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Database Systems – Lab 9

1. Functional Dependencies:

People
P_ID → First Name, Last Name, Date of Birth

Engineers
P_ID → Highest Degree Earned, Favorite Video Game

Flight Control Operators
P_ID → Chair Preference, Favorite Drink, Hangover Cure

Astronauts
A_ID → Years Flying, Spouse Name

Crew
SP_ID & P_ID (simply tells us who was on what spacecraft)

Spacecraft
SP_ID → Name, Tail Number, Weight (Tons), Fuel Type, Crew Capacity

Systems
System_ID → System Name, Description, CostUSD
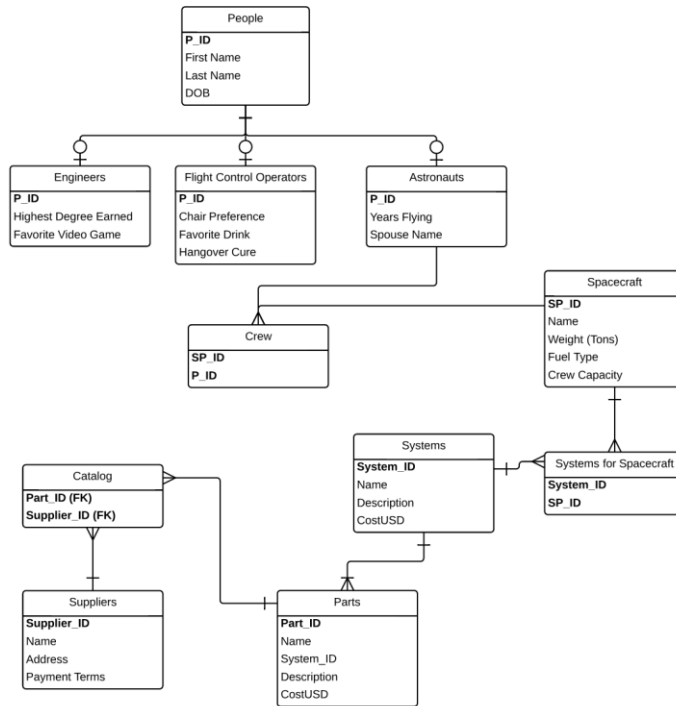
Systems for Spacecraft
System_ID & SP_ID

Parts
Part_ID → Part Name, System_ID , Description, CostUSD

Suppliers
Supplier_ID → Name, Address, Payment Terms

Catalog
Part_ID & Supplier_ID

People
- P_ID
- First Name
- Last Name
- DOB

Engineers
- P_ID
- Highest Degree Earned
- Favorite Video Game

Flight Control Operators
- P_ID
- Chair Preference
- Favorite Drink
- Hangover Cure

Astronauts
- P_ID
- Years Flying
- Spouse Name

Crew
- SP_ID
- P_ID

Spacecraft
- SP_ID
- Name
- Weight (Tons)
- Fuel Type
- Crew Capacity

Systems
- System_ID
- Name
- Description
- CostUSD

Systems for Spacecraft
- System_ID
- SP_ID

Catalog
- Part_ID (FK)
- Supplier_ID (FK)

Suppliers
- Supplier_ID
- Name
- Address
- Payment Terms

Parts
- Part_ID
- Name
- System_ID
- Description
- CostUSD

2.
3. This ER Diagram is in first normal form, because each set of columns has a unique atomic value, there are no multiple values. In addition, each of the rows are unique. Furthermore, the diagram is in second normal form because one, it is in first normal form, but also there are no partial dependencies. In each of the entities, all of the fields that contain attributes are functionally dependent on its primary key (or in some cases the primary composite key), only the primary key, and nothing but the primary key. Lastly, the diagram must be in third normal form. The first requirement is for it to be in second normal form which we have. The second requirement that this diagram must not contain any multiple dependencies within each entity. We look at any transitive dependencies, where we can see that the only candidate key within each entity is the primary key. No other fields within the strong entities could possibly be the primary key. From what I can tell, the ER diagram above is in third normal form.