regular expression, provide a list containing 3 members and 2 non-members of its language that must include the shortest member. For all languages, $\Sigma = \{0,1\}$.

a. $1^+0^*1^*0^+$

b. $(1(11)^* \cup (00)^*)\Sigma$

c. $(\Sigma\Sigma 1)^* \cup 0^*$

d. $\Sigma(01^+)^*$

e. $1\Sigma 1\Sigma^*0\Sigma 0$

f. $(\Sigma\Sigma)^*1 \cup \Sigma(\Sigma\Sigma)^*0$

4. For any regular expression from Question 3, construct a DFA that recognizes its language.

5. Generate the regular expression that is equivalent to the DFA below. Each GNFA definition needs to be provided to receive full credit.

