Brian Erichsen Fagundes
Lab 1: Relational Model and Keys
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Part 1 - English to Schema - describe a table or set of tables that would represent the data using a relational model -

//product has attributes name // stock keeping unit
- Product [_SKU (string)_, name (string), price (real)]
- Inventory [_SKU (string)_, quantity (integer)]

//Now we keep track which aisle(s) the product is to be displayed on
- Product [_SKU (string)_, price (real)]
- AisleDisplay [_SKU (string), _aisleNumber (integer)_, rackId (integer)]

//Car has make, model, year, color and VIN // Salesperson has name, SSN, sold cars //inventory of cars and salesperson
- CarInventory[_VIN (string)_, make (string), year (integer), color (string)]
- Sales Personnel [_SSN (string)_, name (string), #soldCars (integer)]
- CarSalesperson [_VIN (string), _SSN (string)_]

Part 2 - SQL Table Declarations

- CREATE TABLE Patrons (
    Name (string),
    CardNum (integer),
    Phone (string),
    PRIMARY KEY (CardNum)
  );
- CREATE TABLE Phones (
    CardNum (integer),
    Phone (string),
    PRIMARY KEY (CardNum, Phone),
    FOREIGN KEY (CardNum) REFERENCES Patrons (CardNum)
  );
- CREATE TABLE CheckedOut (
    CardNum (integer),
    Serial (integer),
    CheckedoutDate (date),
    ReturnDate (date),
    PRIMARY KEY (CardNum, Serial),
    FOREIGN KEY (CardNum) REFERENCES Patrons (CardNum),

FOREIGN KEY (Serial) REFERENCES Books (Serial)
);

Part 3 - Fill in Tables

- Cars:

VIN	Make	Model	Color	Year
1	Toyota	Tacoma	Red	2008
2	Toyota	Tacoma	Green	1999
3	Tesla	Model 3	White	2018
4	Subaru	WRX	Blue	2016
5	Ford	F150	Red	2004

- Salespeople

SSN	Name
12	Arnold
21	Hannah
32	Steve

- Assignments

Assignment_Id	SSN	VIN
1	12	1
2	12	2
3	21	1
4	21	5
5	32	3

Part 4 - Keys and SuperKeys

Attribute Sets	SuperKey?	Proper Subset	Key?
{A1}	No	{}	No
{A2}	No	{}	No
{A3}	No	{}	No
{A1, A2}	Yes	{A1}, {A2}	Yes
{A1, A3}	Yes	{A1}, {A3}	Yes
{A2, A3}	Yes	{A2}. {A3}	Yes
{A1, A2, A3}	Yes	{A1, A2}, {A1, A3}, {A2, A3}	No

Part 5 - Abstract Reasoning

- *If {x} is a superkey, then any set containing x is also a superkey.* This is **true** because if {x} is a superkey, adding any attributes to this set will still uniquely identify each tuplet, making any set containing x a superkey as well.

- *If {x} is a key, then any set containing x is also a key.* This is **false** because keys are the minimal set of attributes that is used to uniquely identify all attributes in a relation meaning that If we add attributes to a key, the resulting set will be a superkey but no longer be minimal hence not a key anymore.

- *If {x} is key, then {x} is also a superkey.* This is **true** because by definition a key is also a superkey. A key must be first a superkey that uniquely identifies each tuplet, and then it must also be minimal.

- *If {x, y, z} is a superkey, then one of {x}, {y}, or {z} must also be a superkey.* This is **false** because it is possible for {x, y, x} to be a superkey where none of its individual attributes to be superkeys.

- *If an entire schema consists of the set {x, y, z}, and none of the proper subsets of {x, y, z} are keys, then {x, y, z} must be a key.* This is **true** because {x, y, z} in this case would be the minimal set of attributes that uniquely identify each tuple and none of its subsets can do the same.