

CSC423/CSC623

Project: Design, development and implementation of a relational database

Part 1

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Part 1: Develop a conceptual data model reflecting the following requirements:

- Identify the main entity types.
- Identify the main relationship types between the entity types identified in "a".
- Determine the multiplicity constraints for each relationship identified in "b".
- Identify attributes and associate them with entity or relationship types.
- Determine candidate and primary key attributes for each (strong) entity type.
- Generate the E-R diagram for the conceptual level (no FKs as attributes).

a.) The main entity types are Employee, Client, Equipment, Equipment request, Service Schedule, Special Equipment Assignment.

b.)

Employee works on Service Schedule

Client makes Equipment Request

Client makes Special Equipment Assignment

Equipment is assigned for Special Equipment Assignment

Client is assigned a Service Schedule

c.)

	Entity Name 1	Relationship	Entity name 2	Participation	Cardinality	Multiplicity
1	Employee	works	Service Schedule	1	*	1..*
	Service Schedule	assigned	Employee	1	*	1..*
	Employee	works	Special Equipment Assignment	1	*	1..*

	Special Equipment Assignment	assigned	Employee	0	1	0..1
3	Client	makes	Equipment Request	1	*	1..*
	Equipment Request	associatedWith	client	1	1	1..1
4	Client	makes	Special Equipment Assignment	0	*	0..*
	Special Equipment Assignment	associatedWith	client	1	1	1..1
5	Equipment	assigned	Special Equipment Assignment	1	*	1..*
	Special Equipment Assignment	uses	equipment	0	*	0..*
6	Client	assigned	Service Schedule	1	*	1..*
	Service Schedule	associatedWith	client	1	1	1..1
7	Equipment Request	works	Service Schedule	1	1	1..1
	Service Schedule	associatedWith	Equipment Request	1	*	1..*
8	Special Equipment Assignment	works	Service Schedule	1	1	0..1
	Service Schedule	associatedWith	Special Equipment Assignment	0	*	0..*

1. Employee works on Service Schedule (many-to-many)
 - Employee: 1..* (Each service schedule must have one or more employees working on it)
 - Service Schedule: 1..* (Each employee must work on one or more service schedules)
2. Employee works with Special Equipment assignment(many-to-one)

- Employee: 1..* (Each special equipment assignment must have at least one employee responsible for it)
 - Special Equipment Assignment: 0..1 (An employee may or may not be associated with a special equipment assignment)
3. Client makes Equipment Request (1-to-many)
 - Client: 1..* (Each client must make at least one equipment request)
 - Equipment Request: 1..1 (Each equipment request must be related to one client)
 4. Client makes Special Equipment Assignment (1-to-many)
 - Client: 0..* (Each client can make multiple special equipment assignment or none)
 - Special Equipment Assignment: 1..1 (A Special Equipment request must be related to one client)
 5. Equipment is assigned for Special Equipment Assignment (many-to-many)
 - Equipment: 1..* (Each special equipment assignment must involve one or more pieces of equipment)
 - Special Equipment Assignment: 0..* (Each piece of equipment can be assigned for multiple special equipment assignments or none)
 6. Client is assigned a Service Schedule (one-to-many)
 - Client: 1..* (Each client must be assigned to one or more service schedules)
 - Service Schedule: 1..1 (A service schedule can have only one client assigned to it)
 7. Equipment Request works with Service Schedule(many-to-one)
 - Equipment Request: 1..1 (Each equipment request is linked to one specific service schedule)
 - Service Schedule: 1..* (Each service schedule can be associated with one or more equipment requests)
 8. Special Equipment Assignment works with Service Schedule (many-to-one)
 - Special Equipment Assignment: 1..1 (Each special equipment assignment is associated with one service schedule)
 - Service Schedule: 0..* (Each service schedule can have multiple special equipment assignments or none)

d.)

Employee
 Staff Number (Primary Key)
 First Name
 Last Name
 Address

Salary
Telephone Number

Client
Client Number (Primary Key)
First Name
Last Name
Address
Telephone Number

Equipment
Equipment Id (Primary Key)
Description
Usage
Cost

Equipment request
pk request id
special equipment id (fk)
special equipment quantity
standard equipment id (fk)
standard equipment quantity
client number fk

Service Schedule
Schedule ID (Primary Key)
Client Number (Foreign Key)
Employee Staff Number (Foreign Key)
pk request id (Foreign Key)
Day of the Week
Start Time
End Time

Special Equipment Assignment
Assignment ID (Primary Key)
Schedule ID (Foreign Key)
Equipment Id (Foreign Key)
Usage Frequency

e.)
Employee: Staff Number

Client: Client Number
Equipment: Equipment ID
Equipment Request: Request ID
Service Schedule: Schedule ID
Special Equipment Assignment: Assignment ID

f.)

