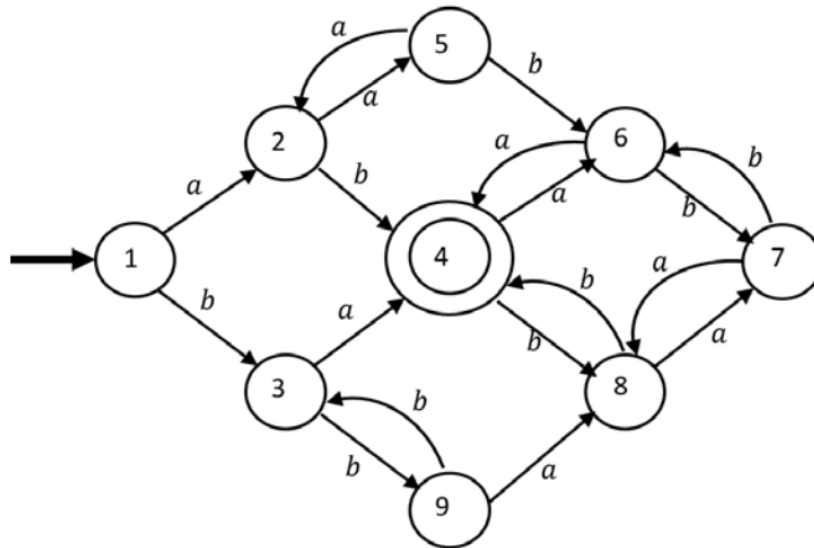


Aughdon Breslin and Isabella Cruz

"I pledge my honor that I have abided by the Stevens Honor System."

### Problem 1

- a) (20 points) Apply the DFA minimization algorithm to the DFA shown below. Show the matrix of distinguishable pairs of states after each iteration of the loop.

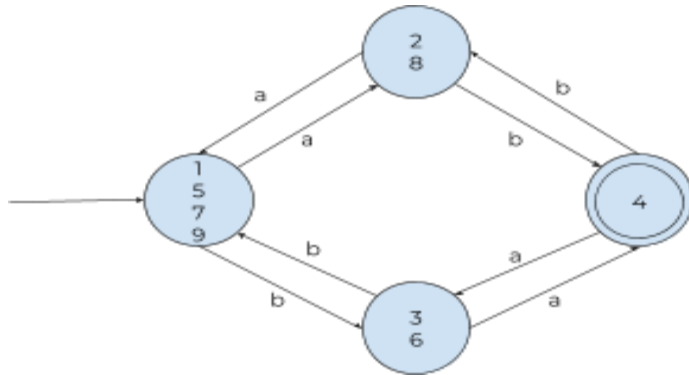


1. ✓ = pair is distinguishable after the first iteration of the algorithm  
 2. = distinguishable after the second iteration, 3. = after third, and so on.  
 Unmarked pairs (in red) are indistinguishable, or equivalent.

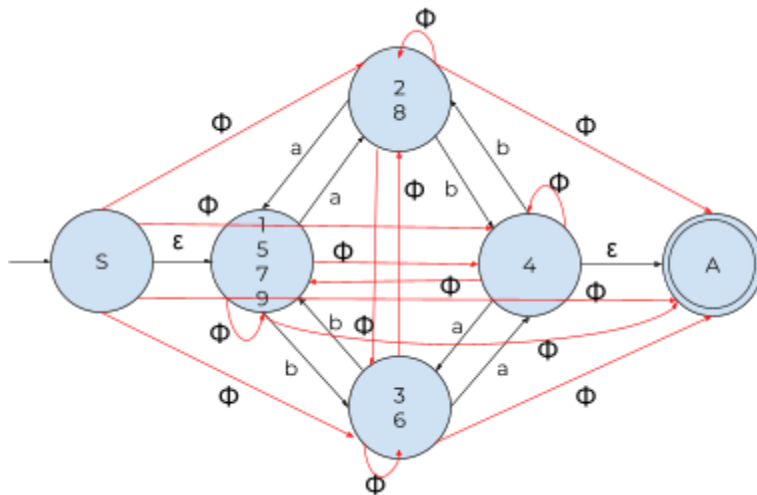
	1	2	3	4	5	6	7	8	9
1		2. ✓	2. ✓	1. ✓		2. ✓		2. ✓	
2			2. ✓	1. ✓	2. ✓	2. ✓	2. ✓		2. ✓
3				1. ✓	2. ✓		2. ✓	2. ✓	2. ✓
4					1. ✓	1. ✓	1. ✓	1. ✓	1. ✓
5						2. ✓		2. ✓	
6							2. ✓	2. ✓	2. ✓
7								2. ✓	
8									2. ✓
9									

- b) (10 points) Give a regular expression for the language of the DFA in part (a). Show the GNFA at each iterative step in the conversion.

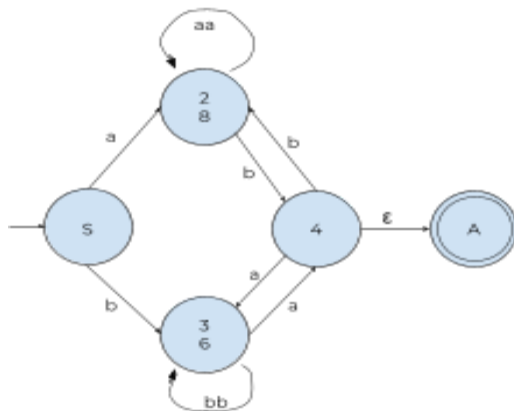
Reduced DFA:



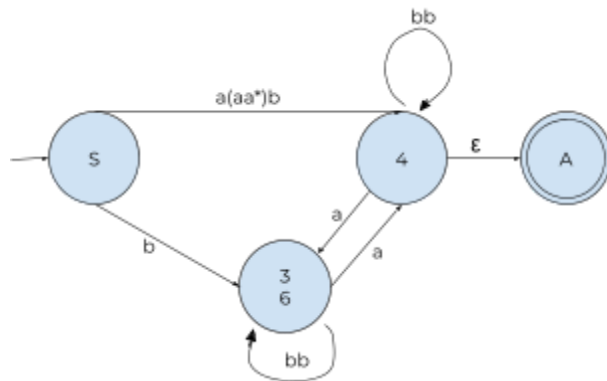
GNFA:



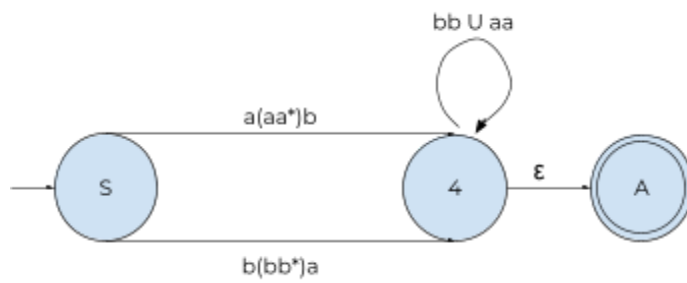
RIP (1 5 7 9):



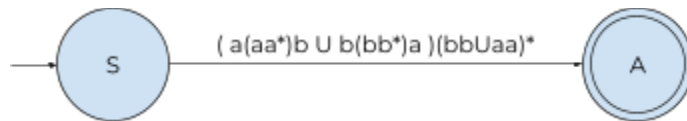
RIP (2 8):



RIP (3 6):



RIP 4:



**REGULAR EXPRESSION:**  $(a(aa^*)b \cup b(bb^*)a)(bb \cup aa)^*$