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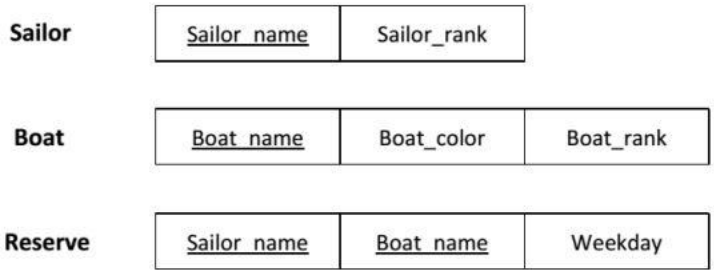
Part 1)

First, the following ER diagrams' tables were made in Microsoft SQL server, with the according primary and foreign keys for each table:



a)

Then, it was asked to apply specifications to the tables:

الف) محدودیت های زیر را اعمال کنید:

Sailor_nameها از نوع int بوده، identity و از مقدار ۳۰۰ شروع می‌شوند.

Boat_color از نوع varchar و با حداکثر ۳۰ کاراکتر

Boat_rankها دارای مقدار حداقل ۷۰ و حداکثر ۱۵۰ باشند.

The tables then were made in MSS by the following commands:

```
create table Sailor(
    Sailor_name int identity(300, 1) not null primary key,
    Sailor_rank int not null
);

create table Reserve(
    Sailor_name int not null,
    Boat_name varchar(50) not null,
    Weekday varchar(20) not null,
    primary key(Sailor_name, Boat_name),
    foreign key(Sailor_name) references Sailor(Sailor_name),
    foreign key(Boat_name) references Boat(Boat_name)
);
create table Boat(
    Boat_name varchar(50) not null primary key,
    Boat_color varchar(30) not null,
    Boat_rank int not null,
    constraint rank_limit check(Boat_rank>=70 and Boat_rank<=150)
);
```

The commands were executed successfully, and there was no error.

b)

Next, data should be added to the tables using query “insert” command:

ب) برای هر جدول ۴ داده ی مختلف را وارد کنید.

```
SET IDENTITY_INSERT Sailor ON
insert into Sailor(Sailor_name, Sailor_rank) values (300, 200);
insert into Sailor(Sailor_name, Sailor_rank) values (301, 400);
insert into Sailor(Sailor_name, Sailor_rank) values (302, 700);
insert into Sailor(Sailor_name, Sailor_rank) values (303, 300);

insert into Boat values ('S32', 'red', 110);
insert into Boat values ('G73', 'black', 100);
insert into Boat values ('A51', 'white', 80);
insert into Boat values ('T99', 'blue', 120);

insert into Reserve(Sailor_name, Boat_name, Weekday) values (300, 'S32', 'saturday');
insert into Reserve(Sailor_name, Boat_name, Weekday) values (301, 'T99', 'sunday');
insert into Reserve(Sailor_name, Boat_name, Weekday) values (302, 'G73', 'thursday');
insert into Reserve(Sailor_name, Boat_name, Weekday) values (303, 'A51', 'friday');
```

All the above were run successfully and there was no error.

c)

Now, there are 5 query questions that should be solved:

ج) پرس و جوهای زیر را بیابید:

۱- نام کلیه ی قایق هایی که در روز شنبه به آب انداخته شده اند.

۲- ایجاد دید(view)که نام کشتی، نام قایقران و رنگ کشتی را نشان دهد.

۳- نمایش رنک کلیه‌ی قایق ها.

۴-نمایش نام قایق هایی که در روزهای شنبه یا دوشنبه به آب انداخته شده‌اند.

۵- رنگ تمامی قایق هایی که در روزی که نام آن با ’s‘ شروع می‌شود، به آب انداخته شده‌اند.

Bellow, are the queries with their outputs:

Query 1:

```
--1:
select Boat_name from Reserve
where Weekday = 'saturday';
```

Results | Messages

	Boat_name
1	S32

Query 2:

```
--2:
create view v1 as
select Sailor_name, Reserve.Boat_name, Boat_color
from Reserve
inner join Boat on Reserve.Boat_name = Boat.Boat_name;
```

Messages

```
Commands completed successfully.

Completion time: 2021-04-04T02:35:38.9955268+04:30
```

Now to see the view “v1”:

```
select * from v1;
```

Results | Messages

	Sailor_name	Boat_name	Boat_color
1	300	S32	red
2	301	T99	blue
3	302	G73	black
4	303	A51	white

Query 3:

```
--3:
select Boat_rank from Boat;
```

Results Messages

	Boat_rank
1	80
2	100
3	110
4	120

Query 4:

```
--4:
select Boat_name from Reserve
where Weekday='saturday' or Weekday='monday';
```

Results Messages

	Boat_name
1	S32

Query 5:

```
--5:
select Boat_color
from Boat
inner join Reserve on Reserve.Boat_name = Boat.Boat_name
where Weekday like 's%';
```

Results Messages

	Boat_color
1	red
2	blue

Part 2)

First, the tables were made according to the following ER diagrams:

Emp

ستون	نوع	محدودیت
Emp_id	عدد صحیح	Primary Key, Identity
Name	رشته حداکثر ۵۰ کاراکتر	
Salary	عدد صحیح	

Project

ستون	نوع	محدودیت
Prj_id	عدد صحیح	Primary Key, Identity
Emp_id		foreign key

Employee-Project

Column	type	Constraints
Emp_id	int	Primary, foreign key
Prj_id	int	Primary, foreign key

The commands to create the tables were as the following:

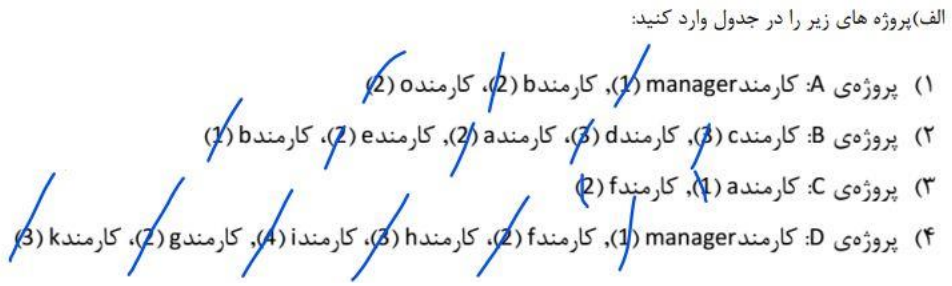
```
create table Emp(
    Emp_id int identity not null primary key,
    Emp_name varchar(50),
    Salary int
);
```

```sql
create table Project(
    Prj_id int identity not null primary key,
    Prj_name varchar(5)
);
```

```sql
create table Employee_Project(
    Prj_id int not null,
    Emp_id int not null,
    primary key(Prj_id, Emp_id),
    foreign key (Prj_id) references Project(Prj_id),
    foreign key (Emp_id) references Emp(Emp_id)
);
```

a)

Next, data should be added to the table, according to the report description:




```sql
--1
SET IDENTITY_INSERT Emp ON
insert into Emp(Emp_id, Emp_name, Salary) values (1, 'manager', 1500);
insert into Emp(Emp_id, Emp_name, Salary) values (2, 'a', 100)
insert into Emp(Emp_id, Emp_name, Salary) values (3, 'b', 200)
insert into Emp(Emp_id, Emp_name, Salary) values (4, 'c', 300)
insert into Emp(Emp_id, Emp_name, Salary) values (5, 'd', 400)
insert into Emp(Emp_id, Emp_name, Salary) values (6, 'e', 500)
insert into Emp(Emp_id, Emp_name, Salary) values (7, 'f', 600)
insert into Emp(Emp_id, Emp_name, Salary) values (8, 'g', 700)
insert into Emp(Emp_id, Emp_name, Salary) values (9, 'h', 750)
insert into Emp(Emp_id, Emp_name, Salary) values (10, 'i', 800)
insert into Emp(Emp_id, Emp_name, Salary) values (11, 'k', 840)
insert into Emp(Emp_id, Emp_name, Salary) values (12, 'o', 900)
```

```sql
--2
SET IDENTITY_INSERT Project ON
insert into Project(Prj_id, Prj_name) values (100, 'A');
insert into Project(Prj_id, Prj_name) values (101, 'B');
insert into Project(Prj_id, Prj_name) values (102, 'C');
insert into Project(Prj_id, Prj_name) values (103, 'D');
```

```sql
--3
insert into Employee_Project(Prj_id, Emp_id) values (100, 1);
insert into Employee_Project(Prj_id, Emp_id) values (100, 3);
insert into Employee_Project(Prj_id, Emp_id) values (100, 12);
insert into Employee_Project(Prj_id, Emp_id) values (101, 4);
insert into Employee_Project(Prj_id, Emp_id) values (101, 5);
insert into Employee_Project(Prj_id, Emp_id) values (101, 2);
insert into Employee_Project(Prj_id, Emp_id) values (101, 6);
insert into Employee_Project(Prj_id, Emp_id) values (101, 3);
insert into Employee_Project(Prj_id, Emp_id) values (102, 2);
insert into Employee_Project(Prj_id, Emp_id) values (102, 7);
insert into Employee_Project(Prj_id, Emp_id) values (103, 1);
insert into Employee_Project(Prj_id, Emp_id) values (103, 7);
insert into Employee_Project(Prj_id, Emp_id) values (103, 9);
insert into Employee_Project(Prj_id, Emp_id) values (103, 10);
insert into Employee_Project(Prj_id, Emp_id) values (103, 8);
insert into Employee_Project(Prj_id, Emp_id) values (103, 11);
```

The commands were run successfully without any error.

b)

Next, it is asked to execute the following query commands. The queries with their outputs are shown bellow:

ب) دستورات زیر را اجرا کنید:

۱) لیستی از پروژه هایی که کم‌تر از ۴ کارمند در آن ها کار می کنند.

۲) لیستی از کارمندان به همراه نام بخش مربوطه، نام پروژه ها.

۳)مجموع حقوق افراددی که در پروژه ی B شرکت دارند.

۴)لیستی از پروژه ها به همراه حقوق متوس افرادی که در آن شرکت دارند.

۵) لیست پروژه هایی که manager در آنها دخیل است.

Query 1:

```
--1
select Prj_id, count(Prj_id) as summation from Employee_Project
group by Prj_id
having count(Prj_id) < 4;
```

Results | Messages

	Prj_id	summation
1	100	3
2	102	2

Query 2:

```
--2
select Emp_id, Prj_name
from Employee_Project
inner join Project on Project.Prj_id = Employee_Project.Prj_id
order by Emp_id ASC;
```

Results | Messages

	Emp_id	Prj_name
1	1	A
2	1	D
3	2	C
4	2	B
5	3	B
6	3	A
7	4	B
8	5	B
9	6	B
10	7	C
11	7	D
12	8	D
13	9	D
14	10	D
15	11	D
16	12	A

Query 3:

```
--3
select sum(Salary) as sum_salary
from Emp
inner join Employee_Project on Employee_Project.Emp_id = Emp.Emp_id
inner join Project on Project.Prj_id = Employee_Project.Prj_id
where Prj_name = 'B';
```

Results Messages

	sum_salary
1	1500

Query 4:

```
--4
select Prj_name, avg(salary) as average_salary
from Emp
inner join Employee_Project on Employee_Project.Emp_id = Emp.Emp_id
inner join Project on Project.Prj_id = Employee_Project.Prj_id
group by Prj_name;
```

Results Messages

	Prj_name	average_salary
1	A	866
2	B	300
3	C	350
4	D	865

Query 5:

```
--5
select Prj_name
from Emp
inner join Employee_Project on Employee_Project.Emp_id = Emp.Emp_id
inner join Project on Project.Prj_id = Employee_Project.Prj_id
where Emp_name = 'manager';
```

Results Messages

	Prj_name
1	A
2	D