# DATABASE SYSTEMS AND WEB PROJECT BASED LEARNING



**Case Study Title: Student Placement Database** 

#### **Abstract**

In the following case study a placement cell is maintaining a database of the students from different colleges, placed in various companies.

There are 5 tables namely; Student, Company, College, Placement, College\_company containing the information regarding the colleges, companies and the students.

Through this case study we can conclude how many students are placed from which college in which company more clearly by viewing the following tables and writing respective queries to find the details for the same.

#### Introduction

Being an engineering student in the pre-final year, having a basic knowledge of the placement cell of colleges to understand the big picture of placements as a whole, we are making this database of the placement cell containing the details regarding the placement of students in various companies through simple tables such as student, company, college, placement, college company.

With this we would be having a proper record and numbers of the placement done in different companies with their CTC mentioned in the table. This will make it easy to understand the companies various CTC being offered to how many students, number of companies visiting the campus of college and number of students taking and getting placed through college TnP cell. As we all know, placement season is near and this database would help in different fields by having proper data of the placements such as college ranking, On campus placement records etc.

#### Schema details

A placement cell maintains a database of the students placed in various companies. They maintain the student details in a table called **Student**, containing their:

student id: integer,

student\_name:String,

college\_id: integer,

The student\_id can be used to uniquely identify any student.

The company details are stored in the Company table comprising of

company id: integer,

company\_name: string,

avg\_sal: decimal(32,2).

The company\_id serves as a primary key for each company and the avg\_sal records the average

salary offered.

The college details are stored in a table called **College** containing:

college id:integer,

college\_name: string,

city: string.

The **Placement** table is a relationship entity with the following details:

student id: integer,

company id: integer,

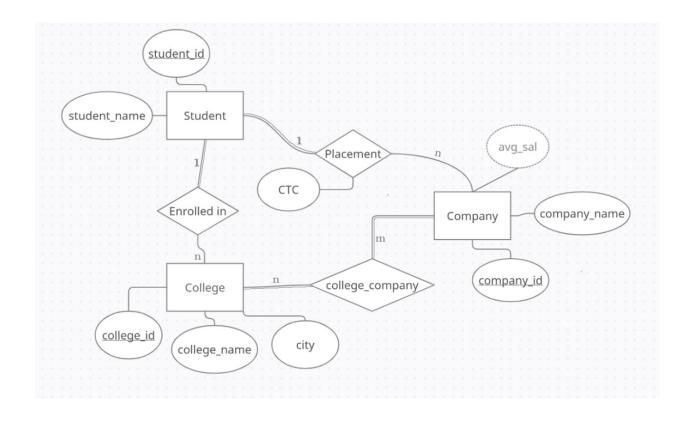
CTC: decimal(32,2).

The **college\_company** table is relationship entity with the following details:

college id: integer,

company id: integer.

# **ERD Diagram**



# **Table Description**

```
CREATE TABLE Company(
  company_id INT NOT NULL,
  company name VARCHAR(100),
  avg_sal DECIMAL(32, 2),
  PRIMARY KEY(company_id)
);
CREATE TABLE College(
  college_id INT NOT NULL,
  college name VARCHAR(100),
  city VARCHAR(50),
  PRIMARY KEY (college_id)
);
CREATE TABLE Student(
  student id INT NOT NULL UNIQUE,
  student_name VARCHAR(50),
  college_id INT,
  FOREIGN KEY(college_id) REFERENCES College(college_id),
  PRIMARY KEY (student id)
);
CREATE TABLE Placement(
  student_id INT NOT NULL,
  company_id INT NOT NULL,
  CTC DECIMAL(32, 2) NOT NULL,
  FOREIGN KEY(company id) REFERENCES Company(company id),
  FOREIGN KEY(student id) REFERENCES Student(student id),
  PRIMARY KEY(student_id, company_id)
);
CREATE TABLE college_company (
  college id INT NOT NULL,
```

```
company_id INT NOT NULL,

FOREIGN KEY (college_id) REFERENCES College(college_id),

FOREIGN KEY (company_id) REFERENCES company(company_id),

PRIMARY KEY(college_id, company_id)

);
```

#### **Schema Details**

A placement cell maintains a database of the students placed in various companies. They maintain the student details in a table called **Student**, containing their:

student_id	Integer	Primary Key
student_name	String	-
college_id	Integer	Foreign Key

The company details are stored in the Company table comprising of

company_id	Integer	Primary Key
company_name	String	-
avg_sal	Decimal	-

The college details are stored in a table called **College** containing:

college_id	integer	Primary key
college_name	String	-
city	String	-

The **placement** details are stored in a table as shown:

student_id	Integer	Primary Key, Foreign Key
company_id	Integer	Primary Key, Foreign Key
CTC	Decimal	-

This **college\_comapny** table details are shown below:

college_id	Integer	Primary Key, Foreign Key
company_id	Integer	Primary Key, Foreign Key

# Queries

# **Create table queries:**

```
CREATE TABLE Company(
company_id INT NOT NULL,
company_name VARCHAR(100),
avg_sal DECIMAL(32, 2),
PRIMARY KEY(company_id)
);

CREATE TABLE College(
college_id INT NOT NULL,
college_name VARCHAR(100),
city VARCHAR(50),
PRIMARY KEY (college_id)
);
```

```
CREATE TABLE Student(
  student id INT NOT NULL UNIQUE,
  student_name VARCHAR(50),
  college id INT,
  FOREIGN KEY(college_id) REFERENCES College(college_id),
  PRIMARY KEY (student id)
);
CREATE TABLE Placement(
  student_id INT NOT NULL,
  company_id INT NOT NULL,
  CTC DECIMAL(32, 2) NOT NULL,
  FOREIGN KEY(company id) REFERENCES Company(company id),
  FOREIGN KEY(student id) REFERENCES Student(student id),
  PRIMARY KEY(student id, company id)
);
CREATE TABLE college company (
  college_id INT NOT NULL,
  company id INT NOT NULL,
  FOREIGN KEY (college id) REFERENCES College(college id),
  FOREIGN KEY (company id) REFERENCES company (company id),
  PRIMARY KEY(college_id, company_id)
);
Triggers:
DROP TRIGGER IF EXISTS avg sal insert;
DROP TRIGGER IF EXISTS avg sal delete;
DROP TRIGGER IF EXISTS college company add;
DROP TRIGGER IF EXISTS college company delete;
DELIMITER $$
CREATE TRIGGER avg sal insert
```

```
AFTER INSERT
ON placement
FOR EACH ROW
BEGIN
  UPDATE company
  SET company.avg_sal := (
    SELECT AVG(placement.CTC)
    FROM placement
    WHERE NEW.company_id = placement.company_id
  WHERE company.company id = NEW.company id;
END $$
CREATE TRIGGER avg sal delete
AFTER DELETE
ON placement
FOR EACH ROW
BEGIN
  UPDATE company
  SET company.avg sal := (
    SELECT AVG(placement.CTC)
   FROM placement
    WHERE OLD.company id = placement.company id
 )
  WHERE company.company id = OLD.company id;
END $$
DELIMITER $$
CREATE TRIGGER college_company_add
AFTER INSERT
ON placement
FOR EACH ROW
BEGIN
```

```
DECLARE college id student INT;
  SET college id student := (SELECT college id
                FROM student
                WHERE student.student id = NEW.student id);
  IF ( SELECT NOT EXISTS (
      SELECT college id
      FROM college company
      WHERE college_company_id = NEW.company_id
      AND college id = college id student
    ) THEN
    INSERT INTO
      college company
    VALUES
      (college id student, NEW.company id);
  END IF;
END $$
DELIMITER $$
CREATE TRIGGER college company delete
AFTER DELETE
ON placement
FOR EACH ROW
BEGIN
  DECLARE college_id_student INT;
 SET college_id_student := (SELECT college_id
                FROM student
                WHERE student.student id = OLD.student id);
  IF ( SELECT EXISTS (
      SELECT college id
```

```
FROM college company
      WHERE college_company_id = OLD.company_id
      AND college id = college id student
      )
   ) THEN
   DELETE
    FROM
      college_company
    WHERE
      college company.company id = OLD.company id
      AND college_id = college_id_student;
  END IF;
END $$
DELIMITER;
Insert values:
INSERT INTO
  Company (company_id, company_name)
VALUES
  (1, 'XORIANT'),
  (2, 'QUINNOX'),
  (3, 'INDUS VALLEY'),
  (4, 'IGATE'),
  (5, 'HEXAWARE TECHNOLOGIES'),
  (6, 'MAQ SOFTWARE'),
  (7, 'DIRECTI'),
  (8, 'ATOS'),
 (9, 'MPHASIS'),
  (10, 'WIPRO'),
  (11, 'NEOSOFT TECHNOLOGIES'),
  (12, 'INFOSYS'),
  (13, 'RAVE TECHNOLOGIES'),
```

```
(14, 'TECH MAHINDRA'),
(15, 'NUCSOFT');
```

#### **INSERT INTO College VALUES**

(1001, 'XAVIER INSTITUTE OF ENGINEERING', 'MUMBAI'),

(1002, 'INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT', 'PUNE'),

(1003, 'VISHWAKARMA INSTITUTE OF TECHNOLOGY', 'THANE'),

(1004, 'PILLAI COLLEGE OF ENGINEERING', 'NAVI MUMBAI'),

(1005, 'THAKUR COLLEGE OF ENGINEERING AND TECHNOLOGY', 'MUMBAI'),

(1006, 'THADOMAL SHAHANI ENGINEERING COLLEGE', 'MUMBAI'),

(1007, 'LOKMANYA TILAK COLLEGE OF ENGINEERING', 'NAVI MUMNAI'),

(1008, 'MIT COLLEGE OF ENGINEERING', 'PUNE'),

(1009, 'PUNE INSTITUTE OF COMPUTER TECHNOLOGY', 'PUNE'),

(1010, 'TRINITY COLLEGE OF ENGINEERING AND RESEARCH', 'PUNE');

#### **INSERT INTO Student VALUES**

(1910, 'RIA SINGH', 1001),

(1920, 'SHIVANGI GUPTA', 1001),

(2098, 'RITU SINGH', 1002),

(2100, 'SHLOK GUPTA', 1002),

(3120, 'RITU KUMAR', 1002),

(4562, 'AAKANSHA AGARWAL', 1003),

(2356, 'RAJ MALHOTRA', 1003),

(2344, 'BHUMI PADREKAR', 1003),

(1987, 'RAHUL GUPTA', 1004),

(1992, 'SUMIT GUPTA', 1005),

(1976, 'TUSHAR SINGH', 1005),

(1912, 'HARSH SINGH', 1005),

(1672, 'GOURAV SINGH', 1006),

(1723, 'NIKITA MITTAL', 1006),

(1623, 'ISHITA BHATIA', 1007),

(1434, 'STUTI GUPTA', 1008),

```
(1324, 'SURBHI VERMA', 1008),
(1999, 'ARCHIT TIWARI', 1008),
(2000, 'KARAN SHARMA', 1009),
(2001, 'ISHAAN AGARWAL', 1010),
(2002, 'YASH GUPTA', 1010);
```

#### **INSERT INTO Placement VALUES**

(1910, 12, 400000.00),

(1920, 12, 400000.00),

(2098, 1, 69420.00),

(2100, 2, 696969.00),

(3120, 3, 767678.00),

(2356, 4, 67898.00),

(2344, 4, 67898.00),

(1987, 5, 1899922.00),

(1992, 5, 1899922.00),

(1976, 6, 234467.00),

(1912, 6, 234467.00),

(1672, 6, 345673.00),

(1723, 7, 877722.00),

(2000, 12, 300000.00),

(2001, 12, 500000.00),

(1999, 12, 350000.00);

ıysql> SELECT	* FROM company;	++
company_id   +	company_name	avg_sal
1	XORIANT	69420.00
2	QUINNOX	696969.00
3	INDUS VALLEY	767678.00
4	IGATE	67898.00
5	HEXAWARE TECHNOLOGIES	1899922.00
6	MAQ SOFTWARE	271535.67
7	DIRECTI	877722.00
8	ATOS	0.00
9	MPHASIS	0.00
10	WIPRO	0.00
11	NEOSOFT TECHNOLOGIES	0.00
12	INFOSYS	390000.00
13	RAVE TECHNOLOGIES	0.00
14	TECH MAHINDRA	0.00
15	NUCSOFT	0.00
+ 15 rows in set	(0.00 sec)	++

college_id	college_name	city city
1001	XAVIER INSTITUTE OF ENGINEERING	MUMBAI
1002	INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT	PUNE
1003	VISHWAKARMA INSTITUTE OF TECHNOLOGY	THANE
1004	PILLAI COLLEGE OF ENGINEERING	NAVI MUMBAI
1005	THAKUR COLLEGE OF ENGINEERING AND TECHNOLOGY	MUMBAI
1006	THADOMAL SHAHANI ENGINEERING COLLEGE	MUMBAI
1007	LOKMANYA TILAK COLLEGE OF ENGINEERING	NAVI MUMNAI
1008	MIT COLLEGE OF ENGINEERING	PUNE
1009	PUNE INSTITUTE OF COMPUTER TECHNOLOGY	PUNE
1010	TRINITY COLLEGE OF ENGINEERING AND RESEARCH	PUNE

mysql> SELECT	* FROM student;	
student_id	student_name	college_id
1324	SURBHI VERMA	1008
1434	STUTI GUPTA	1008
1623	ISHITA BHATIA	1007
1672	GOURAV SINGH	1006
1723	NIKITA MITTAL	1006
1910	RIA SINGH	1001
1912	HARSH SINGH	1005
1920	SHIVANGI GUPTA	1001
1976	TUSHAR SINGH	1005
1987	RAHUL GUPTA	1004
1992	SUMIT GUPTA	1005
1999	ARCHIT TIWARI	1008
2000	KARAN SHARMA	1009
2001	ISHAAN AGARWAL	1010
2002	YASH GUPTA	1010
2098	RITU SINGH	1002
2100	SHLOK GUPTA	1002
2344	BHUMI PADREKAR	1003
2356	RAJ MALHOTRA	1003
3120	RITU KUMAR	1002
4562	AAKANSHA AGARWAL	1003
+		++
21 rows in set	(0.00 sec)	

mysql> SELECT	* FROM placer	ment; ++
student_id	company_id	стс
1672	6	345673.00
1723	7	877722.00
1910	12	400000.00
1912	6	234467.00
1920	12	400000.00
1976	6	234467.00
1987	5	1899922.00
1992	5	1899922.00
1999	12	350000.00
2000	12	300000.00
2001	12	500000.00
2098	1	69420.00
2100	2	696969.00
2344	4	67898.00
2356	4	67898.00
3120	3	767678.00
+	+	++
16 rows in set	(0.00 sec)	

college_id	company_id
 1 1002	1
1002	2
1002	3 İ
1003	4
1004	5
1005	5
1005	6
1006	6
1006	7
1001	12
1008	12
1009	12
1010	12

# **Queries:**

## -- Number of students placed from each college

```
SELECT

college.college_name AS `College`,

COUNT(*) AS `Number of students placed`

FROM student JOIN college

USING (college_id)

WHERE student.student_id IN (

SELECT placement.student_id

FROM placement
) GROUP BY college.college_name;
```

College	Number of students placed
THADOMAL SHAHANI ENGINEERING COLLEGE	+   2
XAVIER INSTITUTE OF ENGINEERING	
THAKUR COLLEGE OF ENGINEERING AND TECHNOLOGY	j 3 j
PILLAI COLLEGE OF ENGINEERING	j 1 j
MIT COLLEGE OF ENGINEERING	1
PUNE INSTITUTE OF COMPUTER TECHNOLOGY	1
TRINITY COLLEGE OF ENGINEERING AND RESEARCH	1
INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT	] 3
VISHWAKARMA INSTITUTE OF TECHNOLOGY	2
rows in set (0.01 sec)	++

## -- List of students who have not been placed

```
SELECT
```

```
student.student_id AS `Enrollment Number`,
student.student_name AS `Name`,
college.college_name AS `College`
FROM
```

student JOIN

```
college USING(college_id)
WHERE student_id NOT IN(
SELECT student_id
FROM placement
);
```

```
College
Enrollment Number | Name
                    ISHITA BHATIA
                                       LOKMANYA TILAK COLLEGE OF ENGINEERING
             1623
             1324
                    SURBHI VERMA
                                       MIT COLLEGE OF ENGINEERING
             1434
                    STUTI GUPTA
                                       MIT COLLEGE OF ENGINEERING
             2002
                    YASH GUPTA
                                       TRINITY COLLEGE OF ENGINEERING AND RESEARCH
             4562
                    AAKANSHA AGARWAL
                                       VISHWAKARMA INSTITUTE OF TECHNOLOGY
rows in set (0.17 sec)
```

#### -- All placements formatted properly

#### **SELECT**

```
student.student_id AS `Enrollment Number`,
student.student_name AS `Name`,
placement.CTC AS `CTC`,
company_name AS `Company`,
college.college_name AS `College`
FROM
student JOIN
placement USING (student_id) JOIN
college USING (college_id) JOIN
```

company USING (company id);

nrollment Number	Name	стс	Company	College
1723	NIKITA MITTAL	877722.00	DIRECTI	THADOMAL SHAHANI ENGINEERING COLLEGE
1987	RAHUL GUPTA	1899922.00	HEXAWARE TECHNOLOGIES	PILLAI COLLEGE OF ENGINEERING
1992	SUMIT GUPTA	1899922.00	HEXAWARE TECHNOLOGIES	THAKUR COLLEGE OF ENGINEERING AND TECHNOLOG
2344	BHUMI PADREKAR	67898.00	IGATE	VISHWAKARMA INSTITUTE OF TECHNOLOGY
2356	RAJ MALHOTRA	67898.00	IGATE	VISHWAKARMA INSTITUTE OF TECHNOLOGY
3120	RITU KUMAR	767678.00	INDUS VALLEY	INDIRA COLLEGE OF ENGINEERING AND MANAGEMEN
1910	RIA SINGH	400000.00	INFOSYS	XAVIER INSTITUTE OF ENGINEERING
1920	SHIVANGI GUPTA	400000.00	INFOSYS	XAVIER INSTITUTE OF ENGINEERING
1999	ARCHIT TIWARI	350000.00	INFOSYS	MIT COLLEGE OF ENGINEERING
2000	KARAN SHARMA	300000.00	INFOSYS	PUNE INSTITUTE OF COMPUTER TECHNOLOGY
2001	ISHAAN AGARWAL	500000.00	INFOSYS	TRINITY COLLEGE OF ENGINEERING AND RESEARCH
1672	GOURAV SINGH	345673.00	MAQ SOFTWARE	THADOMAL SHAHANI ENGINEERING COLLEGE
1912	HARSH SINGH	234467.00	MAQ SOFTWARE	THAKUR COLLEGE OF ENGINEERING AND TECHNOLOG
1976	TUSHAR SINGH	234467.00	MAQ SOFTWARE	THAKUR COLLEGE OF ENGINEERING AND TECHNOLOG
2100	SHLOK GUPTA	696969.00	QUINNOX	INDIRA COLLEGE OF ENGINEERING AND MANAGEMEN
2098	RITU SINGH	69420.00	XORIANT	INDIRA COLLEGE OF ENGINEERING AND MANAGEMEN

# -- Average CTC of each College

```
SELECT
```

college\_name AS `College`,

FORMAT(AVG(CTC), 2) AS 'Average CTC'

# FROM

student

JOIN placement USING (student\_id)

JOIN company USING (company\_id)

JOIN college USING (college\_id)

GROUP BY college\_name;

+	++
College	Average CTC
<del>+</del>	++
INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT	511,355.67
MIT COLLEGE OF ENGINEERING	350,000.00
PILLAI COLLEGE OF ENGINEERING	1,899,922.00
PUNE INSTITUTE OF COMPUTER TECHNOLOGY	300,000.00
THADOMAL SHAHANI ENGINEERING COLLEGE	611,697.50
THAKUR COLLEGE OF ENGINEERING AND TECHNOLOGY	789,618.67
TRINITY COLLEGE OF ENGINEERING AND RESEARCH	500,000.00
VISHWAKARMA INSTITUTE OF TECHNOLOGY	67,898.00
XAVIER INSTITUTE OF ENGINEERING	400,000.00
+	++
9 rows in set (0.05 sec)	

# -- Total number of students in each college

SELECT

college\_name AS `College`,

 $COUNT(student\_id)\ AS\ `Total\ Students`$ 

FROM

student JOIN college USING(college\_id)

GROUP BY college\_name;

t	Total Students
INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT LOKMANYA TILAK COLLEGE OF ENGINEERING MIT COLLEGE OF ENGINEERING PILLAI COLLEGE OF ENGINEERING PUNE INSTITUTE OF COMPUTER TECHNOLOGY THADOMAL SHAHANI ENGINEERING COLLEGE THAKUR COLLEGE OF ENGINEERING AND TECHNOLOGY TRINITY COLLEGE OF ENGINEERING AND RESEARCH VISHWAKARMA INSTITUTE OF TECHNOLOGY	1   3   1   3   1   1   1   1   1   1
XAVIER INSTITUTE OF ENGINEERING + 10 rows in set (0.21 sec)	2

# -- Number of students placed in each city

```
SELECT
college.city AS `City`,
COUNT(*) AS `Number of students placed`
FROM student JOIN college
USING (college_id)
WHERE student.student_id IN (
SELECT placement.student_id
FROM placement
) GROUP BY college.city;
```

# -- MAX CTC in each college

```
SELECT

college_name AS `College Name`,

MAX(CTC)

FROM

placement JOIN student USING (student_id)

JOIN college USING (college_id)

GROUP BY college_name;
```

```
MAX(CTC)
 College Name
 THADOMAL SHAHANI ENGINEERING COLLEGE
                                                  877722.00
 XAVIER INSTITUTE OF ENGINEERING
                                                  400000.00
 THAKUR COLLEGE OF ENGINEERING AND TECHNOLOGY
                                                 1899922.00
 PILLAI COLLEGE OF ENGINEERING
                                                 1899922.00
 MIT COLLEGE OF ENGINEERING
                                                  350000.00
 PUNE INSTITUTE OF COMPUTER TECHNOLOGY
                                                  300000.00
 TRINITY COLLEGE OF ENGINEERING AND RESEARCH
                                                  500000.00
 INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT
                                                  767678.00
 VISHWAKARMA INSTITUTE OF TECHNOLOGY
                                                   67898.00
9 rows in set (0.03 sec)
```

#### **Queries with procedures:**

```
DROP PROCEDURE IF EXISTS verify_college_name;
DROP PROCEDURE IF EXISTS company_in_college;
DROP PROCEDURE IF EXISTS max_ctc_company placement in college;
DELIMITER $$
CREATE PROCEDURE verify college name(
 IN input college name VARCHAR(100)
) BEGIN
 IF (
    SELECT NOT EXISTS (
      SELECT*
      FROM college
      WHERE college name = input college name
    )
 ) THEN
    SIGNAL SQLSTATE '45000'
    SET MESSAGE_TEXT = 'College does not exist in our Database';
```

```
END IF;
END $$
DELIMITER $$
CREATE PROCEDURE max ctc company placement in college(
 IN input college name VARCHAR(100)
) BEGIN
 CALL verify college name(input college name);
 SELECT
    student.student name AS 'Name',
    college.college name AS 'College',
    company_name AS `Company`
 FROM
    student JOIN
    college USING(college id) JOIN
    placement USING(student_id) JOIN
    company USING (company id) JOIN (
      SELECT company id
      FROM company JOIN college_company
      USING (company id)
      WHERE college id IN (
        SELECT college id
        FROM college
        WHERE college name = input college name
      )
      ORDER BY avg_sal DESC
      LIMIT 1
    ) max paying company
    ON placement.company id = max paying company.company id
 WHERE college_name = input_college_name;
END $$
```

#### **DELIMITER \$\$**

```
CREATE PROCEDURE company_in_college(
  IN input college name VARCHAR(100)
) BEGIN
  CALL verify college name(input college name);
 SELECT
    company.company id AS 'Company ID',
    company_name AS `Company Name`
 FROM
    company
  WHERE company.company id IN (
    SELECT company_id
   FROM college_company
    WHERE college_id = (
      SELECT college id
      FROM college
     WHERE college name = input college name
   )
 );
END $$
DELIMITER;
```