Question 1:  [3 points]
Find a regular expression for each of the following languages over the alphabet $\Sigma = \{0, 1\}$:

a) $L = \{ x \in \Sigma^* \mid x$ begins and ends with 0 $\}$

b) $L = \{ x \in \Sigma^* \mid$ no consecutive 1’s appear in x $\}$

c) $L = \{ x \in \Sigma^* \mid 1$ appears twice in x and only after a 0 $\}$

Question 2:  [3 points]
Find a deterministic finite automaton equivalent to the following non-deterministic one by first eliminating $\Lambda$-transitions and then by using the powerset construction. Label the state of the deterministic automaton so as to make it clear how they are obtained from the powerset construction.

[Diagram of non-deterministic finite automaton]

Question 3:  [2 points]
Find a non-deterministic finite automaton with $\Lambda$-transitions accepting the same language as the one denoted by the regular expression $(a + aab)^*b$ using the construction described in class.

Question 4:  [2 points]
Calculate the a-derivative and the a-partial derivative of $(a + aab)^*b$.

The final score is given by the sum of the points obtained.

Return your homework solution to Sander van Rijn (svr003@gmail.com). The deadline is on Tuesday October 21, 2014. This deadline is strict, thus homework solutions sent after the deadline will not be considered.

Remember to write in your solution your name, surname and student number.