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Database Management

Professor Labouseur
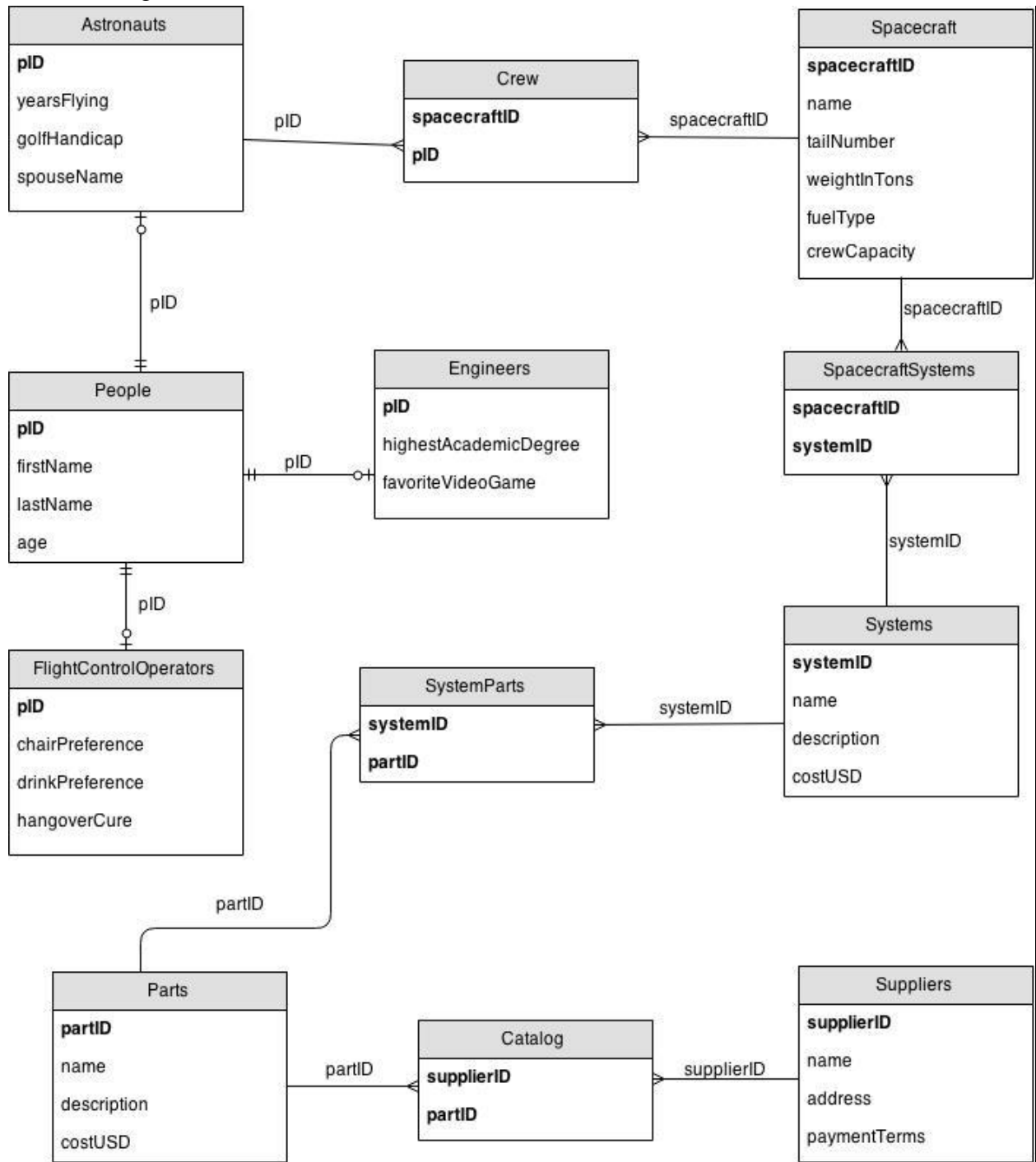
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<div align="center">Lab 9</div>

1. All functional dependencies (by table):
    a. <u>People</u>
       pID → firstName, lastName, age
    b. <u>Engineers</u>
       pID → highestAcademicDegree, favoriteVideoGame
    c. <u>Astronauts</u>
       pID → yearsFlying, golfHandicap, spouseName
    d. <u>FlightControlOperators</u>
       pID → chairPreference, drinkPreference, hangoverCure
    e. <u>Spacecraft</u>
       spacecraftID → name, tailNumber, weightInTons, fuelType, crewCapacity
    f. <u>Crew</u> (no functional dependencies in this table)
       astronautID, pID
    g. <u>Systems</u>
       systemID → name, description, costUSD
    h. <u>SpacecraftSystems</u> (no functional dependencies in this table)
       spacecraftID, systemID
    i. <u>Parts</u>
       partID → name, description, costUSD
    j. <u>SystemParts</u> (no functional dependencies in this table)
       systemID, partID
    k. <u>Suppliers</u>
       supplierID → name, address, paymentTerms
    l. <u>Catalog</u> (no functional dependencies in this table)
       supplierID, partID

2. The ER Diagram is below:

Astronauts
- **pID**
- yearsFlying
- golfHandicap
- spouseName

Crew
- **spacecraftID**
- **pID**

pID

Spacecraft
- **spacecraftID**
- name
- tailNumber
- weightInTons
- fuelType
- crewCapacity

spacecraftID

spacecraftID

pID

People
- **pID**
- firstName
- lastName
- age

pID

Engineers
- **pID**
- highestAcademicDegree
- favoriteVideoGame

SpacecraftSystems
- **spacecraftID**
- **systemID**

spacecraftID

systemID

pID

FlightControlOperators
- **pID**
- chairPreference
- drinkPreference
- hangoverCure

SystemParts
- **systemID**
- **partID**

systemID

Systems
- **systemID**
- name
- description
- costUSD

partID

Parts
- **partID**
- name
- description
- costUSD

partID

Catalog
- **supplierID**
- **partID**

supplierID

Suppliers
- **supplierID**
- name
- address
- paymentTerms

3. The database is in third normal form for several reasons. First, the primary key for each table is an atomic value. In addition, all of the fields within each table are atomic values. None of the tables have partial dependencies, because all of the fields in each table are dependent on that table's key, the whole key, and nothing but the key. The same is true for multiple dependencies, as all of the fields within each table that are not part of the

primary key cannot be identified using fields that are not part of the primary key. The strength of each's table's primary key makes update, insert, and delete anomalies impossible.