Practice.. Practice.. Practice

Display the names of the departments that have no female employees.

```
Select Dname From Department
Except
Select Dname From Department join Employee on Dnumber = Dnum
Where Gender = 'F'
```

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

Practice.. Practice.. Practice

Find the SSN of all employees who are older than their Department Manager.

```
Select ssn
From (Employee as E join Department as D on E.dno=D.dnumber) join
Employee as M on mgr_ssn=ssn
Where E.birthdate < M.birthdate
```

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
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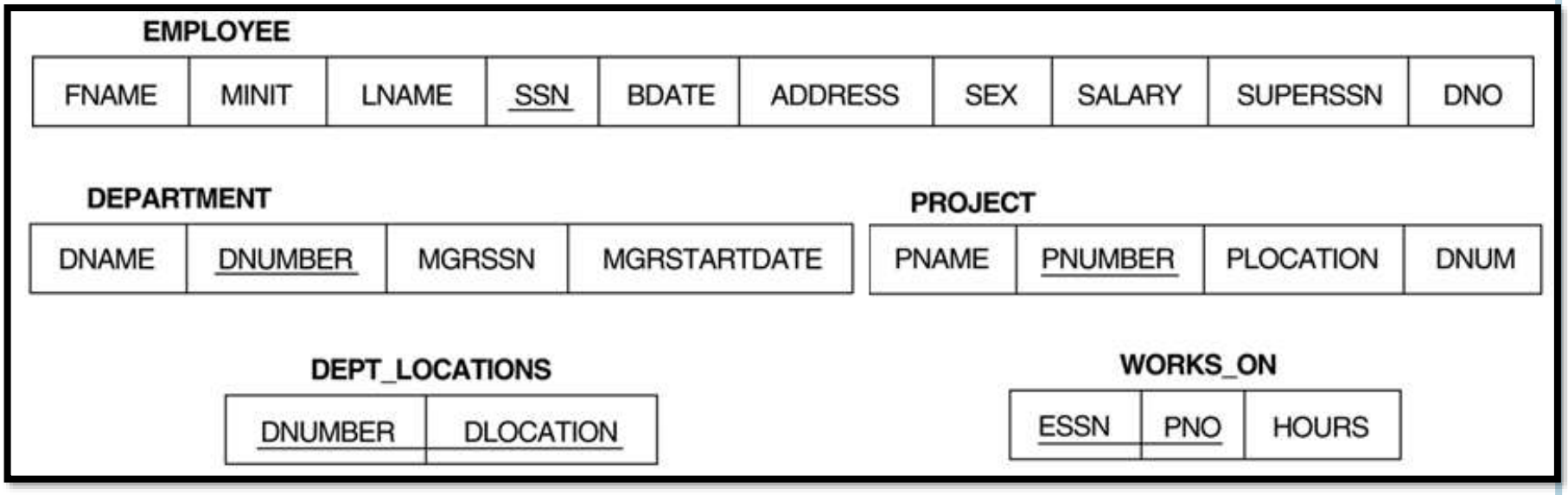
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

Practice.. Practice.. Practice

Display the SSN and name of all employees who report to John. (in other words John is their immediate supervisor)

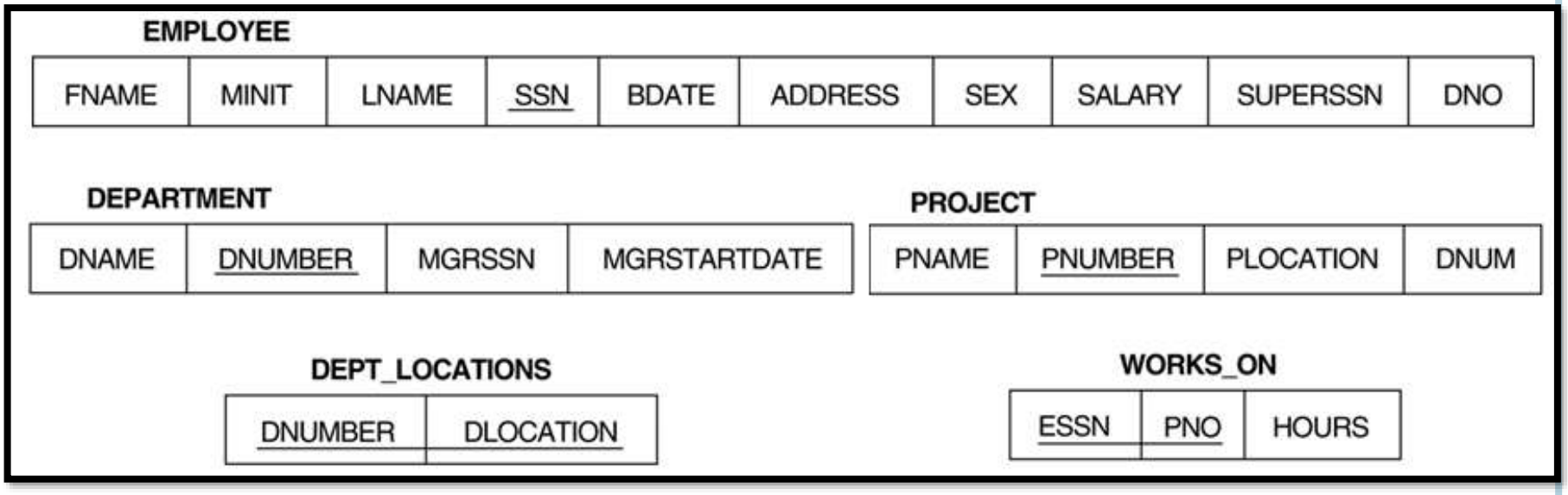
```
Select E.ssn
From Employee E join Employee S on E.Super_ssn=S.ssn and
Where S.Fname='John'
```



Practice.. Practice.. Practice

Find out how many managers there are without listing them.

```
Select count(distinct mgr_ssn)
From department
```



Practice.. Practice.. Practice

Find out the difference between highest and lowest salaries.

```
Select max(salary) - min(salary)
From department
```

EMPLOYEE

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

Practice.. Practice.. Practice

List SSN and Fname of all employees with more than 2 children

```
Select ssn, Fname
From employee join dependent on ssn=essn
Where Relationship = 'Son' or Relationship = 'daughter'
Groupby ssn
Having count(ssn)> 2
```

EMPLOYEE

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

Practice.. Practice.. Practice

- List the names of the departments, where all the employees have salary > 30000

```
SELECT Dname
FROM    Employee, Department
WHERE  dno= dnumber
GROUP BY  Dnumber, Dname
HAVING 30000 < min(Salary)
```

Example: Boat Rental database

- **Consider the following Boat Rental database schema:**
  - SAILOR (SID, SName, Phone, City)
  - BOAT (BName, BType, Price, OID)
  - RESERVATION (SID, BName, Date, Duration)
  - OWNER (OID, OName, Phone, Street, City, Country)

What does the query do?

```
SELECT Bname
FROM   (Boat b join Owner o on b.OID = o.OID)
          join Reservation r on r.BName = b.BName
WHERE  Country = 'Pakistan'
ORDER BY Price
```

Example: Boat Rental database

- **Consider the following Boat Rental database schema:**
  - SAILOR (SID, SName, Phone, City)
  - BOAT (BName, BType, Price, OID)
  - RESERVATION (SID, BName, Date, Duration)
  - OWNER (OID, OName, Phone, Street, City, Country)

- Select bname,count(*)
- From reservation r ,boat b,owner o
- Where b.bname=r.bname and b. oid=o.oid and country='USA'
- Group by bname
- Having count(*) > 10

What does the above query do?

Example: Boat Rental database

- Consider the following schema
  - SAILOR (SID, SName, Phone, City)
  - BOAT (BName, BType, Price, OID)
  - RESERVATION (SID, BName, Date, Duration)
  - OWNER (OID, OName, Phone, Street, City, Country)

- **Find the names of boats that are reserved by at least ten different sailors.**
-
```
Select bname
From reservation r
Group by bname
Having count(DISTINCT SID) >9
```

Example: Boat Rental database

- Consider the following schema
  - SAILOR (SID, SName, Phone, City)
  - BOAT (BName, BType, Price, OID)
  - RESERVATION (SID, BName, Date, Duration)
  - OWNER (OID, OName, Phone, Street, City, Country)

- **List name and price of the boats that were reserved in 2018 or in 2019.**

```
Select distinct b.bname, b.price
From reservation r join boat b on r.bname = b.bname
Where r.date LIKE '%2018%' or  r.date LIKE '%2019%'
```

Example: Boat Rental database

- Consider the following schema
  - SAILOR (SID, SName, Phone, City)
  - BOAT (BName, BType, Price, OID)
  - RESERVATION (SID, BName, Date, Duration)
  - OWNER (OID, OName, Phone, Street, City, Country)
- **List name and price of the boats that were reserved in 2018 and in 2019.**

```
Select distinct b.bname, b.price
From reservation r, boat b
Where r.bname = b.bname and r.date LIKE '%2018%'
INTERSECT
Select distinct b.bname, b.price
From reservation r, boat b
Where r.bname = b.bname and r.date LIKE '%2019%'
```

Example: Boat Rental database

- Consider the following schema
  - SAILOR (SID, SName, Phone, City)
  - BOAT (BName, BType, Price, OID)
  - RESERVATION (SID, BName, Date, Duration)
  - OWNER (OID, OName, Phone, Street, City, Country)
- **List name, owner name, and price of the boats which were reserved in 2018 but not in 2019.**

```
Select distinct b.bname, b.price, o.oname
From reservation r, boat b, owner o
Where r.bname = b.bname and b.oid=o.oid and r.date LIKE '%2018%'
EXCEPT
Select distinct b.bname, b.price, o.oname
From reservation r, boat b, owner o
Where r.bname = b.bname and b.oid=o.oid and r.date LIKE '%2019%'
```

Boat Rental

The boat rental schema

- SAILOR (SID, SName, Phone, City)
- BOAT (BName, BType, Price, OID)
- RESERVATION (SID, BName, Date, Duration)
- OWNER (OID, OName, Phone, Street, City, Country)

List name and price of the boats which were reserved in 2018 and 2019 but not in 2020.

```
(Select distinct b.bname, b.price
From reservation r join boat b on r.bname = b.bname
Where r.date LIKE '%2018%'
INTERSECT
Select distinct b.bname, b.price
From reservation r join boat b on r.bname = b.bname
Where r.date LIKE '%2019%')
EXCEPT
Select distinct b.bname, b.price
From reservation r join boat b on r.bname = b.bname
Where r.date LIKE '%2020%'
```

Example: Boat Rental database

- Consider the following schema
  - SAILOR (SID, SName, Phone, City)
  - BOAT (BName, BType, Price, OID)
  - RESERVATION (SID, BName, Date, Duration)
  - OWNER (OID, OName, Phone, Street, City, Country)
- **Find ids of the sailors who only reserved a boat owned by Mr. Jonas with OID=12345**
  - All sailors who reserved a boat – sailors who have reserved a boat not owned by MR Jonas
- **Find ids of the sailors who have never reserved a boat owned by Mr. Jonas with OID=12345**
  - All sailors – sailors who have reserved a boat owned by MR jonas

SQL SERVER (TSQL) Functions

- Visit following slides for details on SQL functions
  - Like aggregate
  - String Functions
  - Date Functions
  - Math Functions

- https://docs.microsoft.com/en-us/sql/t-sql/functions/functions?view=sql-server-ver15