This exercise continues our study of relational design theory, focusing on multivalued dependencies and 4NF, along with a bit of recursive SQL.

1. List the members of your group below. Underline your name.

2. Provide the smallest possible instance of a relation that violates the multivalued dependency $AB \rightarrow\rightarrow CD$.

3. Decompose, as needed, the schema of Question 2 to 4NF.
4. Given a table `Edges(src, dst, color)` that encodes edges of a connected directed graph with colors as edge labels, write a recursive SQL query for pairs of vertices \((a, b)\) such that there is a directed path composed of all red edges from \(a\) to \(b\) but no directed path from \(b\) to \(a\).

5. State Armstrong’s Axioms for functional dependencies and prove their soundness from first principles.