Using relational theory and normalization, show how you would store information in datasets for the following situations. You must draw rectangles for the datasets (tables) and list the minimum required fields (columns). You must draw lines between keys that are used for joining separate tables. Example:

*In a medical database, we need to know which doctor, nurse or technician has taken care of which patients at specific times.*

*PERSONNEL*

**Staff-ID**

1:1 info about staff

*PATIENT*

**Patient-ID**

1:1 info about patient

*PERSONNEL-PATIENT INTERACTIONS*

**Staff-ID**

**Patient-ID**

Start

End

Other info in 1:1 relation to interaction

1. An engineering firm needs to track which part was used in which system.

2. A grocery store must know how many units of each product they stock was sold at any time.

3. A police force needs to track all cases in which any officer was involved as well as the identity of all suspects in a specific case.

4. A school must have full information on which instructor taught which section of any course in any semester and the identities and results for all students in each section.

5. The Department of Motor Vehicles needs to be able to know immediately exactly which car(s) a driver owns.

6. A financial-investment firm wants to be able to calculate exactly how much money was in any specific investment account for a client at any time since the client started using their services. The clients may have any number of investment accounts with the firm. Use a normalized design.

7. For the problem above, show how you might *denormalize* the design to speed up access to the total of all investments by a specific client at any time.