

RELATIONAL DATABASES

END OF COURSE PROJECT

ASSUMPTIONS MADE:

- The company founded in 1980s that had been running successfully so far is facing some difficulties in the recent years due to tough competition in the software market.
- The newly appointed HR seek our help to get him/her understand the current company situation.
- We assume the date of analysis as 2003-08-01 because of the following reasons.
 - Salary mostly varies every year for employees
 - The last observed salary change was on 2002-08-01
 - It is logical to improve the company's situation one year after all the processes are frozen

Query:

List of the most experienced employees (by the number of years) in each department and the company as a whole.

(i) Each department

```
SELECT E.first_name AS "First Name", E.last_name AS "Last Name",
       T.title AS "Position", D.dept_name AS "Department Name",
       YEAR('2002-08-01')-YEAR(E.birth_date) AS "Age",
       YEAR('2002-08-01')-YEAR(E.hire_date) AS "Experience"
FROM ((employees E JOIN dept_emp DE USING(emp_no))
      JOIN titles T USING(emp_no))
      JOIN departments D ON D.dept_no=DE.dept_no
WHERE (YEAR('2002-08-01')-YEAR(E.hire_date))=17 AND DE.to_date='9999-01-01' AND
T.to_date='9999-01-01' AND D.dept_name='Development';
```

(ii) the company

```
SELECT E.first_name AS "First Name", E.last_name AS "Last Name", T.title AS "Position",
       D.dept_name AS "Department Name", YEAR('2002-08-01')-YEAR(E.birth_date) AS "Age",
       YEAR('2002-08-01')-YEAR(E.hire_date) AS "Experience"
FROM ((employees E JOIN dept_emp DE USING(emp_no))
      JOIN titles T USING(emp_no))
      JOIN departments D ON D.dept_no=DE.dept_no
WHERE (YEAR('2002-08-01')-YEAR(E.hire_date))=17 AND T.to_date='9999-01-01' AND
DE.to_date='9999-01-01';
```

Result:

In all the departments, maximum experiences are 17 years as shown in the table below.

Experience	Department Name
17	Development
17	Sales
17	Production
17	Human Resources
17	Research
17	Quality Management
17	Customer Service
17	Marketing
17	Finance

Then, after proceeding further, we obtained the list of the most experience employees in each of the department and the company as a whole. Sample results for the whole company is attached below.

First Name	Last Name	Position	Department Name	Age	Experience
Bezalel	Simmel	Staff	Sales	38	17
Sumant	Peac	Senior Engineer	Quality Management	50	17
Eberhardt	Terkki	Senior Staff	Human Resources	39	17
Otmair	Herbst	Senior Engineer	Quality Management	46	17
Tse	Herber	Senior Staff	Sales	40	17
Reuven	Garigliano	Technique Leader	Research	47	17
Erez	Ritzmann	Senior Engineer	Development	50	17
Premal	Baek	Senior Staff	Human Resources	45	17
Yuichiro	Swick	Staff	Customer Service	39	17
Kayoko	Valtorta	Senior Staff	Customer Service	48	17

(the same query can be used to obtain all the most experienced employees in each of the departments. For sample, I have attached the results of “Development” team.

First Name	Last Name	Position	Department Name	Age	Experience
Erez	Ritzmann	Senior Engineer	Development	50	17
Armond	Peir	Technique Leader	Development	47	17
Nigel	Aloisi	Senior Engineer	Development	48	17
Pranav	Furedi	Senior Engineer	Development	49	17
Carrsten	Schmiedel	Engineer	Development	39	17
Foong	Flasterstein	Engineer	Development	41	17
Basil	Ishibashi	Senior Engineer	Development	47	17
Prodip	Schusler	Assistant Engineer	Development	38	17
Mototsugu	Beilner	Senior Engineer	Development	44	17
Eishiro	Miyakawa	Senior Engineer	Development	46	17

Analysis/interpretation:

As mentioned earlier, 17 is the maximum years of experience of employees in various departments. Total number of employees with this experience in various departments are shown below.

Sl. No.	Department	No. of employees
01	Development	7270
02	Production	6383
03	Sales	4344
04	Customer Service	2021
05	Research	1841
06	Marketing	1773
07	Quality Management	1712
08	Human Resources	1514
09	Finance	1433
	Total	28291

After analyzing the above data of 28291 employees, their age distribution across departments and job roles are shown below.

Job Title	Department Name								
	Customer Servi..	Development	Finance	Human Resourc..	Marketing	Production	Quality Manag..	Research	Sales
Assistant Engineer	45.500	44.847				44.575	45.233	44.800	
Engineer	45.120	44.701				44.950	45.017	44.708	
Manager			46.000	45.000					
Senior Engineer	45.098	44.908				44.857	44.857	44.720	
Senior Staff	44.877	44.928	45.047	44.794	44.922	45.162		45.057	44.982
Staff	44.838	45.500	44.802	44.807	44.996	46.538		45.012	45.157
Technique Leader	44.500	44.845				44.762	45.589	45.081	

It is found through further analyses that more aged people are found in Production, Development and Sales departments.

As we have mentioned earlier cluster 1 has most aged people among the most experienced people in the company.

Recommendations:

As more aged people are concentrated in certain departments alone, this leads to an invariability in the distribution of experience across different departments. There might be some misguidance if experienced people are not present in certain departments. We suggest revamping employees' departments according to their interests simultaneously considering their expertise in this company and their previous company. For example, some senior engineer in Quality Management department could be serving for some time in production to share some problems that has been repeating for a long time and causing issues. This will decrease the time to market of the product.

Query:

List of the most recently hired employees (that is, the year the most recent employee was recruited).

```
SELECT E.first_name AS "First Name", E.last_name AS "Last Name", T.title AS "Position",  
       YEAR('2002-08-01')-YEAR(E.birth_date) AS "Age", E.gender AS "Gender",  
       TIMESTAMPDIF(YEAR, E.hire_date, '2002-08-01') AS "Experience"  
FROM employees E JOIN titles T USING(emp_no)  
WHERE YEAR(E.hire_date) IN (SELECT MAX(YEAR(E.hire_date)) FROM employees E);
```

Result:

2000 is the last year that an employee has been recruited in the company. Totally, we have 13 employees who were hired in 2000 as shown below.

First Name	Last Name	Position	Age	Gender	Experience
Ulf	Flexer	Staff	42	M	2
Seshu	Rathonyi	Staff	38	F	2
Randi	Luit	Staff	49	F	2
Mariangiola	Boreale	Senior Engineer	47	M	2
Ennio	Alblas	Senior Staff	42	F	2
Volkmar	Perko	Senior Staff	43	F	2
Xuejun	Benzmuller	Staff	44	F	2
Shahab	Demeyer	Senior Staff	48	M	2
Jaana	Verspoor	Engineer	49	F	2
Jeong	Boreale	Engineer	49	M	2
Yucal	Gerlach	Engineer	45	M	2
Bikash	Covnot	Engineer	38	M	2
Hideyuki	Delgrande	Engineer	48	F	2

Analysis/interpretation:

Of all the 13 employees hired in 2000, their distribution of job position along with their average age is shown below. It can be observed that highest number of hires was for "Staff" position. But they have the lowest average age.

It is also interesting to note that higher the number of hires, lower is the average age.



Of all these 13 employees, 4 of them left the company within almost 2 years in the company as shown below.

First Name	Last Name	Position	Age	Relieved date	Months Spent at company
Seshu	Rathonyi	Staff	38	2001-07-24	18
Shahab	Demeyer	Senior Staff	48	2002-03-25	26
Jeong	Boreale	Engineer	49	2002-02-05	25
Bikash	Covnot	Engineer	38	2000-05-19	3

Bikash Covnot left the company within 3 months of joining. Company spends a lot of money on hiring potential employees. If newly recruited employees leave the company before generating much value to the company, it is still a great loss of revenue to the company.

Recommendations:

Efforts must be taken to retain employees in the company. More helpful employee benefits could be given to increase their chances of being retained in the company. The company can also try to sign a contract while joining stating that if the employee stays in the company for a particular number of years, they will be entitled to receive a huge increment and few shares of the company. The company could also create a team to follow up with the employees to check with their level of satisfaction in their roles.

Query:

How many employees were hired every year?

```

SELECT YEAR(E.hire_date) AS "Year" ,COUNT(DISTINCT E.emp_no) AS "No. of employees
hired"
    FROM ((employees E JOIN dept_emp DE USING(emp_no))
    JOIN titles T USING(emp_no))
    JOIN departments D ON D.dept_no=DE.dept_no
    GROUP BY YEAR(E.hire_date);

```

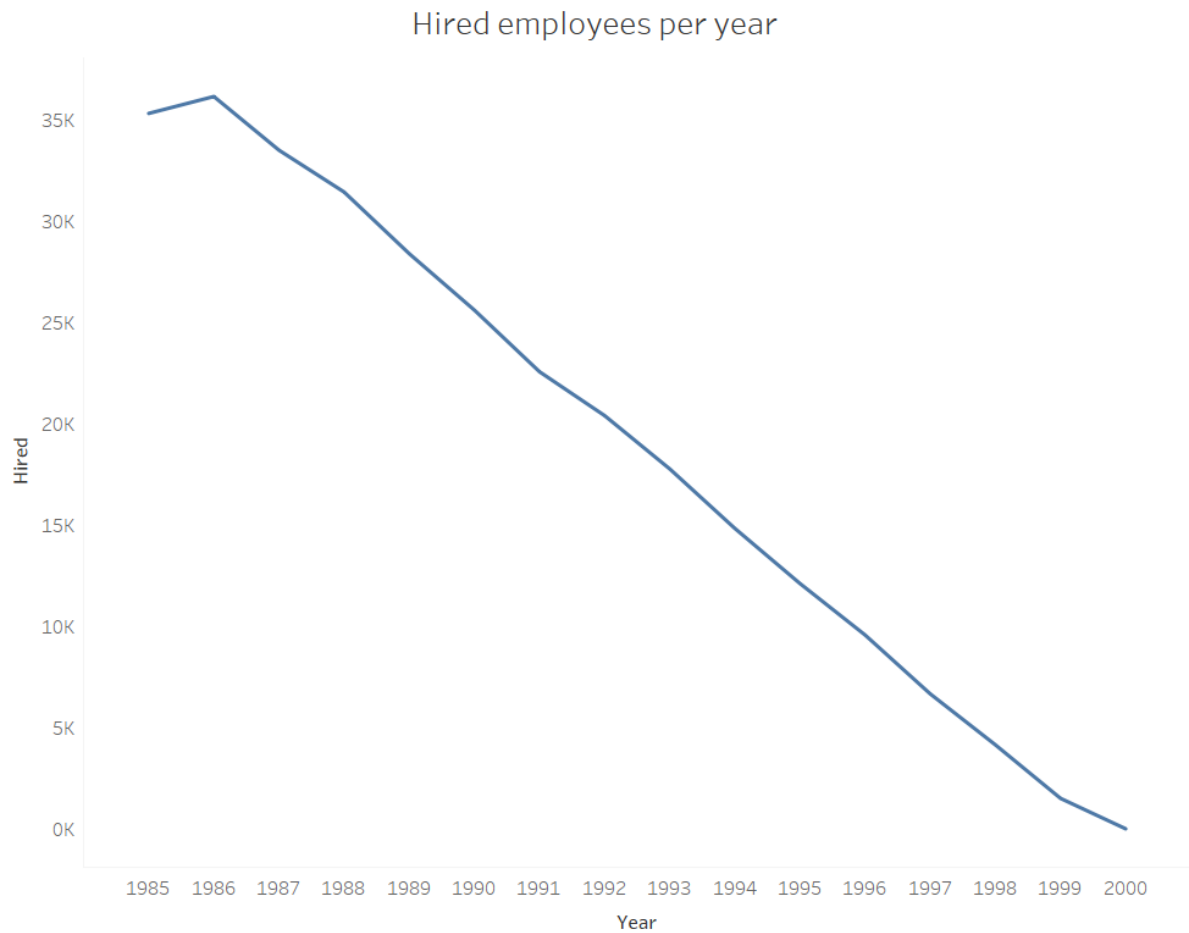
Result:

The below list shows the total number of employees hired every year since the beginning of the company.

Year	No. of employees hired
1985	35316
1986	36150
1987	33501
1988	31436
1989	28394
1990	25610
1991	22568
1992	20402
1993	17772
1994	14835
1995	12115
1996	9574
1997	6669
1998	4155
1999	1514
2000	13

Analysis/interpretation:

Analyzing the results obtained, we found that the number of employees hired has been decreasing over years. Our statements are backed by the results below.



Recommendations:

Hiring new employees helps the company stay along with its competitors. Decreasing or halting the recruitment process prevent potential employees from joining the company which in turns adversely affects the growth of the company in long run. As time moves, potential employees grow old and eventually leave the company. They also take their knowledge and experience with them. So, we suggest stabilizing the hiring process and brining in new talents to the company thus keeping it sustainable.