Problem 1
Prove that the following language is undecidable:

\[ L_1 = \{ \langle M_1, M_2, M_3 \rangle \mid L(M_1) \cup L(M_2) = L(M_3) \} \]

Problem 2
Prove that the following language is undecidable:

\[ L_2 = \{ \langle M \rangle \mid M \text{ does not accept any string beginning with 1} \} \]

Problem 3
Prove that \( \overline{A_{TM}} \leq_m L_2 \).