02. Relational DB Schema - Examples

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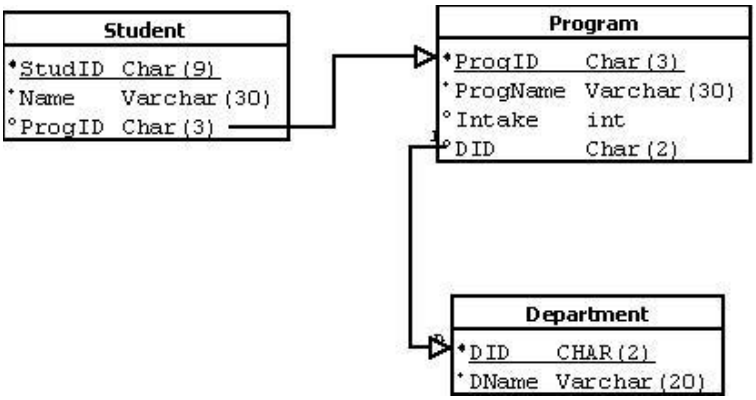
For all following database schema examples, try doing following

(1) Interpretation of each tuple in the relation
(2) What is Primary Key; validate that.
(3) What are Foreign Keys; what does each association, FK represents
(4) Any other constraints

#1 XIT Database

Here is complete schema of XIT database:



An instance XIT schema:

Student

StudentID	Name	ProgID	CPI
101	Rahul	BCS	7.5
102	Vikash	BIT	8.6
103	Shally	BEE	5.4
104	Alka	BIT	6.8
105	Ravi	BCS	6.5

Program

PID	ProgName	Intake	DID
BCS	BTech(CS)	40	CS
BIT	BTech(IT)	30	CS
BEE	BTech(EE)	40	EE
BME	BTech(ME)	40	ME

Department

DID	DName
CS	Computer Engineering
EE	Electrical Engineering
ME	Mechanical Engineering

`Student` Relation

1. Each tuple represents a student entity
2. Primary Key is StudID
3. ProgID is Foreign Key referring to PID attribute of Program Relation. This foreign key associates a student entity with a program entity; a value in this FK is ID of the department in which the student studies.

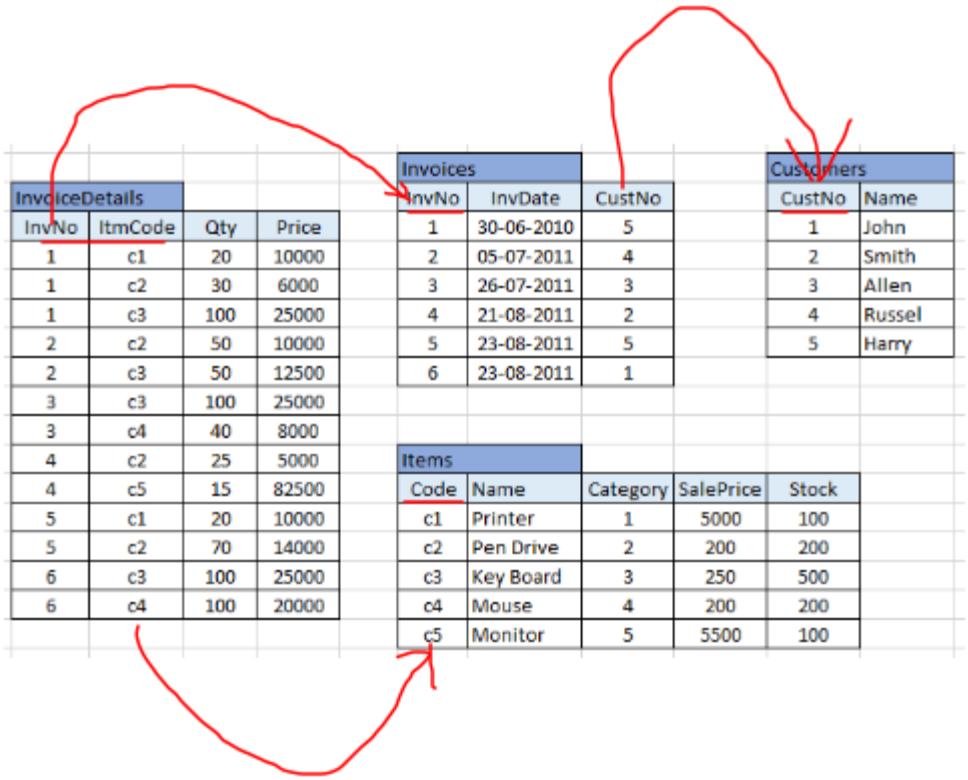
`Program` Relation

1. Each tuple represents a program entity
2. Primary Key is PID
3. Prog Name is constrained to be Unique and Not Null
4. DID is Foreign Key referring to DID attribute of Department Relation. This foreign key associates a program entity with a department entity that is department that offers the program. A value in this FK is ID of the department in that offers the program

`Department` Relation

1. Each tuple represents a department entity
2. Primary Key is DID
3. Department Name is constrained to be Unique and Not Null

#2 Sales Database



InvoiceDetails

InvNo	ItmCode	Qty	Price
1	c1	20	10000
1	c2	30	6000
1	c3	100	25000
2	c2	50	10000
2	c3	50	12500
3	c3	100	25000
3	c4	40	8000
4	c2	25	5000
4	c5	15	82500
5	c1	20	10000
5	c2	70	14000
6	c3	100	25000
6	c4	100	20000

Invoices

InvNo	InvDate	CustNo
1	30-06-2010	5
2	05-07-2011	4
3	26-07-2011	3
4	21-08-2011	2
5	23-08-2011	5
6	23-08-2011	1

Customers

CustNo	Name
1	John
2	Smith
3	Allen
4	Russel
5	Harry

Items

Code	Name	Category	SalePrice	Stock
c1	Printer	1	5000	100
c2	Pen Drive	2	200	200
c3	Key Board	3	250	500
c4	Mouse	4	200	200
c5	Monitor	5	5500	100

`Customer` Relation

1. Each tuple represents a customer entity
2. CustNo is Primary Key

`Item` Relation

1. Each tuple represents an item entity
2. Primary Key is item “code”

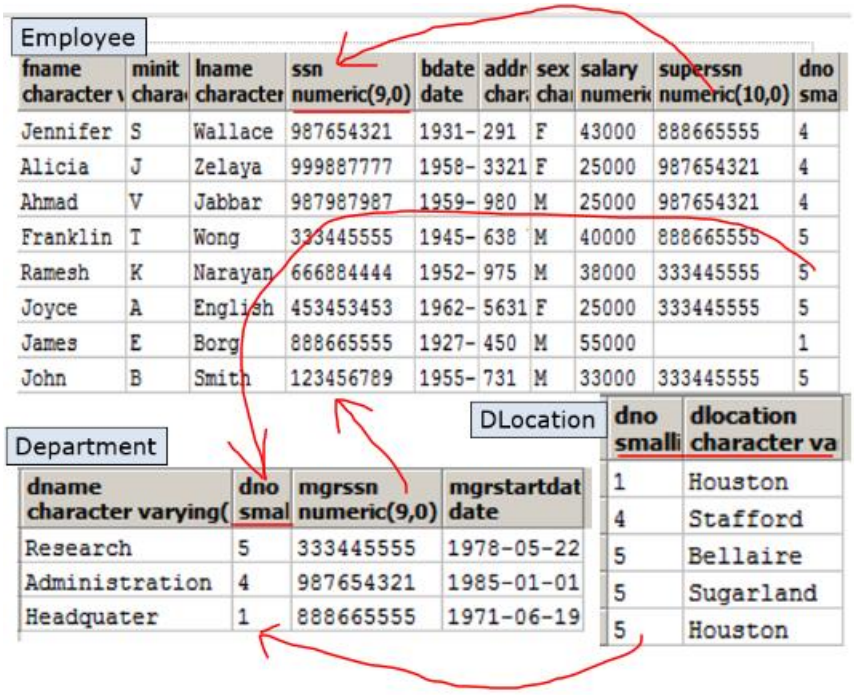
`Invoice` Relation

1. Each tuple represents an invoice
2. Primary Key is “InvNo”
3. “CustNo” is a foreign key referring into customer table. This foreign key associates the invoice with the customer (person who has ordered the items)

`InvoiceDetails` Relation

1. This relation is used to records details of an invoice. A tuple of this relation represents an item entry in an invoice.
2. Primary Key: Compiste Key {invno, itemcode}
3. Two foreign keys here: InvNo, and “ItmCode”. Note these are two FKs and not a composite.
4. FK “InvNo” refers to “InvNo” in invoice relation. The foreign key here associates an entry with a corresponding invoice.
5. FK “ItmCode” refers to “code” in item relation. The foreign key here associates an entry with a corresponding item.

#3 Company Database



Employee

fname character v	minit chara	lname character	ssn numeric(9,0)	bdate date	addr char	sex cha	salary numeric	superssn numeric(10,0)	dno sma
Jennifer	S	Wallace	987654321	1931-	291	F	43000	888665555	4
Alicia	J	Zelaya	999887777	1958-	3321	F	25000	987654321	4
Ahmad	V	Jabbar	987987987	1959-	980	M	25000	987654321	4
Franklin	T	Wong	333445555	1945-	638	M	40000	888665555	5
Ramesh	K	Narayan	666884444	1952-	975	M	38000	333445555	5
Joyce	A	English	453453453	1962-	5631	F	25000	333445555	5
James	E	Borg	888665555	1927-	450	M	55000		1
John	B	Smith	123456789	1955-	731	M	33000	333445555	5

Department

dname character varying(	dno smal	mgrssn numeric(9,0)	mgrstartdat date
Research	5	333445555	1978-05-22
Administration	4	987654321	1985-01-01
Headquater	1	888665555	1971-06-19

DLocation

dno smalli	dlocation character va
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

`Employee` Relation

1. Each tuple represents an employee entity
2. Primary Key is “SSN”
3. “dno” is foreign key refers to “dno” in the department relation. This FK associate the employee with the department to which this employee works. A value in FK here is ID of the department for the employee works.
4. “supersn” is another foreign key referring into employee table itself. This FK captures supervision association; a value in this foreign is ssn of the employee’s supervisor.

`Department` Relation

1. Each tuple represents a department entity
2. Primary Key is “DNO”
3. “mgrssn” is foreign key refers to “ssn” in the employee relation. A value in this FK is SSN of employee, who is manager of the department.

`DLocation` Relation

A department be located at multiple locations. We record name of all locations of a department.

1. A tuple here records one location with reference to corresponding department
2. Primary Key is composite: {DNO, dlocation}
3. FK: dno having reference to corresponding department

Department

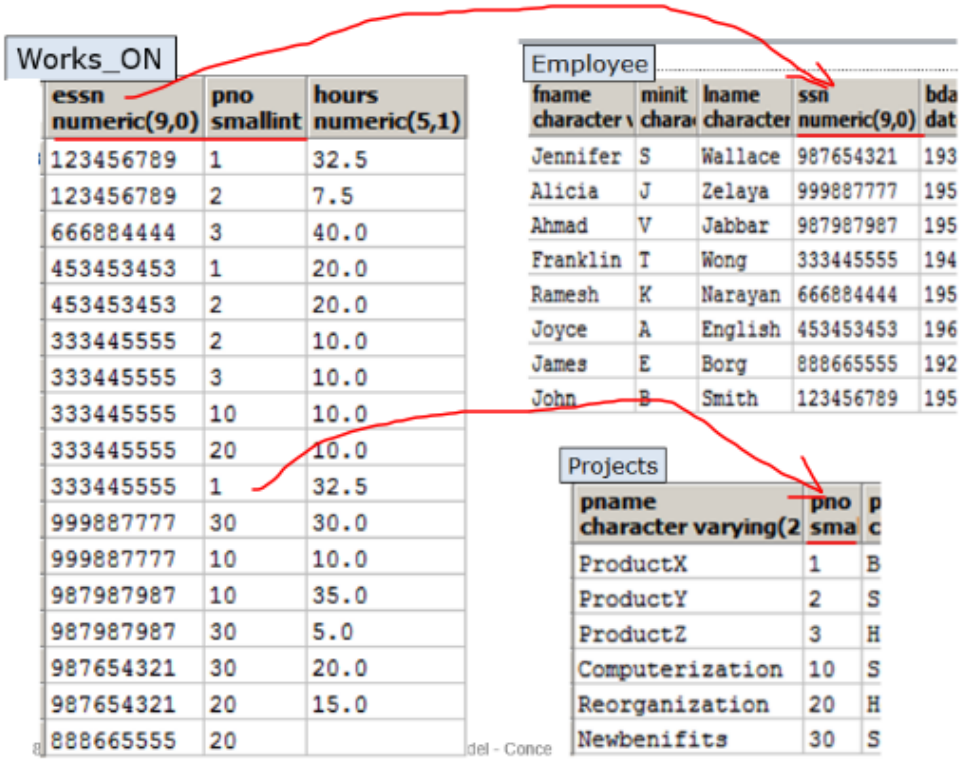
dname character varying(	dno smal	mgrssn numeric(9,0)	mgrstartdat date
Research	5	333445555	1978-05-22
Administration	4	987654321	1985-01-01
Headquater	1	888665555	1971-06-19

Projects

pname character varying(2	pno sma	plocation character v	dno sma
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenifits	30	Stafford	4

`Project` Relation

1. Each tuple represents a Project entity
2. Primary Key is “PNO”
3. Each project is managed by some department. “DNO” is foreign key refers that refers to the managing department.



`WorksOn` Relation

This relation records the fact of employees working on different projects. An employee can work any number of projects and a project can have many employees working on. While we do this, we also record how many hours employee works on a project.

1. Every tuple here records one instance of an employee working on a project along with the number of hours
2. Primary Key is composite: {ESSN, PNO}
3. Two foreign keys: ESSN, and PNO
4. FK refers to the SSN in to employee relation, where as PNO refers to PNO of project relation.

Dependents

essn numeric(9,0)	dependent_name character varying(20)	sex character(1)	bdate date	relationship character var
333445555	Alice	F	1976-	DAUGHTER
333445555	Theodore	M	1973-	SON
333445555	Joy	F	1948-	SPOUSE
987654321	Abner	M	1932-	SPOUSE
123456789	Michael	M	1978-	SON
123456789	Alice	F	1978-	DAUGHTER
123456789	Elizabeth	F	1957-	SPOUSE

Employee

fname character v	minit chara	lname character	ssn numeric(9,0)	bda dat
Jennifer	S	Wallace	987654321	193
Alicia	J	Zelaya	999887777	195
Ahmad	V	Jabbar	987987987	195
Franklin	T	Wong	333445555	194
Ramesh	K	Narayan	666884444	195
Joyce	A	English	453453453	196
James	E	Borg	888665555	192
John	B	Smith	123456789	195

`Dependents` Relation

This relation records all dependents of employees. An employee may have multiple dependents. We record few details of dependents along with their names.

1. A tuple here records one dependent with reference to corresponding employee
2. Primary Key is composite: {ESSN, dependent_name}
3. “essn” is foreign key refers to “ssn” in the employee relation.