- These problem sets are not graded. However students are strongly encouraged to solve these problems and submit solutions for feedback.

- Submissions shall be accepted till Friday, 14th February (♥) 2020 for feedback. Feel free to contact the TA in case of any doubts.

Let $\{p, q\}$ be the set of propositions.

1. Write LTL formulae to express the following:

    (a) At every even position p holds and at every odd position $\neg p$ holds.

    (b) Every p is eventually, but not immediately, followed by a q.

2. Consider the following LTL or MSO formulae:

    φ_1 $\mathsf{FG}\, p \to \mathsf{GF}\, p$

    φ_2 $\mathsf{GF}\, p \to \mathsf{FG}\, p$

    φ_3 $\mathsf{FG}(p \to \mathsf{GF}\, p)$

    φ_4 $\mathsf{GF}(p \to \mathsf{FG}\, p)$

    φ_5 $\exists X\, (\forall x\, (x \in X \to (\exists y\, y \in X \wedge x > y))) \wedge (\forall x\, (x \in X \to p(x)))$

    For each pair φ_i, φ_j from the above list, decide how L_{φ_i} and L_{φ_j} compares. Are they equal, one contained in the other, disjoint, or intersecting? Prove your claims.