LOGIC & AUTOMATA — HOMEWORK 1

Due: Tuesday 2 February, 3pm

Write first-order formulae defining the following regular languages over the alphabet $\Sigma = \{a, b\}$.

1. $(a + b)^+ \cdot a$ (1 mark)

2. $a^* b^*$ (1 mark)

3. Write an MSO formula defining the following regular languages over the alphabet $\Sigma = \{a, b\}$:

$$\left((aa)^*(bb)^*\right)^*$$ (2 marks)

4. What is an existential MSO formula that is equivalent to the following:

$$\forall X \forall Y \left(\forall x (X(x) \wedge Y(x) \rightarrow P_a(x))\right)$$ (1 mark)