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November 10, 2016

Part 1

Functional Dependencies:

PeopleID -> FirstName, LastName, Age

EngineerID -> HighestDegree, FavoriteVideoGame

FCOID -> ChairPreference, PreferredDrink, HangoverCure

AstronautID -> YearsFlying, GolfHandicap, SpouseName

SpacecraftID -> Name, TailNumber, WeightInTons, FuelType, CrewCapacity,

SystemID -> Name, Description, CostUSD

PartID -> Name, Description, CostUSD

SupplierID -> Name, Address, PaymentTerms

AstronautID, SpacecraftID ->

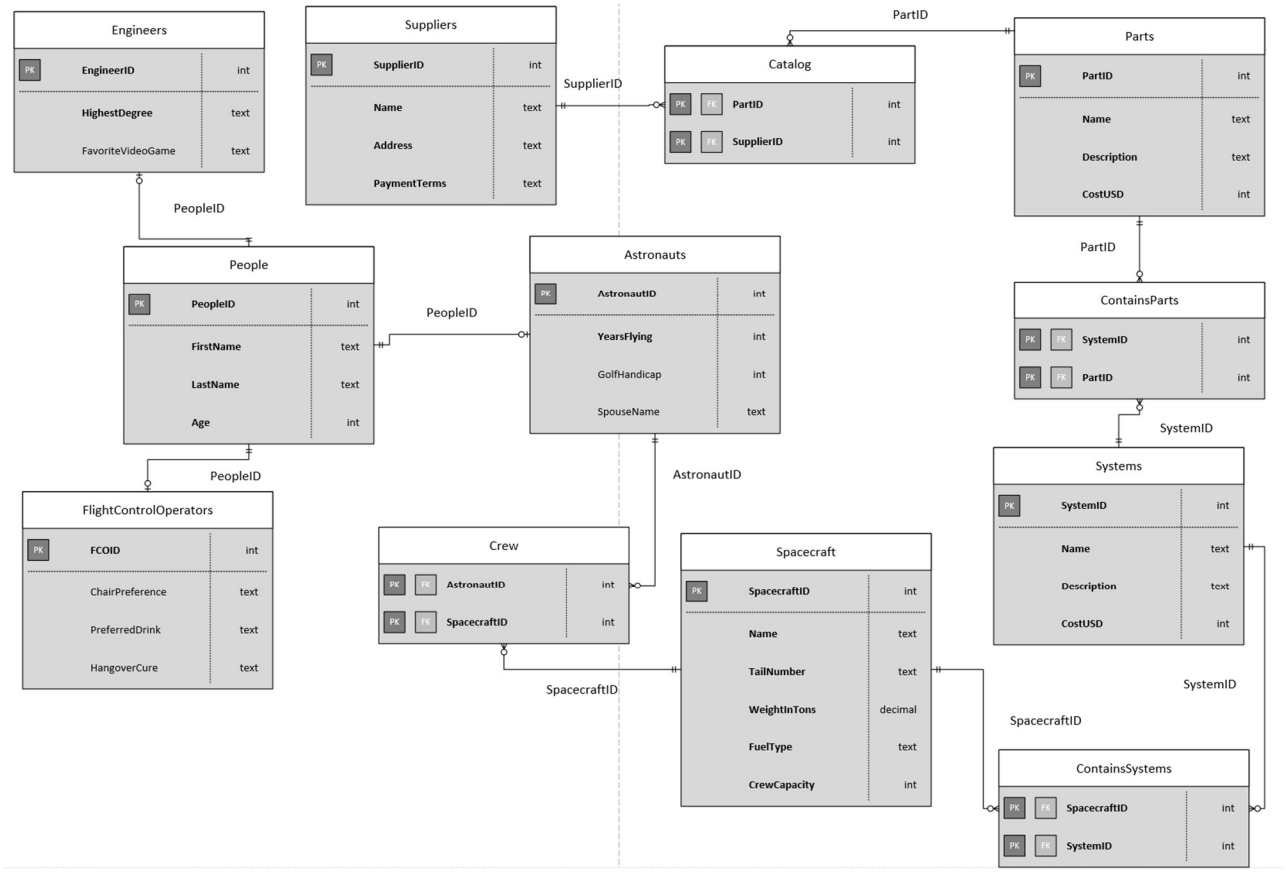
SpacecraftID, SystemID ->

SystemID, PartID ->

PartID, SupplierID ->

Part 2

Beautiful ER Diagram:



Part 3

Is it in 3NF/BCNF?

In order for the database to be in 3NF it must first be in 2NF, which requires it to be in 1NF. 1NF says that each field (intersection of rows and columns) must be atomic. Since each field has no external structure, I argue that the database is in 1NF. 2NF says that there are no partial key dependencies. This means that no column in a row is determined by only part of the key. For all of the strong tables, since the primary key is a single column, there are no partial key dependencies. For the weak tables, even though the keys are multiple columns, since there are no non-key elements, there are no partial key dependencies. Since there are no partial key dependencies, I argue that the database is in 2NF. 3NF says that there are no multi-key dependencies. Multi-key dependencies are where one or more non-key attributes are dependent on a non-key element. For the strong tables, there are no non-key attributes which can be used to determine any other elements in the row. For the weak entities, since there are no non-key attributes, there are no multi-key dependencies. Taking this into consideration, I argue that the database is in 3NF. BCNF says that there are no transitive dependencies within the database. Since transitive dependencies can only occur when there are multiple candidate keys in a table, which does not occur in this database, I argue that this table is in BCNF.