Faculty of Computers and Artificial Intelligence

Cairo University

Final Assessment Project

Course Title: Introduction to Database Systems (IS211)
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Online Recruitment Project

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Chapter 1: Introduction

1.1 Description of the project idea

Our idea is a system for employing applicants for jobs published in the system. First thing first, the employer, who has free positions in his company, offers the jobs by recording them into the system. Second thing second, the applicant who searches for a new job or a new free position apply for this job by introducing his CV or Resume to the employer. Third thing third, after many applicants apply for the job, the employer, then, could contact the best choices for his job and offer them an interview. These steps are the main operations for the system we are working on. This idea will ease the operation of hiring or employing new employees, it won't make it easier for the employer only, but for the applicant as well.

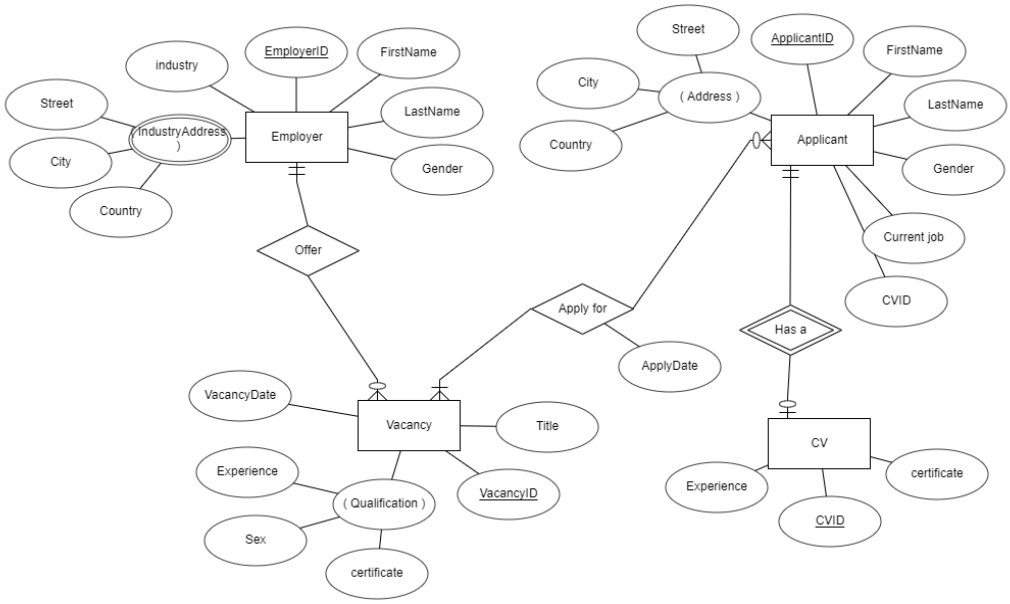
1.2 Technology and tools used

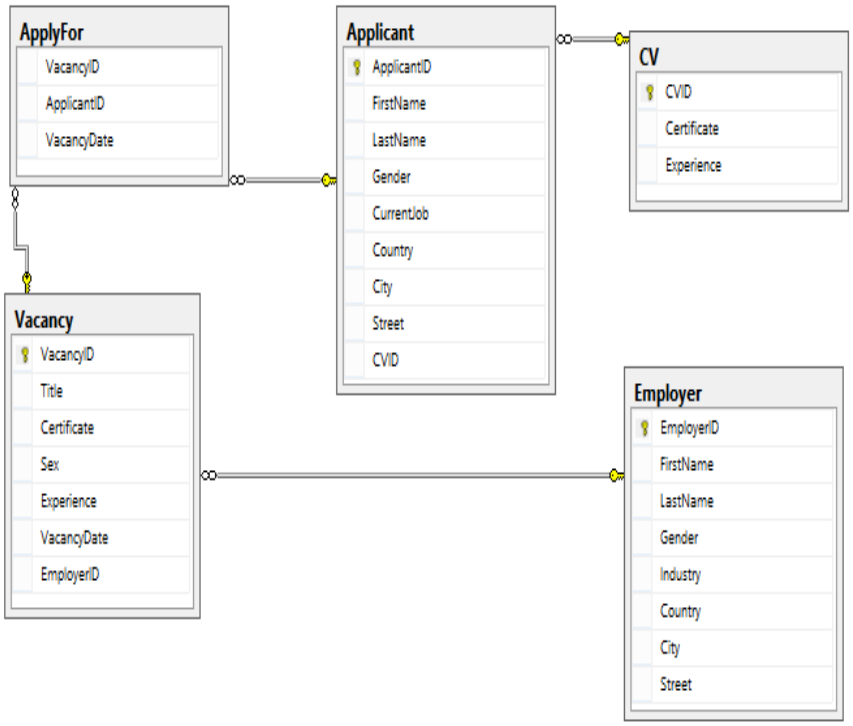
Microsoft SQL Server 2014 Management Studio.

https://erdplus.com/standalone

Chapter 2: Analysis

2.1 DB Conceptual ERD





2.2 DB Physical ERD

2.2.1 Create database

```
CREATE DATABASE Recruitment;
```

2.2.2 Create tables

```
CREATE TABLE Employer (
    EmployerID int NOT NULL PRIMARY KEY IDENTITY,
    FirstName varchar(25) NOT NULL,
       LastName varchar(25) NOT NULL,
       Gender varchar(10)  NOT NULL CHECK (Gender = 'male' or Gender = 'female'),
    Industry varchar(25) NOT NULL,
       Country varchar(25) NOT NULL,
       City varchar(25) NOT NULL,
       Street varchar(25) NOT NULL,
);
CREATE TABLE CV (
    CVID int NOT NULL PRIMARY KEY IDENTITY,
    Certificate varchar(100),
    Experience varchar(100),
);
CREATE TABLE Applicant (
    ApplicantID int NOT NULL PRIMARY KEY IDENTITY,
    FirstName varchar(25) NOT NULL,
    LastName varchar(25) NOT NULL,
    Gender varchar(10)  NOT NULL CHECK (Gender = 'male' or Gender = 'female'),
    CurrentJob varchar(25) NULL DEFAULT 'non-working',
    Country varchar(25) NOT NULL,
    City varchar(25) NOT NULL,
    Street varchar(25) NOT NULL,
    CVID int FOREIGN KEY (CVID) REFERENCES CV(CVID)
);
CREATE TABLE Vacancy (
    VacancyID int NOT NULL PRIMARY KEY IDENTITY,
    Title varchar(25) NOT NULL,
    Certificate varchar(100),
    Sex varchar(10)  NOT NULL CHECK (Sex = 'male' or Sex = 'female' or Sex = 'Both')
DEFAULT 'Both',
    Experience varchar(100),
    EmployerID int FOREIGN KEY (EmployerID) REFERENCES Employer(EmployerID) NOT NULL,
    VacancyDate date DEFAULT GETDATE() NOT NULL,
);
CREATE TABLE ApplyFor (
       VacancyID int NOT NULL FOREIGN KEY (vacancyID) REFERENCES Vacancy(vacancyID),
    ApplicantID int FOREIGN KEY (ApplicantID) REFERENCES Applicant(ApplicantID) NOT NULL,
       VacancyDate date DEFAULT GETDATE() NOT NULL,
);
```

2.2.3 Set C.V

```
SET IDENTITY_INSERT CV ON
insert into CV(CVID,Certificate,Experience)
values(1,'c++ language','three programms');
insert into CV(CVID,Certificate,Experience)
values(2,'front end','2 websites');
insert into CV(CVID,Certificate,Experience)
```

```
values(3,'English language','2 years in school');
insert into CV(CVID,Certificate,Experience)
values(4,'nothing','3years in alahly bank');
insert into CV(CVID,Certificate,Experience)
values(5,'public relationship','1 year in company');
insert into CV(CVID,Certificate,Experience)
values(6,'public relationship','4 years in hotel');
insert into CV(CVID,Certificate,Experience)
values(7,'civil enginner','built house and cinema');
insert into CV(CVID,Certificate,Experience)
values(8,'kitchen','2 years in bakery');
insert into CV(CVID,Certificate,Experience)
values(9,'nursing','4 years in clinic');
insert into CV(CVID,Certificate,Experience)
values(10,'medican in children','2 years in hospital');
insert into CV(CVID,Certificate,Experience)
values(11,'Arabic literature','25 novels');
insert into CV(CVID,Certificate,Experience)
values(12,'cs magester','professor');
```

2.2.4 Set Applicant

```
SET IDENTITY_INSERT Applicant ON
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(1,'mohamed','gamal','male','programmer','Egypt','cairo','maadi',1);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(2,'youssef','maher','male','web developer','Egypt','cairo','darelsalam',2);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(3,'alamir','hassan','male','teacher','Egypt','giza','ardalwaa',3);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(4,'mohamed','elbna','male','security','Egypt','sohag','badrashen',4);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(5,'abdo','esmat','female','hr','Egypt','asuet','qaz',5);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(6,'mai','mohamed','female','receptionest','Egypt','aswan','naser',6);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(7,'toka','ahmed','female','enginner','Egypt','luxor','simple',7);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(8,'salma','basher','female','baker','Egypt','alex','max',8);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(9,'batol','mohamed','female','nurse','Egypt','giza','panorama',9);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(10,'Alaa','fathy','female','doctor','Egypt','cairo','tahrer',10);
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(11,'ahmed','khaleed','male','writer','Egypt','tanta','asd',11);
```

```
insert into
Applicant(ApplicantID,FirstName,LastName,Gender,CurrentJob,Country,City,Street,CVID)
values(12,'abeer','osama','female','professor','Egypt','sainai','tor',12);
```

2.2.5 Set Employer

```
SET IDENTITY_INSERT Employer ON
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(1,'yasser','abdo','male','library','Egypt','fayoum','soaye');
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(2,'gamal','elwan','male','bank','Egypt','behera','brka');
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(3,'marwa','ezzat','female','hospital','Egypt','domyat','mshbk');
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(4,'wafaa','mahmoud','female','education center','Egypt','sohag','zaitoon');
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(5,'mohab','gamal','male','economist','Egypt','asuet','helwan');
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(6,'nagoa','maoud','female','hotel','Egypt','aswan','kotzika');
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(7,'fatma','hussein','female','programming','Egypt','luxor','thknat');
insert into Employer(EmployerID,FirstName,LastName,Gender,Industry,Country,City,Street)
values(8,'gamal','diab','male','civil company','Egypt','cairo','shohdaa');
```

2.2.6 Set Vacancy

```
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(1,'librarian','library support staff','both','master of library
science','2020/1/20',1);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(2,'security','secure','male','four years in international bank','2019/11/23',2);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(3,'nurse','nursing assistant','female','nothing','2020/3/3',3);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(4,'doctor','ABPS','both','nothing','2020/4/5',3);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(5,'teacher','english language','female','1 year in primary school','2019/5/20',4);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(6,'Clean Worker','nothing','male','nothing','2019/12/6',4);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(7,'Receptionist','Popular Relation','female','2 years in 4stars
hotel','2020/5/29',6);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(8,'programmer','c++ language','both','3 programs','2020/6/1',7);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(9,'web developer','front end','both','4 websites','2020/4/15',7);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(10,'enginner','Architecture art','male','bulding 2 houses','2020/5/20',8);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(11,'courier','tea maker','female','nothing','2020/2/8',8);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(12,'programmer','java language','male','4 programs','2020/3/19',7);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(13,'courier','coffe maker','both','nothing','2020/1/24',1);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
values(14,'Accountant','MSI','both','5 years working in national bank','2020/3/17',2);
insert into Vacancy(VacancyID,Title,Certificate,Sex,Experience,VacancyDate,employerID)
```

```
values(15,'Clean Worker','Cleaning expert','both','nothing','2019/10/30',3);
```

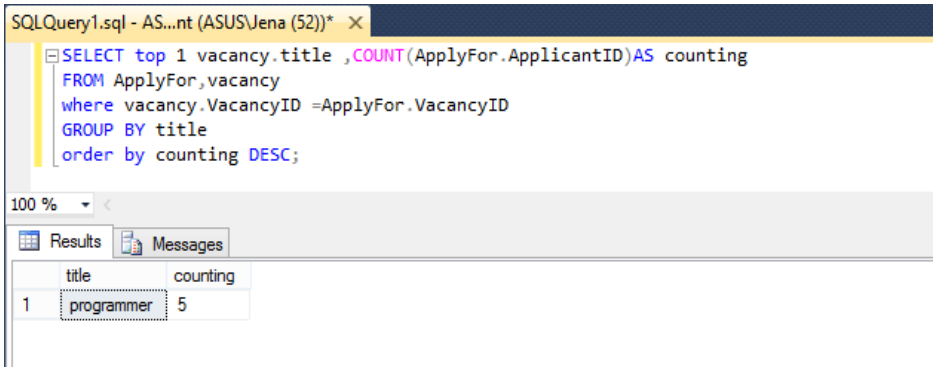
2.2.7 Apply for

```
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(11,    11,    '2020-02-01')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(2,     5,     '2019-12-01')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(2,     4,     '2019-11-30')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(3,     9,     '2020-04-01')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(4,     10,    '2020-04-15')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(4,     12,    '2020-04-10')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(5,     3,     '2019-05-25')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(5,     6,     '2019-05-30')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(6,     4,     '2019-12-25')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(6,     5,     '2019-12-30')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(7,     3,     '2020-06-01')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(8,     7,     '2020-06-17')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(8,     1,     '2020-06-15')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(9,     2,     '2020-04-20')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(10,    7,     '2020-06-01')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(8,     2,     '2020-06-20')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(12,    1,     '2019-04-01')
insert into ApplyFor(VacancyID,ApplicantID,VacancyDate)
values(12,    7,     '2019-04-30')
```

Chapter 3: SQL Queries + screenshots of the results

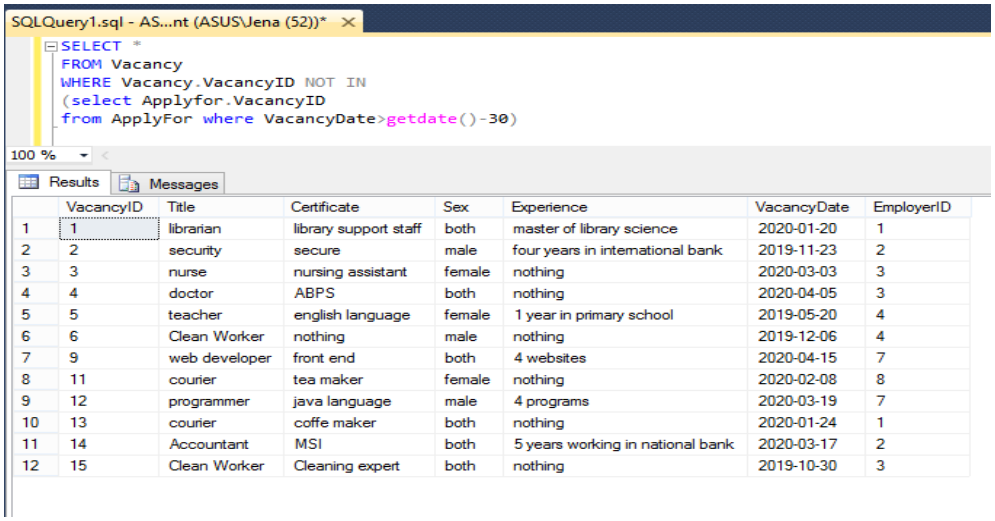
a) What was the most interesting job "title" that had maximum number of applicants?

```
SELECT top 1 vacancy.title ,COUNT(ApplyFor.ApplicantID)AS counting
FROM ApplyFor,vacancy
where vacancy.VacancyID =ApplyFor.VacancyID
GROUP BY title
order by counting DESC;
```



b) What was the announced job "title" that hadn't any applicants last month?

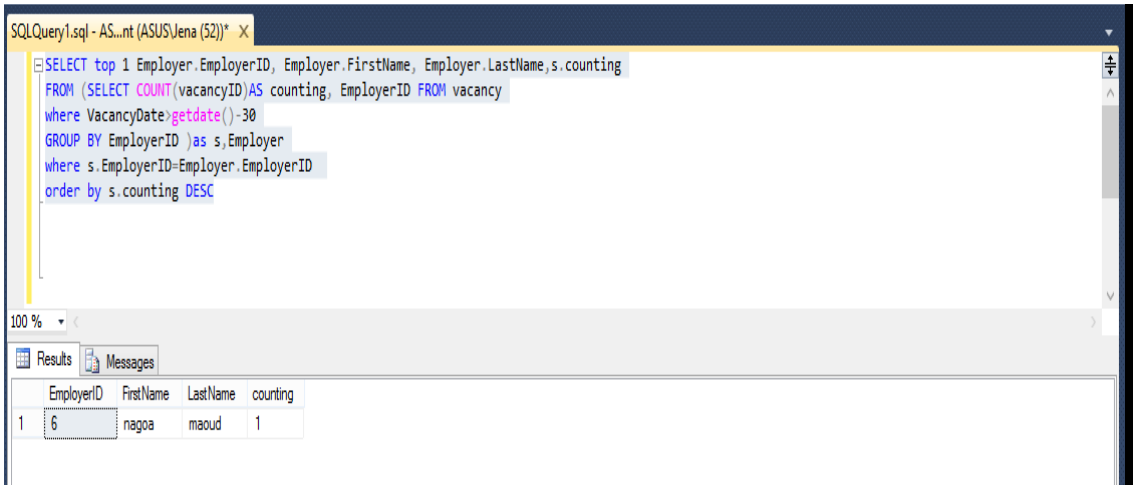
```
SELECT *
FROM Vacancy
WHERE Vacancy.VacancyID NOT IN (select Applyfor.VacancyID from ApplyFor where
VacancyDate>getdate()-30)
```



	VacancyID	Title	Certificate	Sex	Experience	VacancyDate	EmployerID
1	1	librarian	library support staff	both	master of library science	2020-01-20	1
2	2	security	secure	male	four years in international bank	2019-11-23	2
3	3	nurse	nursing assistant	female	nothing	2020-03-03	3
4	4	doctor	ABPS	both	nothing	2020-04-05	3
5	5	teacher	english language	female	1 year in primary school	2019-05-20	4
6	6	Clean Worker	nothing	male	nothing	2019-12-06	4
7	9	web developer	front end	both	4 websites	2020-04-15	7
8	11	courier	tea maker	female	nothing	2020-02-08	8
9	12	programmer	java language	male	4 programs	2020-03-19	7
10	13	courier	coffe maker	both	nothing	2020-01-24	1
11	14	Accountant	MSI	both	5 years working in national bank	2020-03-17	2
12	15	Clean Worker	Cleaning expert	both	nothing	2019-10-30	3

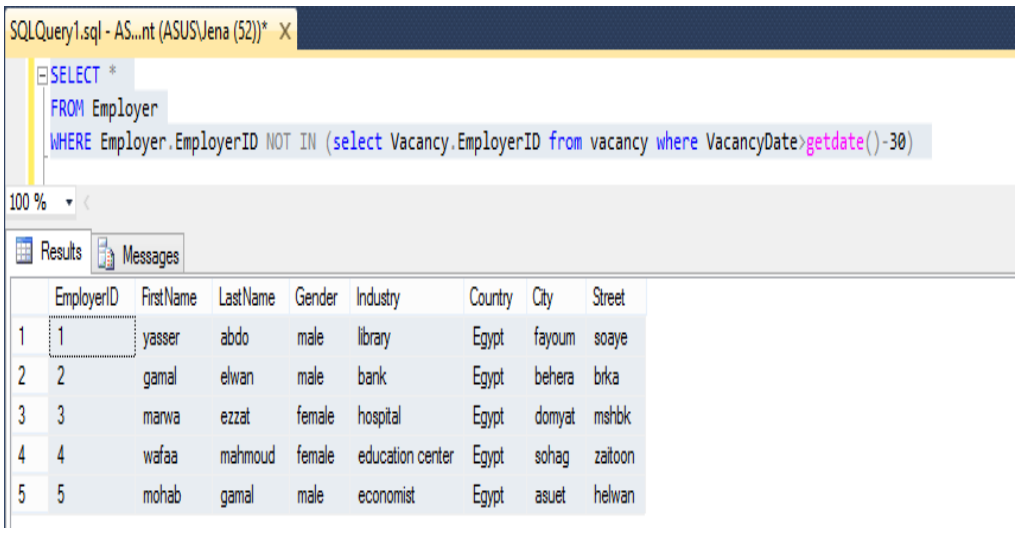
c) Who was the employer with the maximum announcements last month?

```
SELECT top 1 Employer.EmployerID, Employer.FirstName, Employer.LastName,s.counting
FROM (SELECT COUNT(vacancyID)AS counting, EmployerID FROM vacancy
where VacancyDate>getdate()-30
GROUP BY EmployerID )as s,Employer
where s.EmployerID=Employer.EmployerID
order by s.counting DESC
```



d) Who were the employers didn't announce any job last month?

```
SELECT *
FROM Employer
WHERE Employer.EmployerID NOT IN (select Vacancy.EmployerID from vacancy where
VacancyDate>getdate()-30)
```



e) What were the available positions at each employer last month?

```
select *
from Vacancy
where VacancyDate> GETDATE()-30
```

SQLQuery1.sql - AS...nt (ASUS\Jena (52))*

```
select *
from Vacancy
where VacancyDate> GETDATE()-30
```

100 %

Results | Messages

	VacancyID	Title	Certificate	Sex	Experience	VacancyDate	EmployerID
1	7	Receptionist	Popular Relation	female	2 years in 4stars hotel	2020-05-29	6
2	8	programmer	c++ language	both	3 programs	2020-06-01	7
3	10	enginner	Architecture art	male	bulding 2 houses	2020-05-20	8

f) For each seeker, retrieve all his/her information and the number of jobs he applied for

```
SELECT Applicant.ApplicantID,
Applicant.FirstName,Applicant.LastName,Applicant.Gender,s.counting
FROM (SELECT  Applicant.ApplicantID,COUNT(ApplyFor.VacancyID)AS counting
FROM ApplyFor,Applicant
where Applicant.ApplicantID = ApplyFor.ApplicantID
GROUP BY Applicant.ApplicantID )as s FULL OUTER JOIN Applicant
on s.ApplicantID=Applicant.ApplicantID
```

SQLQuery1.sql - AS...nt (ASUS\Jena (52))*

```
SELECT Applicant.ApplicantID, Applicant.FirstName,Applicant.LastName,Applicant.Gender,s.counting
FROM (SELECT  Applicant.ApplicantID,COUNT(ApplyFor.VacancyID)AS counting
FROM ApplyFor,Applicant
where Applicant.ApplicantID = ApplyFor.ApplicantID
GROUP BY Applicant.ApplicantID )as s FULL OUTER JOIN Applicant
on s.ApplicantID=Applicant.ApplicantID
```

100 %

Results | Messages

	ApplicantID	FirstName	LastName	Gender	counting
1	1	mohamed	gamal	male	2
2	2	youssef	maher	male	2
3	3	alamir	hassan	male	2
4	4	mohamed	elbna	male	2
5	5	abdo	esmat	female	2
6	6	mai	mohamed	female	1
7	7	toka	ahmed	female	3
8	8	salma	basher	female	NULL
9	9	batol	mohamed	female	1
10	10	Alaa	fathy	female	1
11	11	ahmed	khaleed	male	1
12	12	abeer	osama	female	1

References

https://www.w3schools.com/sql/default.asp