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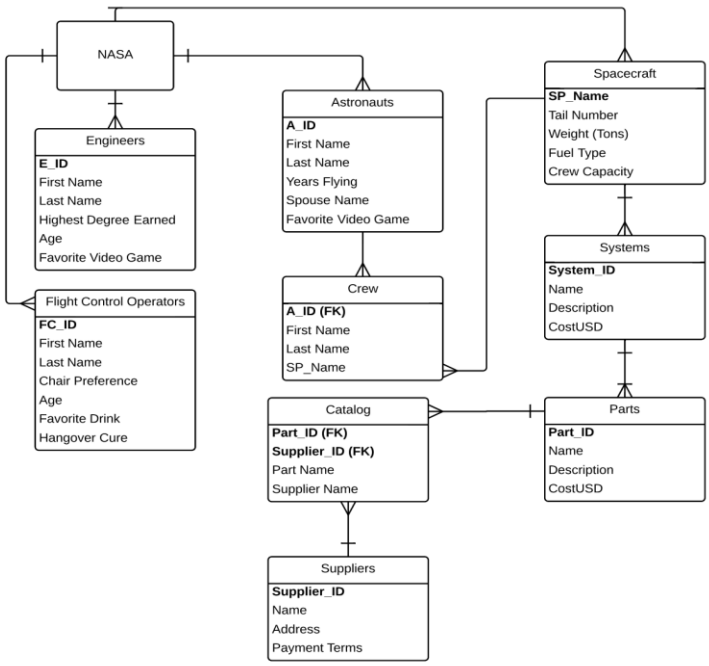
Database Systems – Lab 9

1. Functional Dependencies:

Engineers
First & Last Name → Highest Degree Earned, Age, Favorite Video Game
Flight Control Operators
First & Last Name → Chair Preference, Age, Favorite Drink, Hangover Cure
Astronauts
A_ID → First Name, Last Name, Years Flying, Spouse Name
Crew (suptype of astronauts)
**Note: there are no primary keys within this field, only foreign
A_ID → First Name, Last Name, Spacecraft Name
Spacecraft
Spacecraft Name → Tail Number, Weight (Tons), Fuel Type, Crew Capacity
Systems
System_ID → System Name, Description, CostUSD
Parts
Part_ID → Part Name, Description, CostUSD
Suppliers
Supplier_ID → Name, Address, Payment Terms
Catalog (subtype of suppliers and parts)
Part_ID & Supplier_ID → Part Name, Supplier Name



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.