Database Systems 1

Lab – SQL SELECT Query

Department of Information Technology
Database Systems 1 (IT215)
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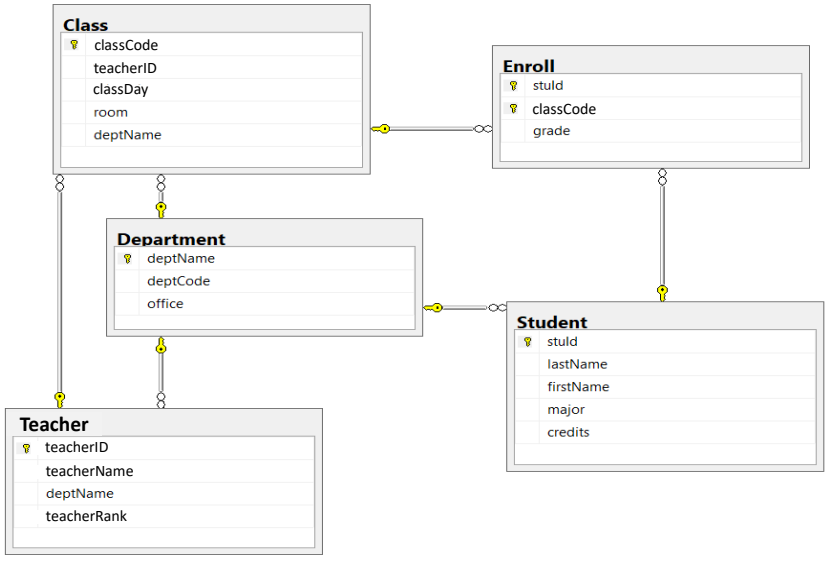
University Database Schema



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Exploring University Database

- How many attributes does **Class** table have?
- How many records are in **Class** table?
- What is the data type of **credits** attribute in **student** table?
- Specify the foreign keys of the **Enroll** table.

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How to Get Data from Database?

- For retrieving information from database, the user send their desired information request (query) to the database by using SELECT statement.

```
SELECT  column_names
FROM    table_names
WHERE   condition(s);
```

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Select Clause

Student (**stuId**, lastName, firstName, major, credits)

- Find the **name** (both **lastName** and **firstName**) and **major** of all students in the university.

```
select  firstName, lastName, major
from Student;
```

- Find all information of all students.

```
select  *
from Student;
```

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Select Clause

Teacher (**teacherID**, teacherName, deptName, teacherRank)

- Find the **department name** of all **teachers.**

```
select  deptName
from  Teacher;
```

teacherID	teacherName	deptName	teacherRank
BI01	Adams	Biology	Lecturer
CS01	Byrne	Computer Science	Assistant Prof
CS02	Smith	Computer Science	Assistant Lec
CS03	John	Computer Science	Lecturer
EN01	Smith	English	Professor
EN02	Leonardo	English	Assistant Lec
EN03	Kate	English	Lecturer
HI01	Kim	History	Assistant Prof
MA01	Julia	Mathematics	Assistant Lec
SP01	Maria	Sport	Professor
SP02	Sarah	Sport	Lecturer

- Find the **department name** of all **teachers** and remove duplicate department names from the result.

```
select distinct  deptName
from  Teacher;
```

deptName
Biology
Computer Science
English
History
Mathematics
Sport

Select Clause

Student (**stuId**, lastName, firstName, major, credits)

- Find the **first name** and **yearly credits** of all **students**. (Knowing that the **credits** attribute in **Student** table is for their 4 years of studying.)

```
SELECT  firstName, credits/4 AS annual_credits
FROM  Student;
```

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Select Clause

- By having **Teacher table**, write an SQL query to get **ID** and **name** of teachers in 'English' department that their rank is 'Professor'.

```
SELECT  teacherID, teacherName
FROM  teacher
WHERE  deptName = 'English'  AND
teacherRank = 'Professor';
```

teacherID	teacherName	deptName	teacherRank
BI01	Adams	Biology	Lecturer
CS01	Byrne	Computer Science	Assistant Prof
CS02	Smith	Computer Science	Assistant Lec
CS03	John	Computer Science	Lecturer
EN01	Smith	English	Professor
EN02	Leonardo	English	Assistant Lec
EN03	Kate	English	Lecturer
HI01	Kim	History	Assistant Prof
MA01	Julia	Mathematics	Assistant Lec
SP01	Maria	Sport	Professor
SP02	Sarah	Sport	Lecturer

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Ordering the Display of Rows

- **order by** clause → sorting the rows in the result of an SQL query

```
SELECT stuId, credits
FROM Student
WHERE major = 'History';
```

stuId	credits
S1001	90
S1005	3
S1017	45

```
SELECT stuId, credits
FROM Student
WHERE major = 'History'
ORDER BY credits;
```

stuId	credits
S1005	3
S1017	45
S1001	90

stuId	lastName	firstName	major	credits
S1001	Smith	Tom	History	90
S1002	Chin	Ann	Mathematics	36
S1004	Smith	Jack	English	75
S1005	Lee	Perry	History	3
S1007	Streep	Sarah	English	81
S1010	Burns	Edward	Biology	63
S1011	Roberts	Mike	English	66
S1012	Damon	Tom	Computer Science	90
S1013	McCarthy	Owen	Mathematics	27
S1015	Jones	Mary	Sport	42
S1017	Ford	Jennifer	History	45
S1018	Nolan	Ryan	English	50
S1020	Rivera	Jane	Computer Science	15

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Example 1 – Order by

- By having **Enroll** table, write an SQL query to get **ID** and **grade** of students enrolled in class code **'E227'** in descending order of their grades.

```
SELECT   stuID, grade
FROM     enroll
WHERE    classCode = 'E227'
ORDER BY grade DESC;
```

stuId	grade
S1007	82.00
S1004	50.00
S1011	33.00

stuID	classCode	grade
S1002	M235	76.00
S1004	E227	50.00
S1005	H115	93.00
S1007	E227	82.00
S1007	E414	71.25
S1010	B226	75.00
S1011	E227	33.00
S1011	E314	57.50
S1012	C413	60.00
S1012	C416	50.50
S1013	M235	90.00
S1015	S226	88.70
S1017	H115	79.00
S1020	C321	40.00
S1020	C413	45.00
S1020	C416	48.00

Example 2 – Order by

- By having **Student** table, write an SQL query to get **major** and **credits** of all students in alphabetic (ascending) order of their **major**.
- For students with the same major, we order them in descending order of their **credits**.

```
SELECT   major, credits
FROM     student
ORDER BY major, credits DESC;
```

major	cred...
Biology	63
Computer Science	90
Computer Science	15
English	81
English	75
English	66
English	50
History	90
History	45
History	3
Mathematics	36
Mathematics	27
Sport	42

student

stuId	lastName	firstName	major	credits
S1001	Smith	Tom	History	90
S1002	Chin	Ann	Mathematics	36
S1004	Smith	Jack	English	75
S1005	Lee	Perry	History	3
S1007	Streep	Sarah	English	81
S1010	Burns	Edward	Biology	63
S1011	Roberts	Mike	English	66
S1012	Damon	Tom	Computer Science	90
S1013	McCarthy	Owen	Mathematics	27
S1015	Jones	Mary	Sport	42
S1017	Ford	Jennifer	History	45
S1018	Nolan	Ryan	English	50
S1020	Rivera	Jane	Computer Science	15