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Construction Bid Database

Project Documentation

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3330 Current Trends in Database Tech

Table of Contents:

Data Requirements	3
ER Design	4
Relational Schema	5
SQL for Implementation	6
Sample Data	9
Sample Queries	11

Data Requirements:

This database has been built around the Bid table, which contains data relating to each bid. Each bid is identified by a unique bid number. Other fields list estimated value, estimated duration, comments, the submission date (if any), and whether or not the bid was approved. Each bid will be assigned an estimator from the Employee table.

The Addendum table is a minor table that holds addendums for each bid.

Job Details is another weak entity that attaches to the bid if the bid is accepted. The bid is assigned a job number that acts as the weak entity's primary key. Best practice is to match the Job number in the Jobs Database. The Job Details table lists the contract type (time & materials, lump sum or cash plus), the company's role (prime or subcontractor), the job category (usually determined by job size) and links a project manager, who might or might not be the estimator, and a superintendent from the employee entity.

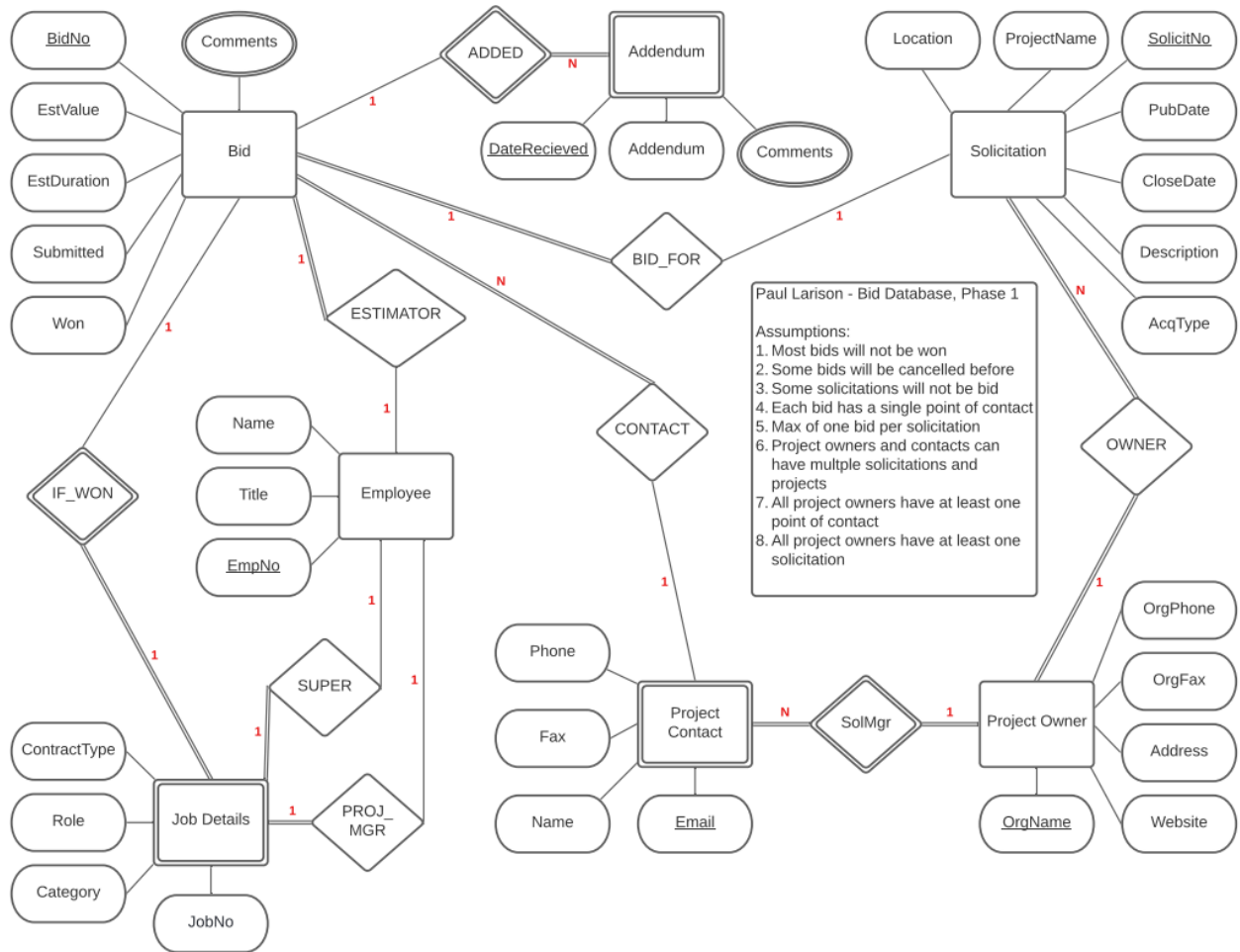
The Employee table only has a few fields, because this is not an HR database. The employee number is the primary key, and could be linked to HR data if needed. The other fields are the employee's name and job title.

The Solicitation table tracks the solicitations each bid is created to fill. Each solicitation will be given a solicitation number when added to the database that serves as the primary key. It also lists the project's location and name, along with the posting and closing dates for the solicitation. It also contains a description of the solicitation and the acquisition type, which is how the company became aware of the solicitation.

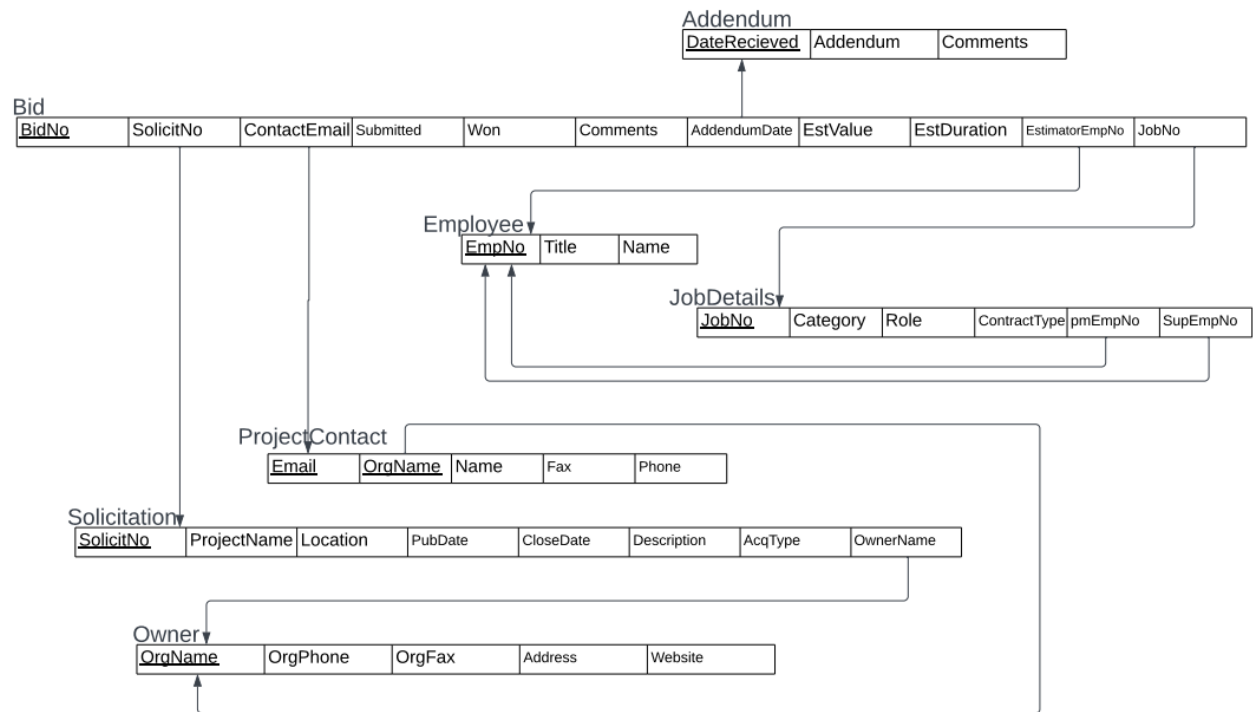
Each solicitation must be attached to a single Project Owner entity. The entity's organization name is its primary key. Other attributes are the organization's phone, fax, physical address and website. A Project Owner can own more than one solicitation.

Within the Project Owner are individuals who serve as a point of contact for the bid process. These people are represented by the Project Contact weak entity. The key for this entity is the contact's email address. It also contains the contact's phone, fax and name. Each Bid is linked to a single Project Contact, but each Project Contact can handle more than one bid.

Relationship Diagram:



Relational Schema:



Code to Implement Database:

```
DROP TABLE Employee cascade constraints;
```

```
CREATE TABLE Employee(  
    EmpNo number(6) not null,  
    Title varchar2(20),  
    Name varchar2(40) not null,  
    primary key (EmpNo)  
);
```

```
DROP TABLE JobDetails cascade constraints;
```

```
CREATE TABLE JobDetails(  
    JobNo number(8) not null,  
    Category varchar2(20),  
    Role varchar2(5),  
    ContractType varchar2(9),  
    PmEmpNo number(6),  
    SupEmpNo number(6),  
    primary key (JobNo),  
    foreign key (PmEmpNo) references Employee,  
    foreign key (SupEmpNo) references Employee  
);
```

```
DROP TABLE Owner cascade constraints;
```

```
CREATE TABLE Owner(  
    OrgName varchar2(50) not null,  
    OrgPhone number(10),  
    OrgFax number(10),  
    Address varchar2(100),  
    Website varchar2(100),  
    primary key (OrgName)  
);
```

```
DROP TABLE Solicitation cascade constraints;
```

```
CREATE TABLE Solicitation(  
    SolicitNo number(10) not null,  
    ProjectName varchar2(50),  
    Location varchar2(100),  
    PubDate date,  
    CloseDate date,  
    Description varchar2(4000),  
    AcqType varchar2(25),  
    OwnerName varchar2(100) not null,  
    primary key (SolicitNo),
```

```
foreign key (OwnerName) references Owner
);
```

```
DROP TABLE ProjectContact cascade constraints;
CREATE TABLE ProjectContact(
  Email varchar(255) not null,
  OrgName varchar2(50) not null,
  Name varchar2(50),
  Fax number(10),
  Phone number(10),
  primary key (Email),
  foreign key (OrgName) references Owner on delete cascade
);
```

```
DROP TABLE Addendum cascade constraints;
CREATE TABLE Addendum(
  DateRecieved date not null,
  Addendum varchar2(4000),
  Comments varchar2(4000),
  primary key (DateRecieved)
);
```

```
DROP TABLE Bid cascade constraints;
CREATE TABLE Bid(
  BidNo number(8) not null,
  SolicitNo number(10) not null,
  ContactEmail varchar2(255),
  Submitted varchar2(1),
  Won varchar2(1),
  Comments varchar2(4000),
  AddendumDate date,
  EstValue number(12),
  EstDuration number(5),
  EstimatorEmpNo number(6) not null,
  JobNo number(8) not null,
  primary key (BidNo),
  foreign key (SolicitNo) references Solicitation,
  foreign key (ContactEmail) references ProjectContact,
  foreign key (EstimatorEmpNo) references Employee,
  foreign key (AddendumDate) references Addendum on delete cascade,
  foreign key (JobNo) references JobDetails on delete cascade
);
```

```
DROP TABLE Addendum cascade constraints;
```

```
CREATE TABLE Addendum(  
    DateRecieved date not null,  
    Addendum varchar2(4000),  
    Comments varchar2(4000),  
    primary key (DateRecieved)  
);
```


Sample Data:

```
insert into Employee values(111222, 'Project Manager', 'Jim Bob');
insert into Employee values(111333, 'Superintendent', 'Joe Bob');
insert into Employee values(111444, 'Project Manager', 'Jill Bill');
insert into Employee values(111555, 'Estimator', 'Bill Bill');
insert into Employee values(111665, 'Estimator', 'Jane May');
insert into Employee values(111777, 'Superintendent', 'Jack Schitt');
```

```
insert into JobDetails values(00000001, 'continuous', 'prime', 'T&M', 111222, 111333);
insert into JobDetails values(00000002, 'small', 'sub', 'cash plus', 111222, 111777);
insert into JobDetails values(00000003, 'large', 'prime', 'T&M', 111444, 111777);
insert into JobDetails values(00000005, 'large', 'sub', 'lump sum', 111444, 111333);
```

```
insert into Owner values('Government Builders', 5551231234, 5551231235, '111 Govment Way',
'www.builder.gov');
insert into Owner values('Hydropower', 5559999995, 5559999996, '6060 Grand Coulee Blvd',
'www.hydropower.com');
insert into Owner values('Lamp & Co', 5554443333, 5554443322, '123 Dayin Ct',
'www.lamp.co');
```

```
insert into Solicitation values(1231231231, 'Substation Maintenance', 'Arkansas', '08-11-2007',
'12-31-2007', 'Scheduled maintenance on electrical substations', 'Client submitted', 'Lamp &
Co');
insert into Solicitation values(1231231232, 'Grand Nowhere Dam', 'North Dakota', '04-21-2012',
'9-21-2007', 'Install hydroelectric generators', 'Public Bid', 'Hydropower');
insert into Solicitation values(1231231233, 'Substation Construction', 'Oklahoma', '03-14-2013',
'12-31-2013', 'Construct substation', 'Trade Organizatin', 'Lamp & Co');
insert into Solicitation values(1231231234, 'Some Other Dam', 'Arkansas', '10-05-2015',
'12-11-2015', 'Hydroelectric maintenance', 'Public Bid', 'Government Builders');
insert into Solicitation values(1231231235, 'Building Things', 'Texas', '01-19-2017', '04-21-2017',
'Random construction thing', 'Spontaneous generation', 'Government Builders');
```

```
insert into ProjectContact values('ffrank@building.gov', 'Government Builders', 'Frank Frank',
5554443221, 5554443325);
insert into ProjectContact values('ihog@lamp.co', 'Lamp & Co', 'Ima Hogg', 5558884897,
5554443325);
insert into ProjectContact values('eron@hydropower.com', 'Hydropower', 'Eron Withanay',
5559456678, 5554443325);
insert into ProjectContact values('cclark@building.gov', 'Government Builders', 'Clark Clark',
5554443226, 5554443325);
```

```
insert into Addendum values('12-13-2008', 'Bid changes go here', 'Company comments go
here');
insert into Addendum values('02-22-2011', 'Addendums everywhere', 'Text here');
```

```
insert into Addendum values('10-16-2013', 'More addendum stuff', 'Company comment');
insert into Addendum values('06-30-2017', 'Addendum text', 'Text to fill the space');
insert into Addendum values('04-06-2015', 'What the client wants', 'What we think of that');
```

```
insert into Bid values(11111111,1231231231, 'ihog@lamp.co', 'T', 'T', 'This is a comment',
'12-13-2008', 3400000, 365, 111222, 00000001);
insert into Bid values(11111112,1231231232, 'eron@hydropower.com', 'T', 'T', 'This is a
comment', '02-22-2011', 3400000, 365, 111444, 00000001);
insert into Bid values(11111113,1231231233, 'ihog@lamp.co', 'T', 'T', 'This is a comment',
'10-16-2013', 3400000, 365, 111222, 00000001);
insert into Bid values(11111114,1231231234, 'ffrank@building.gov', 'T', 'T', 'This is a comment',
'04-06-2015', 3400000, 365, 111444, 00000001);
insert into Bid values(11111115,1231231235, 'cclark@building.gov', 'F', 'F', 'This is a comment',
'06-30-2017', 3400000, 365, 111444, 00000005);
```

Sample Queries:

--1 List all jobs with prime contractor role

```
SELECT Solicitation.ProjectName
FROM BID
JOIN Solicitation on Bid.SolicitNo = Solicitation.SolicitNo
JOIN JobDetails on Bid.JobNo = JobDetails.JobNo
WHERE JobDetails.Role = 'prime'
```

PROJECTNAME
Substation Maintenance
Grand Nowhere Dam
Substation Construction
Some Other Dam
4 rows returned in 0.00 seconds Download

--2 Bids by owner

```
SELECT OwnerName, ProjectName, SolicitNo
FROM Solicitation
GROUP BY OwnerName, ProjectName, SolicitNo
ORDER BY OwnerName
```

OWNERNAME	PROJECTNAME	SOLICITNO
Government Builders	Some Other Dam	1231231234
Government Builders	Building Things	1231231235
Hydropower	Grand Nowhere Dam	1231231232
Lamp & Co	Substation Maintenance	1231231231
Lamp & Co	Substation Construction	1231231233
5 rows returned in 0.03 seconds Download		

--3 Estimator Report

```
SELECT Employee.Name, EstimatorEmpNo, Solicitation.ProjectName, Bid.BidNo
FROM Bid
JOIN Solicitation on Bid.SolicitNo = Solicitation.SolicitNo
JOIN Employee on Bid.EstimatorEmpNo = Employee.EmpNo
```

NAME	ESTIMATOREMPNO	PROJECTNAME	BIDNO
Jim Bob	111222	Substation Maintenance	11111111
Jim Bob	111222	Substation Construction	11111113
Jill Bill	111444	Grand Nowhere Dam	11111112
Jill Bill	111444	Some Other Dam	11111114
Jill Bill	111444	Building Things	11111115
5 rows returned in 0.03 seconds Download			

--4 Add new employee

```
INSERT INTO Employee (EmpNo, Title, Name)
Values ('111999', 'Superintendent', 'New Bob')
```

1 row(s) inserted.

0.01 seconds

--5 List unsubmitted

```
SELECT BidNo
FROM Bid
WHERE Submitted = 'F'
```

BIDNO

1111115

1 rows returned in 0.00 seconds

[Download](#)

--6 Update superintendent

```
UPDATE JobDetails
SET SupEmpNo = '111999'
WHERE JobNo = 3;
```

1 row(s) updated.

0.01 seconds

--7 List contact info for specified bid

```
SELECT name, orgname, email, phone, fax
FROM ProjectContact
JOIN Bid on ProjectContact.email = Bid.ContactEmail
JOIN Solicitation on Solicitation.SolicitNo = Bid.SolicitNo
WHERE Solicitation.ProjectName = 'Substation Construction'
```

NAME	ORGNAME	EMAIL	PHONE	FAX
Ima Hogg	Lamp & Co	ihog@lamp.co	5554443325	5558884897

1 rows returned in 0.03 seconds [Download](#)

```
--8 Get total number of bids:
CREATE OR REPLACE FUNCTION totalbids
    RETURN number IS
    total number(2) := 0;
BEGIN
    SELECT count(*) into total
    FROM bids;
    RETURN total;
END;
/

DECLARE
    c number(2);
BEGIN
    c := totalBids();
    dbms_output.put_line('Total number of Bids: ' || c);
END;
/
```

```
Total number of Bids: 5
Statement processed.

0.01seconds
```