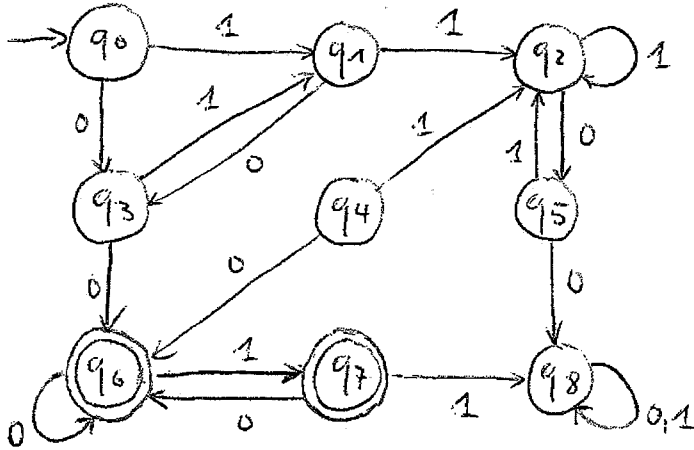


STATE MINIMIZATION

18/12/2009
E9.1

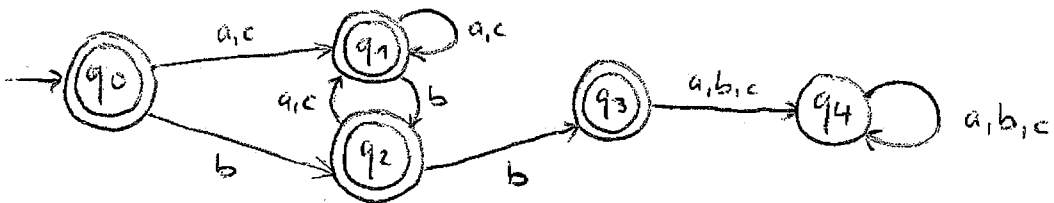
EXERCISE 1

Minimize the following DFA.



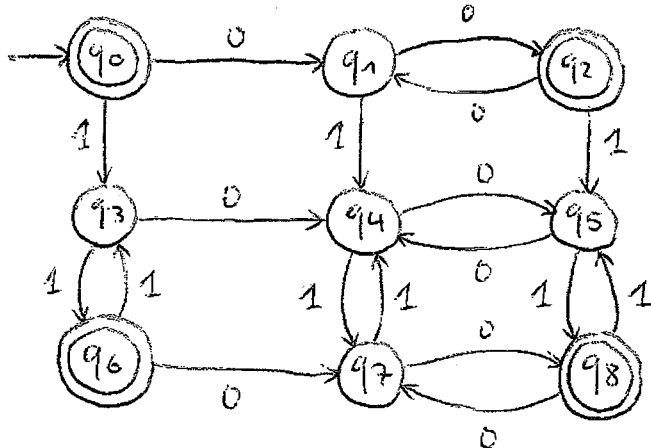
EXERCISE 2

Minimize the following DFA.



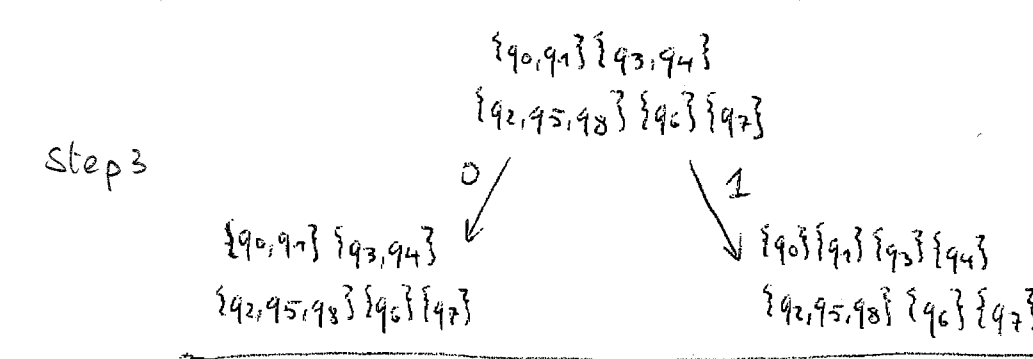
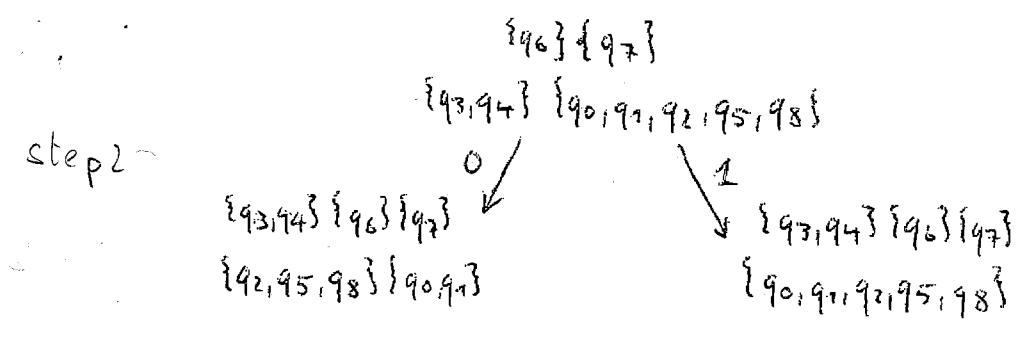
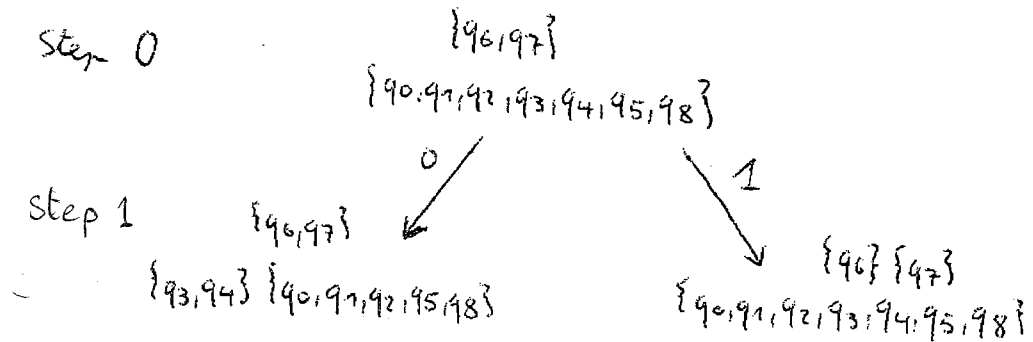
EXERCISE 3

Minimize the following DFA.



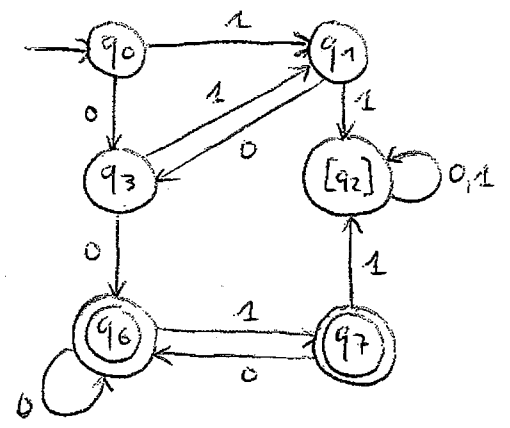
SOLUTIONS (18/12/2008)

1) We start with the following initial partition:
 $C_1 = F = \{q_6, q_7\}$ and $C_2 = Q - F = \{q_0, q_1, q_2, q_3, q_4, q_5, q_8\}$.



Final partition: $\{q_0\} \{q_1\} \{q_2, q_5, q_8\} \{q_3\} \{q_4\} \{q_6\} \{q_7\}$

The minimized automaton looks as follows:



Note: q_4 is not reachable, thus it has been omitted from the minimized automaton

1)

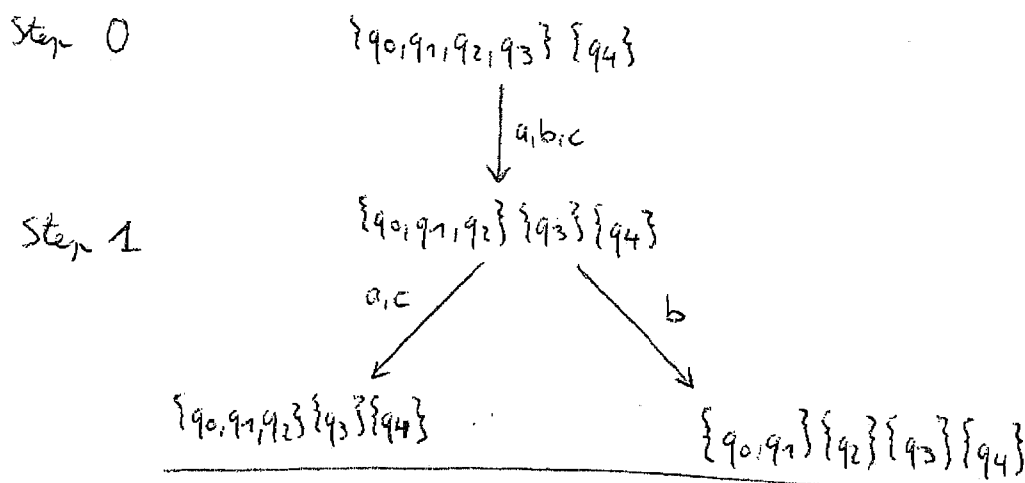
1	3							
2	2	2						
3	1	1	1					
4	1	1	1	3				
5	2	2		1	1			
6	0	0	0	0	0	0		
7	0	0	0	0	0	0	1	
8	2	2		1	1		0	0
	0	1	2	3	4	5	6	7

2)

1				
2	2	2		
3	1	1	1	
4	0	0	0	0
	0	1	2	3

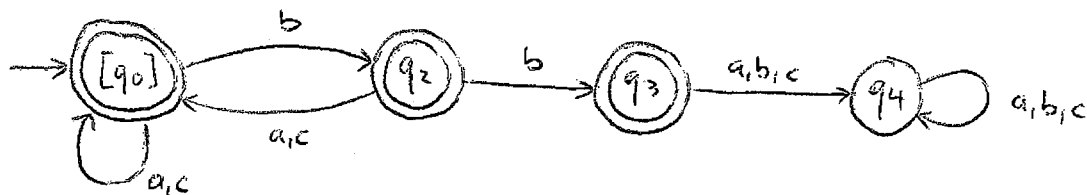
2) Initial partition:

$$C_1 = \{q_0, q_1, q_2, q_3\}, C_2 = \{q_4\}$$



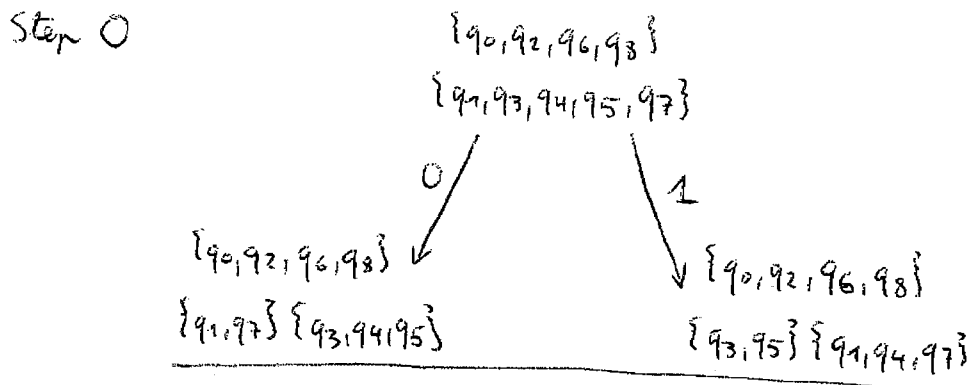
Final partition: $\{q_0, q_1\} \{q_2\} \{q_3\} \{q_4\}$

The minimized automaton looks as follows:



3) Initial partition:

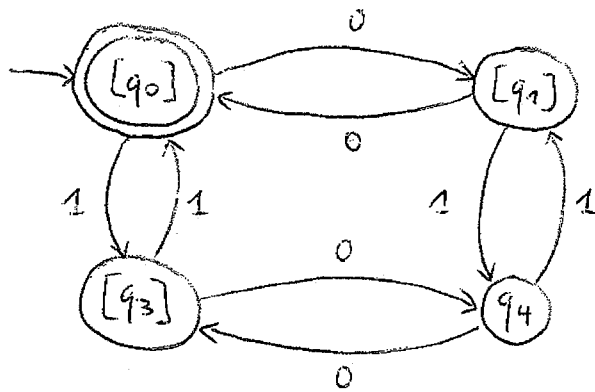
$$C_1 = \{q_0, q_2, q_6, q_8\}, C_2 = \{q_1, q_3, q_4, q_5, q_7\}$$



Final partition: $\{q_0, q_2, q_6, q_8\} \{q_1, q_7\} \{q_3, q_5\} \{q_4\}$

3) con't

The minimized automaton looks as follows:



Alternative solution:

One could first minimize the automata A_1^* and A_2^* of the last exercise in E8 (12/12/2008) and then apply the so-called product construction

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