***Class Exercise- 4***

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1. *Consider the following relational database for Happy Cruise Lines. It keeps track of ships, cruises, ports, and passengers. A “cruise” is a particular sailing of a ship on a particular date. For example, the seven-day journey of the ship Pride of Tampa that leaves on June 13, 2003, is a cruise. Note the following facts about this environment.*

* *Both ship number and ship name are unique in the SHIP Relation.*
* *A ship goes on many cruises over time. A cruise is associated with a single ship.*
* *A port is identified by the combination of port name and country.*
* *As indicated by the VISIT Relation, a cruise includes visits to several ports and a port is typically included in several cruises.*
* *Both Passenger Number and Social Security Number are unique in the PASSENGER Relation. A particular person has a single Passenger Number that is used for all of the cruises that she takes.*
* *The VOYAGE Relation indicates that a person can take many cruises and a cruise, of course, has many passengers.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Ship*  *Number* | *Ship*  *Name* | *Ship*  *Builder* | *Launch*  *Date* | *Gross*  *Weight* |

*SHIP Relation*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Cruise*  *Number* | *Start*  *Date* | *End*  *Date* | *Cruise*  *Director* | *Ship*  *Number* |

*CRUISE Relation*

|  |  |  |  |
| --- | --- | --- | --- |
| *Port*  *Name* | *Country* | *Number of*  *Docks* | *Port*  *Manager* |

*PORT Relation*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Cruise*  *Number* | *Port*  *Name* | *Country* | *Arrival*  *Date* | *Departure*  *Date* |

*VISIT Relation*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Passenger*  *Number* | *Passenger*  *Name* | *Social Security*  *Number* | *Home*  *Address* | *Telephone*  *Number* |

*PASSENGER Relation*

|  |  |  |  |
| --- | --- | --- | --- |
| *Passenger*  *Number* | *Cruise*  *Number* | *Stateroom*  *Number* | *Fare* |

*VOYAGE Relation*

* 1. *Identify the candidate keys of each relation.*

SHIP: Ship number, Ship Name

CRUISE: Cruise Number

PORT: Country + Port Name

VISIT: Country + port Name +Cruise Number

PASSENGER: Passenger Number + Social Security Number

VOYAGE: Passenger Number + Cruise number

* 1. *Identify the primary key and any alternate keys of each relation.*

SHIP: Primary: Ship number

* Alternate: Ship Name

CRUISE: Cruise Number

PORT: Port Name + Country

VISIT: Cruise Number+ Port Name + Country

PASSENGER: Primary: Passenger Number

* Alternate: Social Security Number

VOYAGE: Passenger Number + Cruise Number

* 1. *How many foreign keys does each relation have?*

SHIP: 0

CRUISE: 1

PORT: 0

VISIT: 2

PASSENGER: 0

VOYAGE: 2

* 1. *Identify the foreign keys of each relation.*

CRUISE: Ship Number

VISIT: Cruise Number, Port name + country

VOYAGE: Passenger Number, Cruise Number

* 1. *Indicate any instances in which a foreign key serves as part of the primary key of the relation in which it is a foreign key. Why does each of those relations require a multi-attribute primary key?*

VISIT and VOYAGE. Because the component is not unique, and it will become unique. It also needs to support many-to-many relationship

* 1. *Identify the relations that support many-to-many relationships, the primary keys of those relations, and any intersection data.*

VISIT TO VOYAGE

Primary Key:

VISIT: Cruise Number+ Port Name + Country

VOYAGE: Passenger Number + Cruise Number

Intersection data:

VISIT: Arrival date, departure date

VOYAGE: State room, fair

* 1. *Write SQL commands to:*
     1. *Retrieve the record for passenger number 473942.*

SELECT\*FROM Passenger WHERE passenger\_number = 473942

* + 1. *Retrieve the record for the port of Nassau in the Bahamas.*

*SELECT\*FROM Port WHERE country = “Bahamas”, port\_name = “Nassau”*

* + 1. *List all of the ships built by General Shipbuilding, Inc.*

*SELECT Ship\_name FROM Ship WHERE ship\_builder = “General Shipbuilding, Inc”*

* + 1. *List the port name and number of docks of every port in Mexico .*

*SELECT Port\_name, Number\_of\_docks FROM Port WHERE country = “Mexico”*

* + 1. *List the name and number of every ship.*

*SELECT Ship\_name, Ship\_number FROM Ship*

* + 1. *Who was the cruise director on cruise number 38232?*

*SELECT Cruise\_director FROM Cruise WHERE cruise\_number = 38232*

3. Automata Inc. produces specialty vehicles by contract. The company operates several departments, each of which builds a particular vehicle, such as a limousine, a truck, a van, or an RV.

Before a new vehicle is built, the department places an order with the purchasing department to request specific components. Automata’s purchasing department is interested in creating a database to keep track of orders and to accelerate the process of delivering materials.

The order received by the purchasing department may contain several different items. An inventory is maintained so that the most frequently requested items are delivered almost immediately. When an order comes in, it is checked to determine whether the requested item is in inventory. If an item is not in inventory, it must be ordered from a supplier. Each item may have several suppliers.

Given that functional description of the processes encountered at Automata’s purchasing department, do the following:

a. Identify all of the main entities.

b. Identify all of the relations and connectivities among entities.

c. Identify the type of existence dependency in all the relationships.

d. Give at least two examples of the types of reports that can be obtained from the database.