1. Consider two sets of FDs \( F = \{ A \rightarrow C, AC \rightarrow D, E \rightarrow AD, E \rightarrow H \} \) and \( G = \{ A \rightarrow CD, E \rightarrow AH \} \)
   a. (25 pts.) Apply Armstrong axioms to prove that \( F \) implies \( G \)
   b. (25 pts.) Compute attribute closures with respect to \( G \) to show that \( G \) implies \( F \)
      (Thus, \( F \) and \( G \) are equivalent)

2. (25 pts.) Consider relation \( R(A, B, C, D, E) \) with FDs \( AB \rightarrow C, A \rightarrow D, D \rightarrow E, AC \rightarrow B \). Compute \( \{A, B\}^+ \) and \( \{A, C\}^+ \). What can we conclude from \( \{A, B\}^+ \) and \( \{A, C\}^+ \)?

3. (25 pts.) Consider the relation \( R(A, B, C, D) \) with the following set of functional dependencies:
   \[ \{ A \rightarrow B, BC \rightarrow D, A \rightarrow C \} \]
   a. Identify the candidate key(s)
   b. Is \( R \) in 3NF?
   c. Decompose \( R \) into BCNF relations that preserve the dependencies