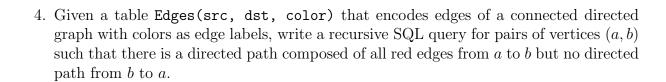This exercise continues our study of relational design theory, focusing on multivalued dependencies and 4NF, along with a bit of recursive SQL.

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 $AB \twoheadrightarrow CD$.

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.