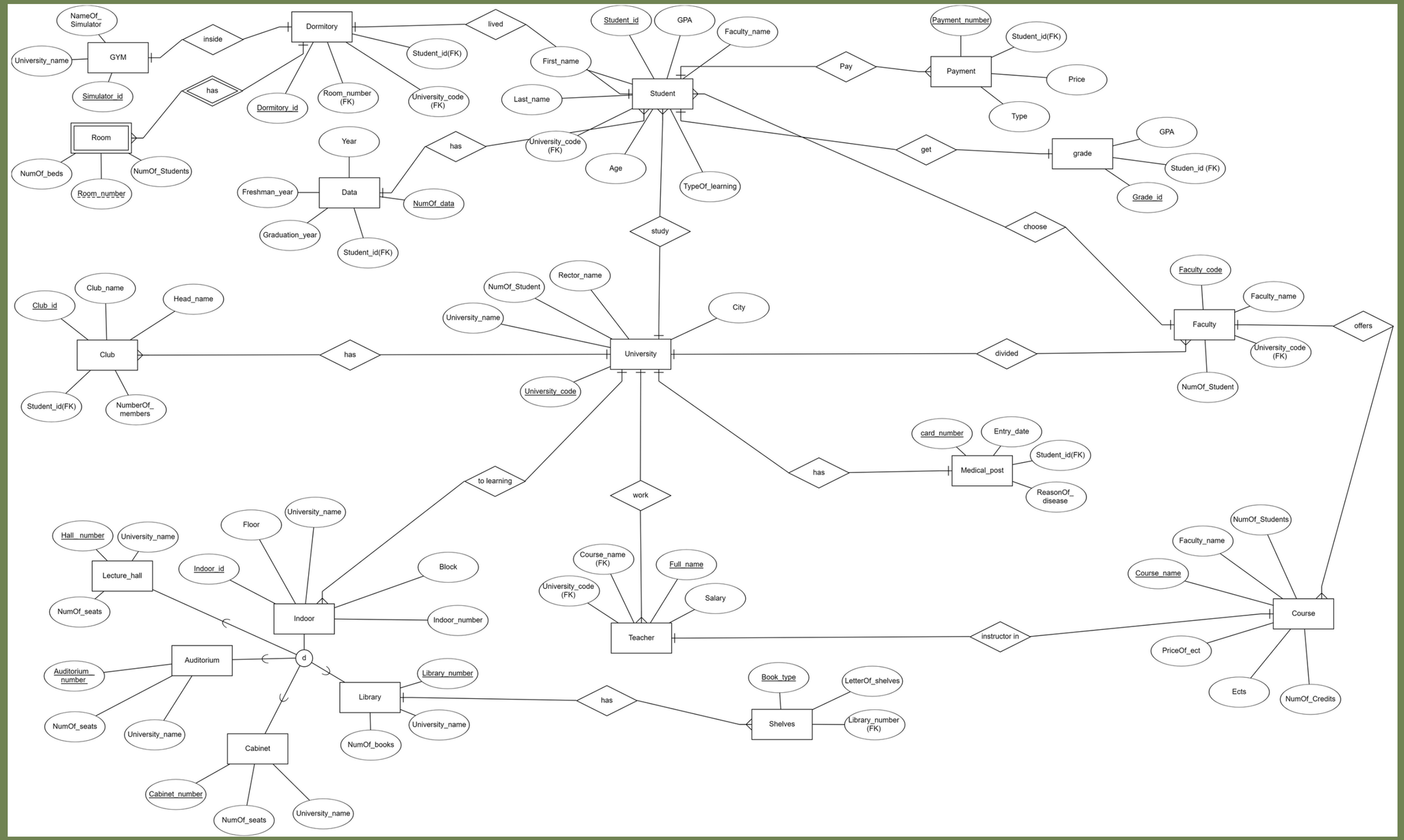
DBMS PROJECT

University

Prepared by Kaldanbekov Bakdaulet,
Sauirbay Arsen and Aliturliyev Aidyn

University of Contents

Main Topics


NameOf_ Simulator
GYM
University_name
Simulator_id
inside
has
Dormitory
Dormitory_id
Room_number (FK)
University_code (FK)
Student_id(FK)
lived
Room
NumOf_beds
Room_number
NumOf_Students
Year
Data
Freshman_year
Graduation_year
Student_id(FK)
NumOf_data
has
Student_id
GPA
Faculty_name
First_name
Last_name
Student
University_code (FK)
Age
TypeOf_learning
Pay
Payment_number
Payment
Student_id(FK)
Price
Type
get
grade
GPA
Studen_id (FK)
Grade_id
choose
study
Club_name
Club_id
Head_name
Club
Student_id(FK)
NumberOf_ members
has
NumOf_Student
Rector_name
University_name
City
University
University_code
divided
Faculty_code
Faculty_name
Faculty
University_code (FK)
NumOf_Student
offers
card_number
Entry_date
Student_id(FK)
Medical_post
ReasonOf_ disease
has
to learning
work
Hall_number
University_name
Lecture_hall
NumOf_seats
Floor
University_name
Indoor_id
Block
Indoor
Indoor_number
Course_name (FK)
University_code (FK)
Full_name
Salary
Teacher
instructor in
NumOf_Students
Faculty_name
Course_name
Course
PriceOf_ect
Ects
NumOf_Credits
Auditorium
Auditorium_ number
NumOf_seats
University_name
d
Library_number
Library
University_name
NumOf_books
has
Book_type
LetterOf_shelves
Shelves
Library_number (FK)
Cabinet
Cabinet_number
NumOf_seats
University_name

ER Diagram

Tables:

Universities: This table contains the name of the universities and the name of the rector of this university and in which city it is located and the unique code of the university and the number of students.

University_code --> Rector_name,University_name,NumOf_Student,City

University_code	University_name	University_id
1	MUA	1
2	KazATU	2
4	ZKGMU	3
5	ZHUBANOV	4
13	ENU	5
19	KazATK	6

University_code -->{University_name,University_id}

University_id	City	NumOf_Student	Rector_name
1	Astana	10000	Kamaljan Nadirov
2	Astana	12300	Kanat Tireuov
3	Aktobe	5678	Aset Kaliev
4	Aktobe	11111	Laura Karabasova
5	Astana	8371	Yerlan Sadykov
6	Almaty	9137	Saltanat Tynyshbayeva

University_id -->{City,numOf_Student,Rector_name}

Students: In this table, we can see the student's ID and his/her first and last name, grade, age, in which university and in which faculty and in what format he studies.

Student_id --> {First_name,Last_name,Age,TypeOf_learning,Faculty_name,GPA,Faculty_name,University_code}

Student_id	First_name	Last_name	Student_num
210000001	Maible	Driver	11
210000002	Georges	Mauser	12
210000003	Jake	Bevar	13
21000004	Joshua	Emson	14
210000005	Abbey	Shanahan	15
210000006	Legra	Bate	16

Student_id --> {First_name,Last_name,Student_num}

Student_num	Age	University_code	Faculty_name	TypeOf_learning	GPA
1	18	302	Engineering	State grant	3.4
2	21	302	Buissness	Rectors grant	4
3	18	302	Law	Paid	4
4	18	421	Engineering	State grant	2.2
5	18	302	Law	Rectors grant	3.5

student2 1

Student_num --> {Age,TypeOf_learning,Faculty_name,GPA,Faculty_name,University_code}

Data:

this table contains important student dates, such as what year he entered and what year he graduated, date number and year of study.

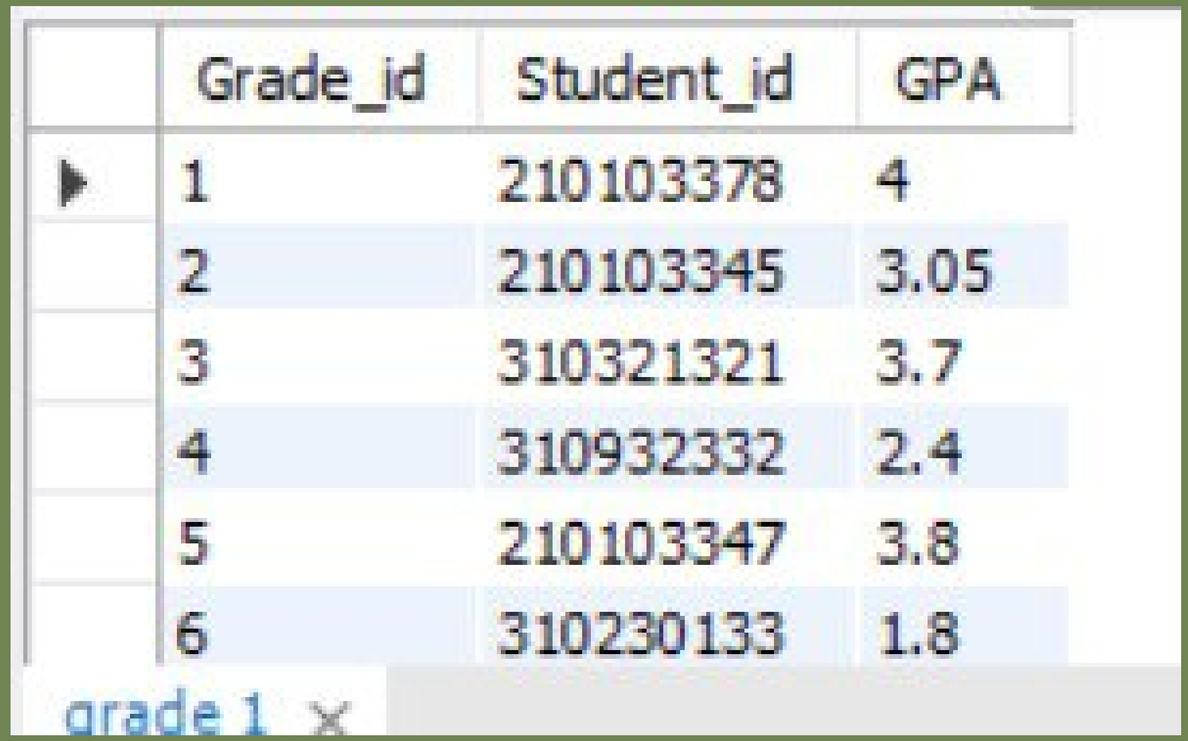
NumOf_data	Student_id	Year	Freshman_year	Graduation_year
1	210103378	2	2021	2025
2	412000234	1	2022	2026
3	310230133	3	2020	2024
4	210103345	2	2021	2025
5	310321321	1	2022	2026
6	210103762	4	2019	2023

data 1

NumOf_data -->{Student_id,Year,Freshman_year,Graduation_year}

Grade :

in this table we can see grade id, student id and his gpa .



Grade_id	Student_id	GPA
1	210103378	4
2	210103345	3.05
3	310321321	3.7
4	310932332	2.4
5	210103347	3.8
6	310230133	1.8

grade 1

Grade_id -->{Student_id,GPA}

Payment:

in this table we can see the student's ID and what he paid (for example, dorm fees or tuition fees) and how much he paid and the payment number.

Payment_num	Student_id	Price	Type
1	310230133	120000	Dormitory
2	412000234	24000	FX
3	210103762	55000	Withdrawl
4	210103762	370000	Dormitory
5	310321321	180000	Retake
6	412939444	22000	FX

payment 1

Payment_number -->{Student_id,Price,Type}

Club: In this table we see the club id, the club name, the name of the head, the number of students in this club and the id of those students.

Club_id -->{Club_name,Head_name,NumberOf_members,Student_id}

Club_num	Student_id	NumberOf_members	Head_name
1	210103345	24	Manas
2	210103347	30	Askar
3	210103762	24	Manas
4	310230133	20	Erbol
5	310321321	14	Amina
6	310932332	34	Almas

Club_num -->{Student_id,NumOf_members,Head_name}

Club_id	Club_name	Club_num
1	Puzzle_club	6
2	Sport_club	5
3	Debate	8
4	Kings Speech	1
5	Orlean	3
6	Music club	7

Club_id -->{Club_name,Club_num}

Dormitory :

This table shows which university it belongs to, through the university code and dormitory ID, and the room number and id of the students who live in the dormitory.

Dormitory_id	Student_id	University_code	Room_number
1	210103378	302	2
2	210103347	302	3
3	310230133	421	1
4	210103345	302	4
5	310321321	421	7
6	310932332	421	5

dormitory 1

Dormitory_id -->{University_code,Student_id,Room_number}

Room:

in this table we can see the room number, number of bed and number of students in this room.

Room_number	NumOf_Students	NumOf_beds
1	3	4
2	4	4
3	8	8
4	2	2
5	2	2
6	4	4

room 1

Room_number -->{NumOf_Students,NumOf_beds}

Gym:

This table shows the id of the simulator and the name of the simulator and in which university this gym is located

Simulator_id	NameOf_Simulator	University_name
1	Trampoline	Zhubanov
2	Exercise	SDU
3	Dumpbells	KBTU
4	Cable	KBTU
5	Bars	SDU
6	Barbell	KBTU

gym 1

Simulator_id -->{NameOf_Simulator,University_name}

Teachers:

In the teachers table we can see his/her full name and in which university and what subject he teaches and his/her salary.

Full_name	Course_name	University_code	Salary
Aaron Pearcehouse	English	101	196467
Aisha Yershigeshova	Linear Algebra	5	350000
Alya Zakariya	Kazakh Language	302	200000
Annmarie Bouller	English	102	343816
Araylim Serikbay	Database	302	300000
Bek Bazatbekov	Calculus	5	250000

Full_name -->{Salary,Course_name,University_code}

Course:

in the table of courses, we can see the name of this course and which faculty it belongs to, the number of students who study this course, how many credits are in this course and the price of credits, and about etc.

Course_name	Faculty_name	NumOf_Students	NumOf_Credits	Ects	PriceOf_ect
Accounbting	Pyrometallurgy	382	9	5	20000
Accounting	EP	379	19	5	20000
Accountingh	DCM	338	7	5	20000
Accountning	NFS	281	18	4	20000
Accoutnbting	Pyrometallurgy	382	9	5	20000
Algohritm	Engineering	300	5	5	25000

course 1 ×

Course_name -->{Faculty_name,NumOf_Students,Ects,PriceOf_ect,NumOf_credits}

Faculty:

the table of faculty shows the name of the faculty and the code of the faculty,the code of the university and how many students study in this faculty.

Course_name	Faculty_name	NumOf_Students	NumOf_Credits	Ects	PriceOf_ect
Accounbting	Pyrometallurgy	382	9	5	20000
Accounting	EP	379	19	5	20000
Accountingh	DCM	338	7	5	20000
Accountning	NFS	281	18	4	20000
Accoutnbting	Pyrometallurgy	382	9	5	20000
Algohritm	Engineering	300	5	5	25000

course 1 ×

Faculty_code -->{Faculty_name,University_code,Numof_Student}

Medical_post:

This table contains the card number of students and the student ID who came and the time of arrival and the reason for arrival.

	Card_num	Student_id	ReasonOf_disease	Entry_date
▶	1	210103347	Headache	2013-05-20
	2	310321321	Headache	2015-12-20
	3	210103378	Nausea	2027-09-20
	4	310230133	Headache	2002-10-20
	5	210103345	Adominal disease	2006-07-20
	6	210103762	Abdominal disease	2020-11-20

medical_post 1

Card_num -->{Entry_date,Student_id,ReasonOf_disease}

Indoor: this table contains the indoor id , the name of the university , and how many floors and how many blocks there are , and the number of indoor.

Indoor_id -->{University_name,Floor,Block,Indoor_number}

Indoor_id	Indoor_number	University_name
1	101	SDU
2	112	SDU
3	215	SDU
4	114	KBTU
5	301	KBTU
6	235	Zhubanov

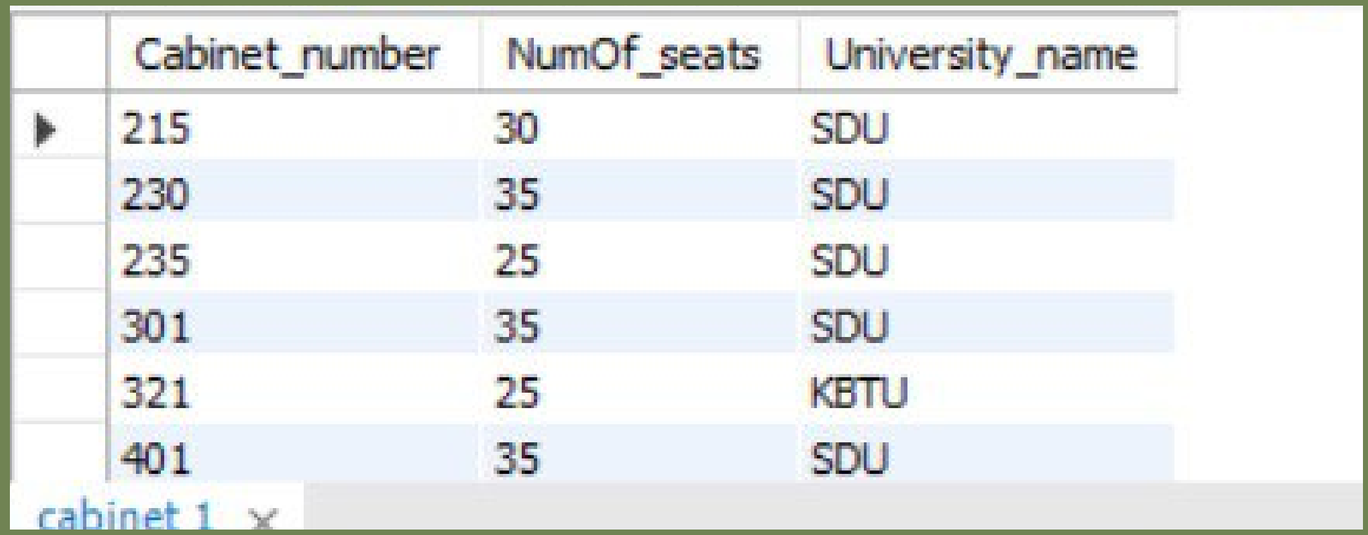
Indoor_id -->{University_name,Indoor_number}

Indoor_number	Floor	Block
101	1	A
112	1	B
114	1	B
215	2	B
230	2	D
235	2	D

Indoor_number -->{Floor,Block}

Cabinet:

This table shows the number of the cabinet and the sum of seats and the name of the university where this cabinet is located.



Cabinet_number	NumOf_seats	University_name
215	30	SDU
230	35	SDU
235	25	SDU
301	35	SDU
321	25	KBTU
401	35	SDU

cabinet 1

Cabinet_number -->{University_name,NumOf_seats}

Auditorium:

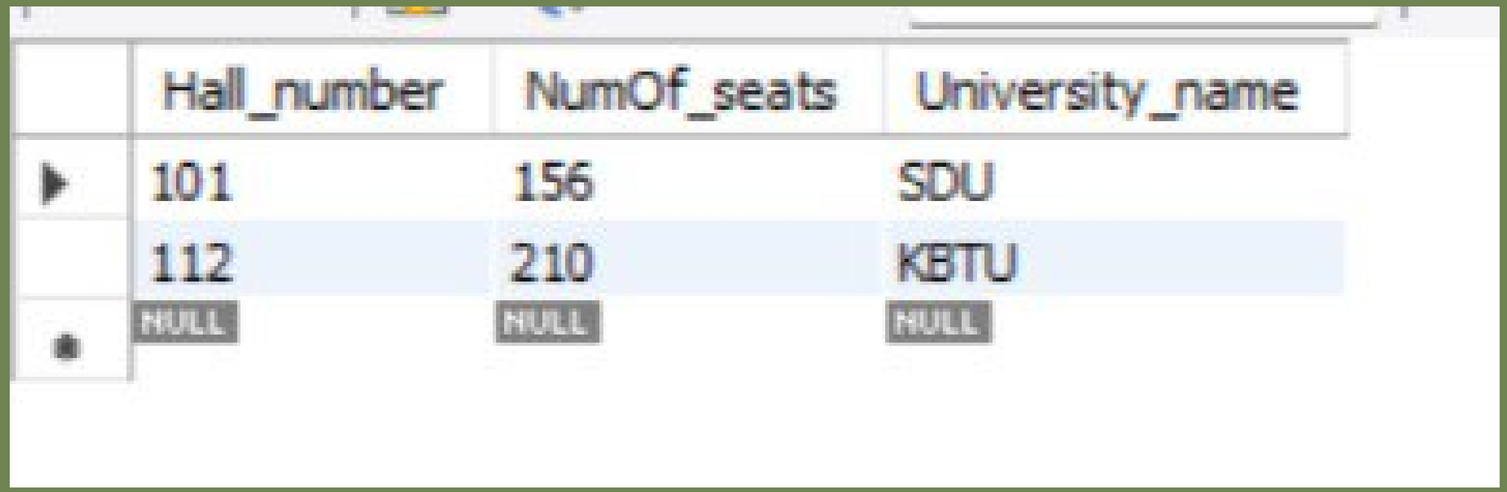
This table shows the number of the auditorium and the sum of seats and the name of the university where this auditorium is located.

Auditorium_number	NumOf_seats	University_name
100	254	KazNU
114	200	SDU
120	300	KBTU
NULL	NULL	NULL

Auditorium_number -->{University_name,NumOf_seats}

Lecture Hall:

This table shows the number of the hall and the sum of seats and the name of the university where this hall is located.

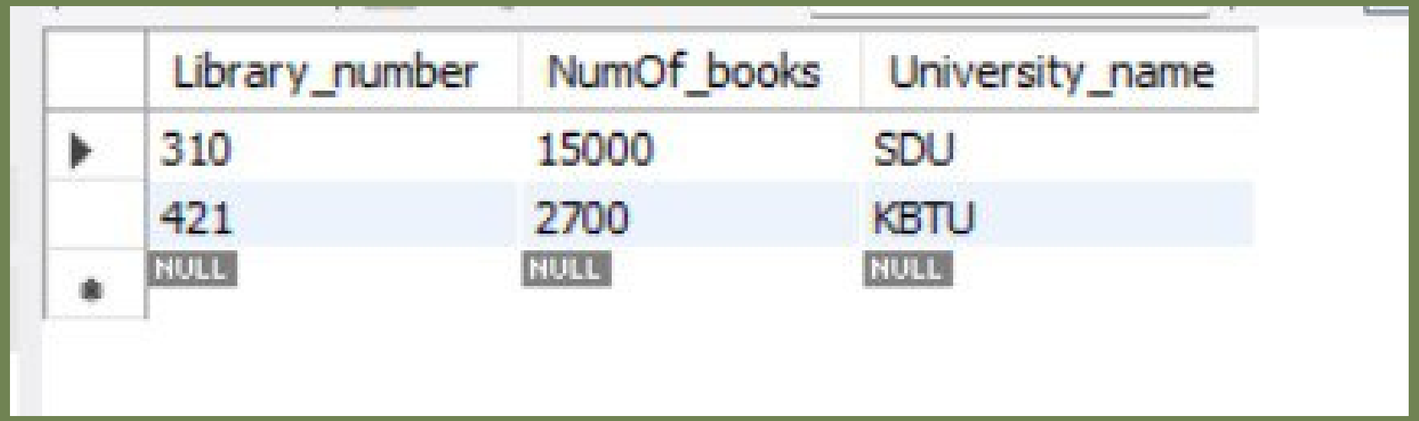


Hall_number	NumOf_seats	University_name
101	156	SDU
112	210	KBTU
NULL	NULL	NULL

Hall_number -->{University_name,NumOf_seats}

Library:

This table shows the number of the library and the sum of books and the name of the university where this library is located.

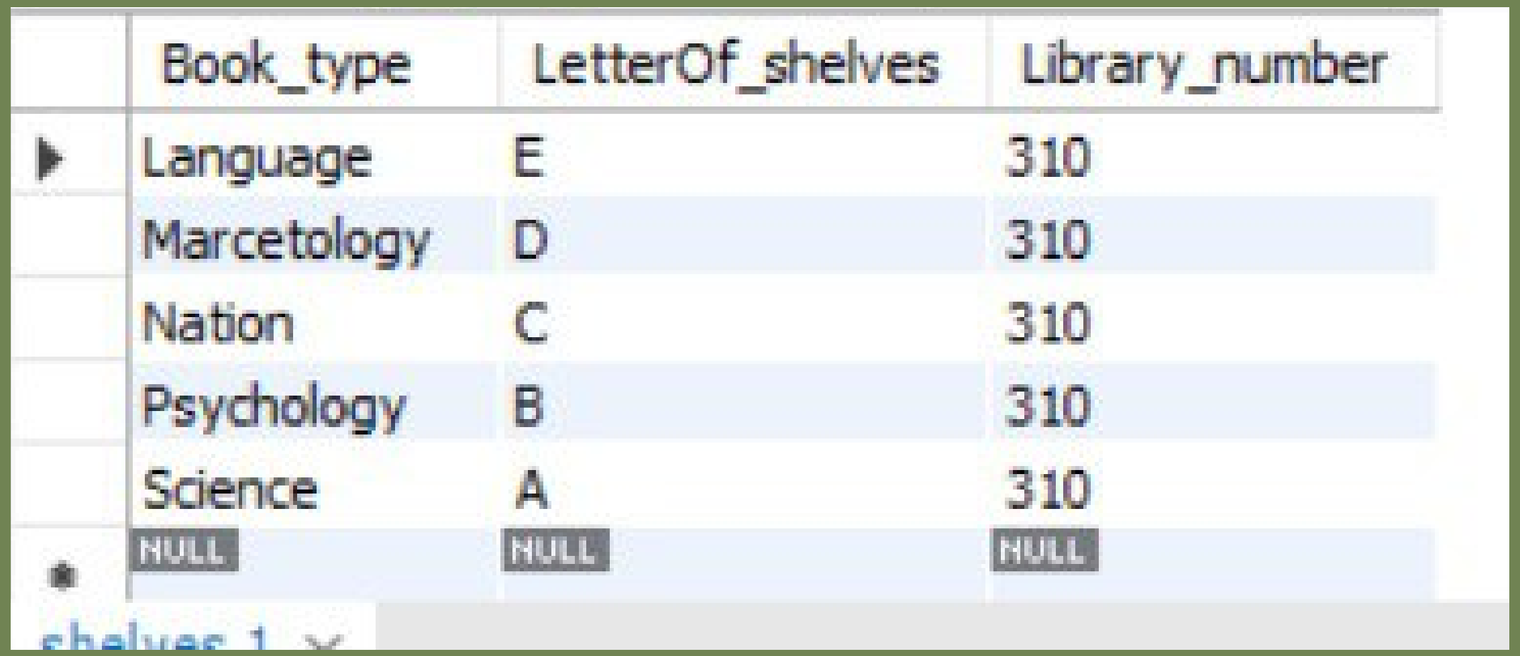


Library_number	NumOf_books	University_name
310	15000	SDU
421	2700	KBTU
NULL	NULL	NULL

Library_number -->{University_name,NumOf_books}

Shelves:

in this table we can see the number of the library in which this shelf is located, the type of books and the letter of the shelf.



Book_type	LetterOf_shelves	Library_number
Language	E	310
Marcetology	D	310
Nation	C	310
Psychology	B	310
Science	A	310
NULL	NULL	NULL

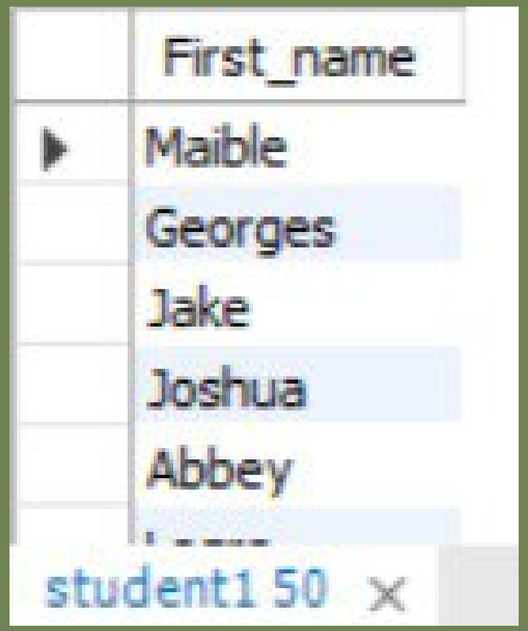
shelves 1

Book_type -->{LetterOf_shelves,Library_number}

Queries

1

this query shows us the first name of the students



	First_name
▶	Maible
	Georges
	Jake
	Joshua
	Abbey

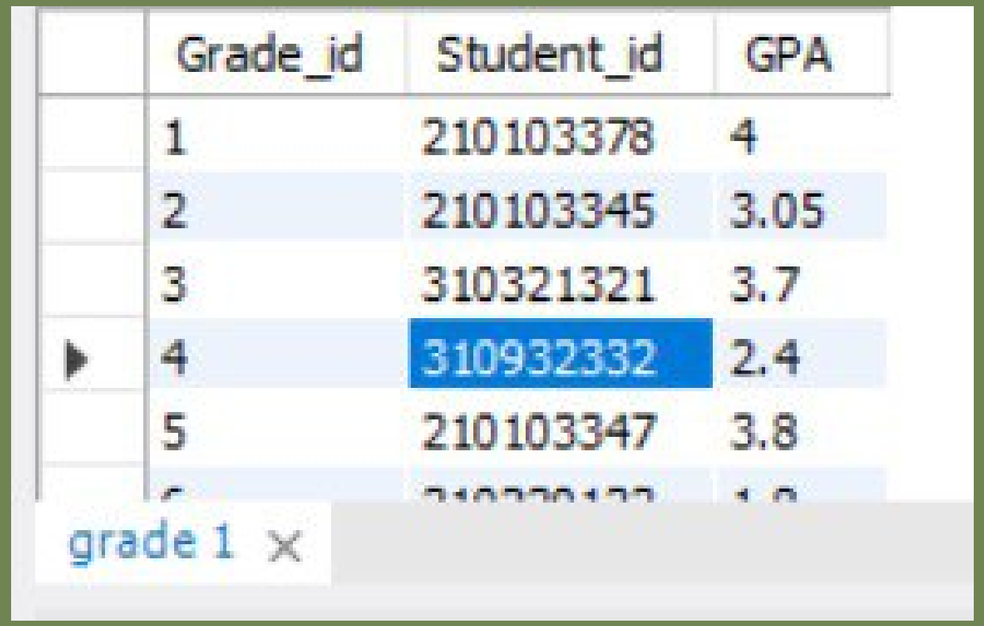
student1 50

select First_name from student1

$$\sigma_{\text{Firstname}}(\text{student1})$$

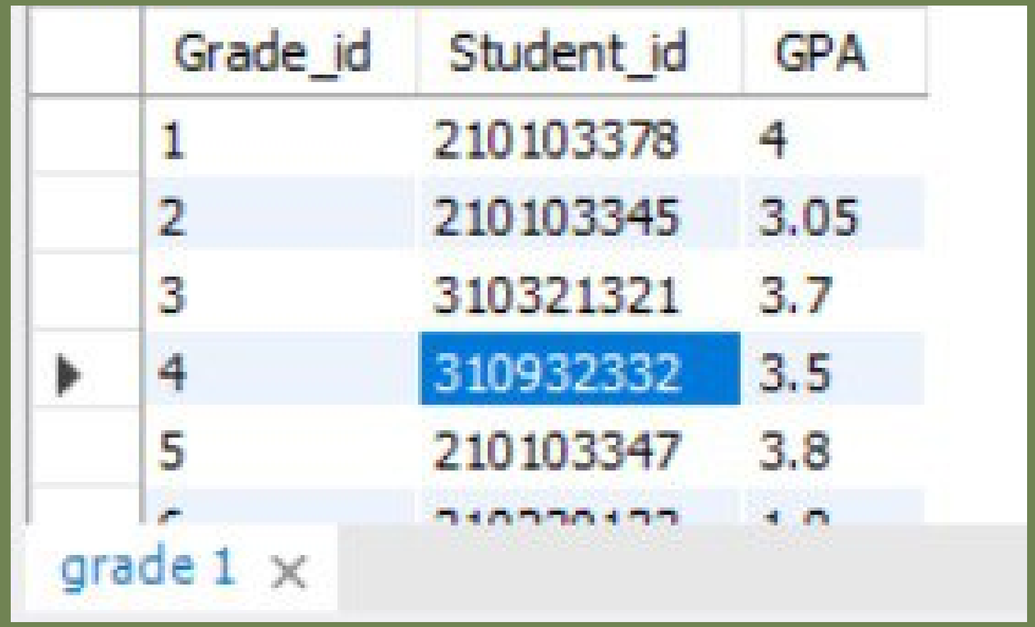
2

in this query, we are updating a student's gpa from 2.4 to 3.5 using update



	Grade_id	Student_id	GPA
	1	210103378	4
	2	210103345	3.05
	3	310321321	3.7
▶	4	310932332	2.4
	5	210103347	3.8

grade 1 ×



	Grade_id	Student_id	GPA
	1	210103378	4
	2	210103345	3.05
	3	310321321	3.7
▶	4	310932332	3.5
	5	210103347	3.8

grade 1 ×

```
update grade
set gpa = 3.5
where Student_id = 310932332
```

3

in this query, we are looking for simulators that have the letter s in their name from sdu university

	Simulator_id	NameOf_Simulator	University_name
▶	2	Exercise	SDU
	5	Bars	SDU
	7	Dumpbells	SDU
*	NULL	NULL	NULL

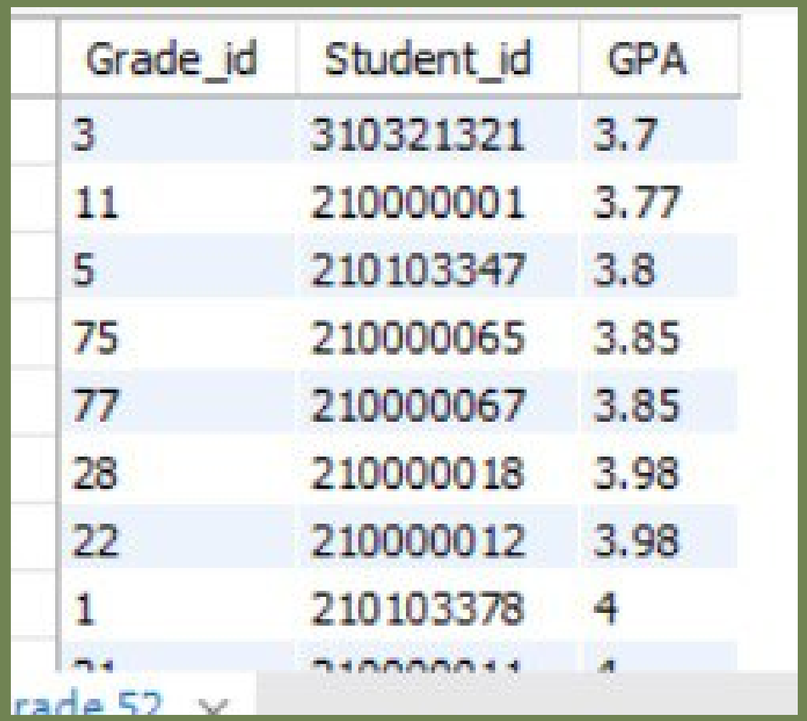
σ **(gym))**

NameOf_Simulator LIKE '%s%' and University_name = 'SDU'

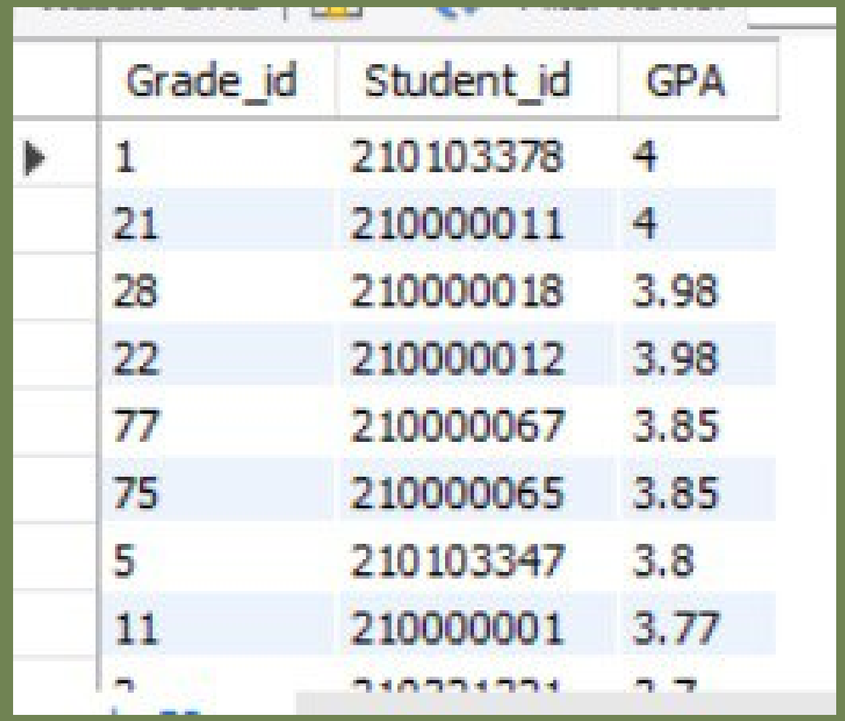
```
select * from gym
where NameOf_Simulator LIKE '%s%' and
University_name = 'SDU'
```

4

in this query we order by grades and we can see students who gpa are close, in the next one in descending order



Grade_id	Student_id	GPA
3	310321321	3.7
11	210000001	3.77
5	210103347	3.8
75	210000065	3.85
77	210000067	3.85
28	210000018	3.98
22	210000012	3.98
1	210103378	4



Grade_id	Student_id	GPA
1	210103378	4
21	210000011	4
28	210000018	3.98
22	210000012	3.98
77	210000067	3.85
75	210000065	3.85
5	210103347	3.8
11	210000001	3.77

select * from grade
Order by GPA

τ grade
GPA

select * from grade
Order by GPA desc

τ grade
DESC(GPA)

5

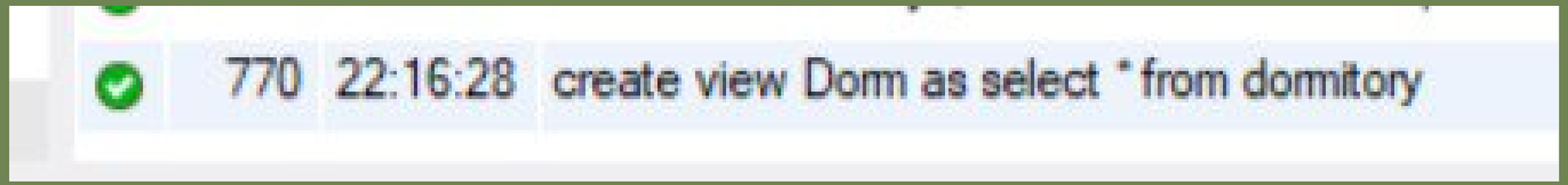
in this query, we are looking for books by type of psychology using exists

	Library_number	NumOf_books	University_name	Book_type	LetterOf_shelves	Library_number
▶	310	15000	SDU	Psychology	B	310

```
select * from library l,shelves s
where exists(select * from shelves where
Book_type = "Psychology") and Book_type =
'Psychology'
```

6

just shows us the table



create view Dorm as select * from dormitory

ρDorm(σ(dormitory)

7

in this query we can see the dorm table

Dormitory_id	Student_id	University_code	Room_number
1	210103378	302	2
2	210103347	302	3
3	310230133	421	1
4	210103345	302	4
5	310321321	421	7
6	310932332	421	5
7	412939444	5	8
8	412000234	5	6

Dorm 55

drop view Dorm

select * from Dorm

σ (Dorm)

8

drop view Dorm

9

in this table we are joining two tables to see all information about students

Student_id	First_name	Last_name	Student_num	Student_num	Age	University_code	Faculty_name	TypeOf_learning	GPA
210000001	Maible	Driver	11	11	21	103	Registered Nurse	Paid	3.9
210000002	Georges	Mauser	12	12	22	102	Registered Nurse	State grant	2.55
210000003	Jake	Bevar	13	13	21	104	Registered Nurse	State grant	1.1
210000004	Joshua	Emson	14	14	17	103	Registered Nurse	State grant	3.05
210000005	Abbey	Shanahan	15	15	21	101	Registered Nurse	Rectors grant	2.15
210000006	Legra	Bate	16	16	24	104	Registered Nurse	Paid	2
210000007	Lilian	Wilkenson	17	17	21	102	Registered Nurse	State grant	0.95
210000008	Jean	Backshaw	18	18	18	103	Registered Nurse	Rectors grant	2.9

Result 57

```
select * from student1 s1  join student2 s2
    on s1.Student_num = s2.Student_num
```

$$\sigma_{s1.Student\_num = s2.Student\_num}(student\ s1 \bowtie student\ s2))$$

10

using this query we see students who have a gpa above the average gpa

Student_num	Age	University_code	Faculty_name	TypeOf_learning	GPA
1	18	302	Engineering	State grant	3.4
2	21	302	Buissness	Rectors grant	4
3	18	302	Law	Paid	4
5	18	302	Law	Rectors grant	3.5
7	17	5	Law	State grant	3.87
8	20	421	Pedagogical	Paid	3.15
9	18	5	Buissnes	Paid	3
11	21	103	Registered Nurse	Paid	3.9

student2 58

```
select * from student2
where GPA > (select AVG(GPA) from student2)
```

11

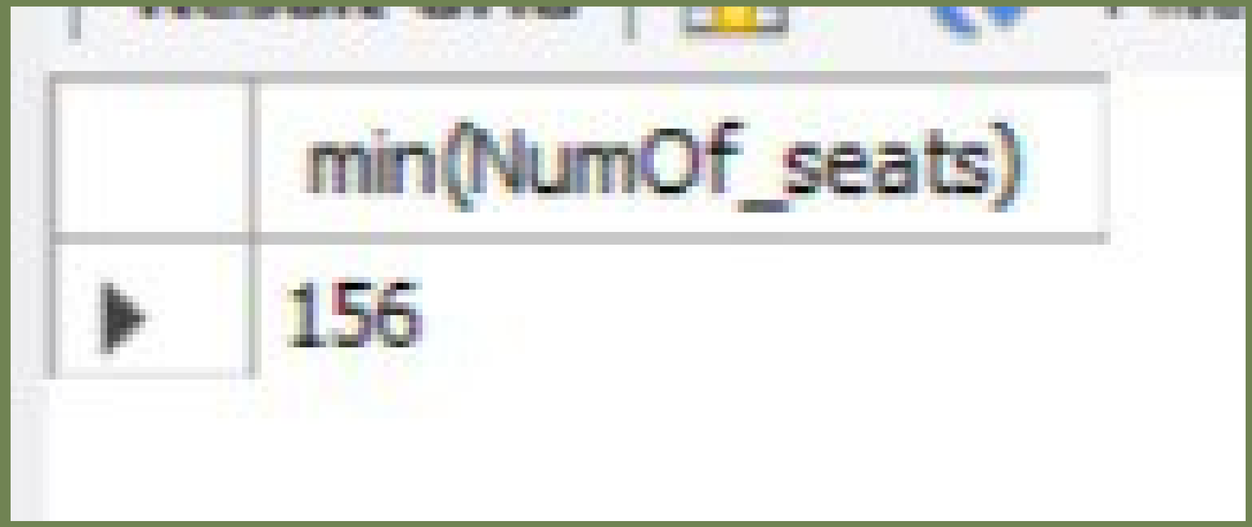
in this query, we see the numbers of cabinets that have the maximum seat

	Cabinet_number	NumOf_seats	University_name
▶	230	35	SDU
	301	35	SDU
	401	35	SDU
*	NULL	NULL	NULL

```
select * from cabinet
where NumOf_seats = (select
max(NumOf_seats) from cabinet)
```

12

in this query we see the number of the minimal seating from the lecture hall

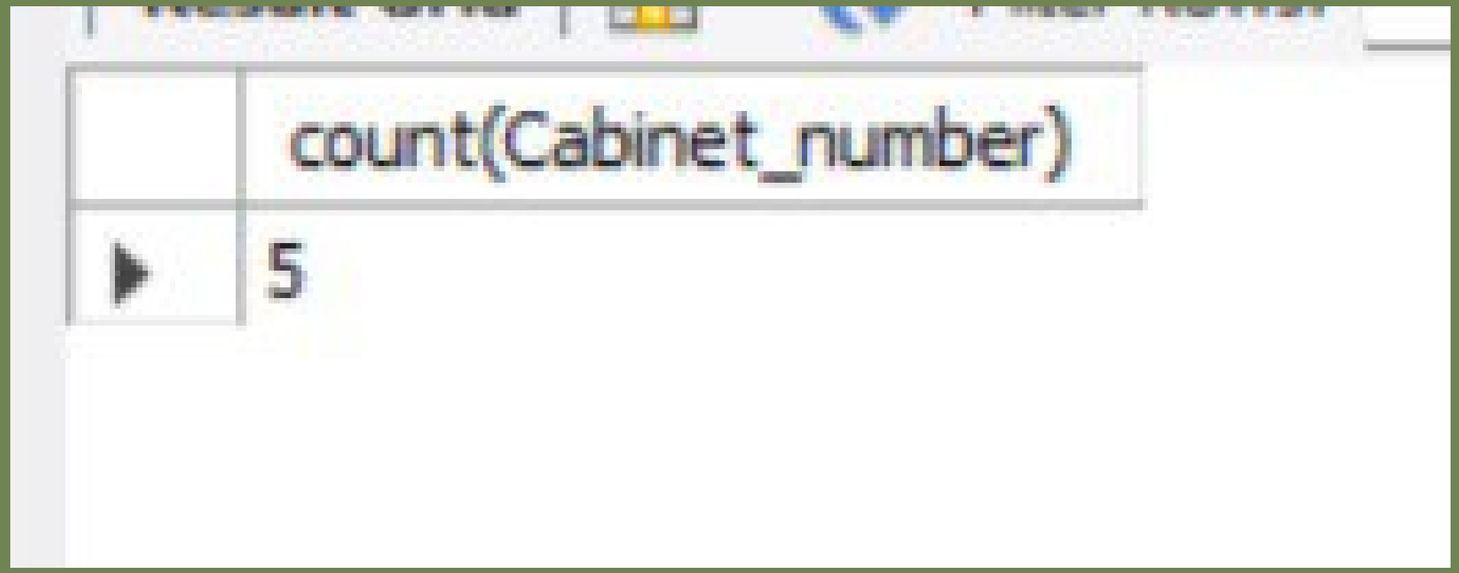


	min(NumOf_seats)
▶	156

select min(NumOf_seats) from lecture_hall

13

in this query, we see the sum of cabinets in sdu

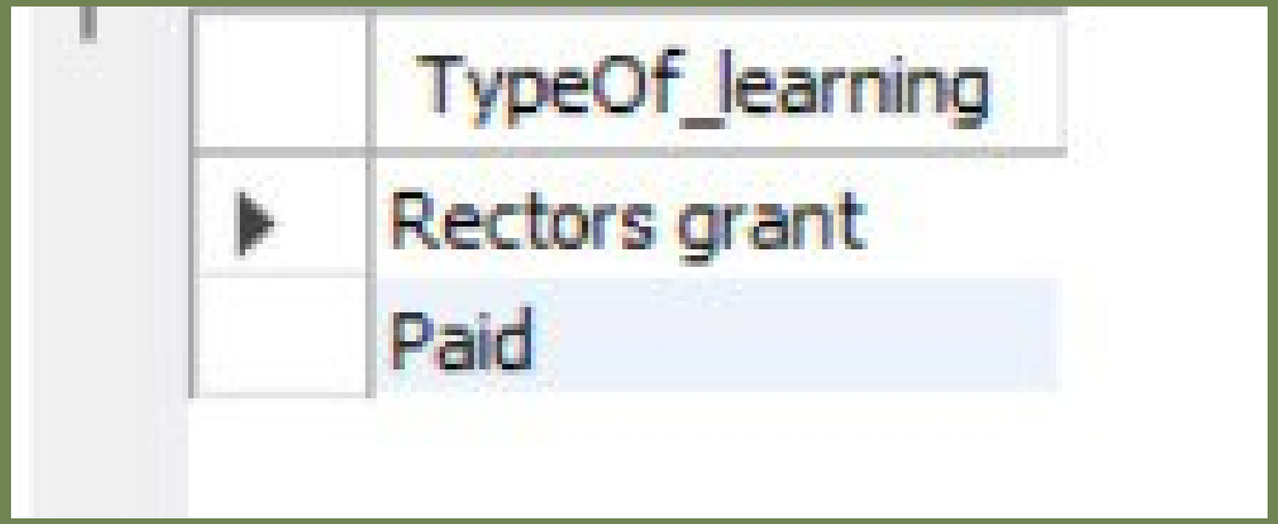


	count(Cabinet_number)
▶	5

```
select count(Cabinet_number) from cabinet
        where University_name = 'SDU'
```

14

here we see the type of study of students who have an average score above 2.6 and group them



TypeOf_learning
Rectors grant
Paid

select TypeOf_learning from student2
group by TypeOf_learning
Having avg(GPA)>2.6

σ (γ(TypeOf_learning)γ avg(GPA)>2.6(student2))
TypeOf_learning

15

in this query we see how many students are in each course

Year	count(Student_id)
1	30
2	24
3	32
4	14

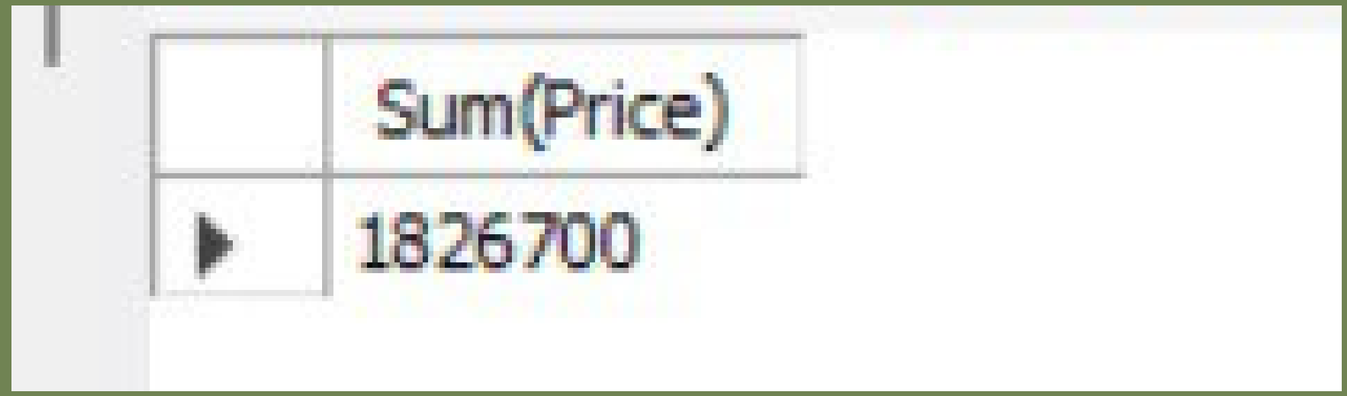
```
select Year,count(Student_id) from data
Group by Year
Order by Year
```

σ τ (y(Year) data)

y count(student_id),year

16

in this query we see the total amount of money from retake



	Sum(Price)
▶	1826700

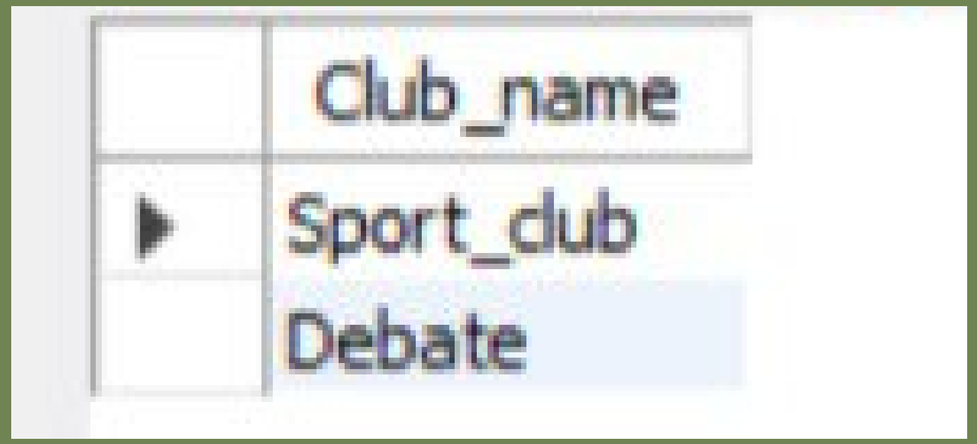
```
select Sum(Price) from payment
where type = 'Retake'
```

σ type='Retake'(Room)

y sum(price)

17

in this request, the student enters the sports club and the second club that he is going to enter with the biggest member

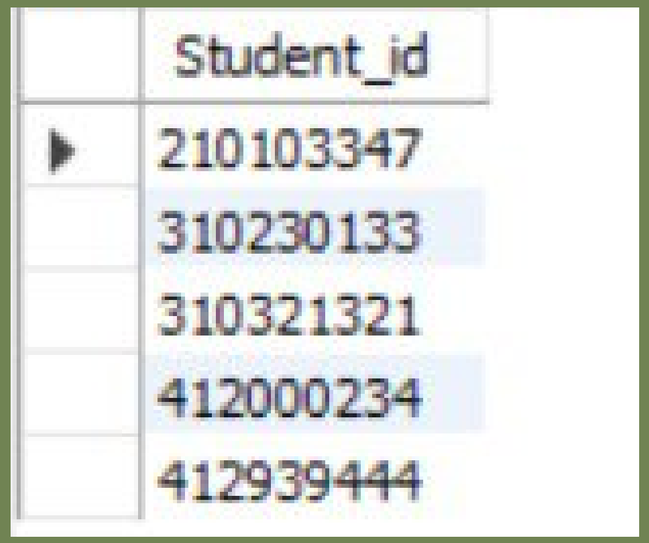


Club_name
Sport_club
Debate

```
select c1.Club_name from club1 c1
where c1.Club_name = 'Sport_club'
union
select c1.Club_name from club2 c2,club1 c1
where c2.NumberOf_members = (select
max(NumberOf_members) from club2) and
c1.club_num = c2.club_num
```

18

in this request, we see the id of the students whose reason for visiting the medical post is a headache



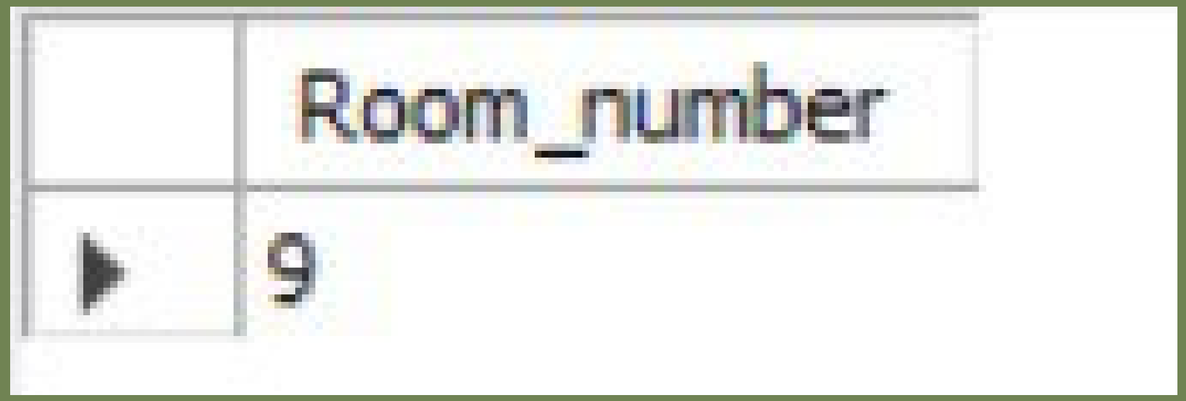
Student_id
210103347
310230133
310321321
412000234
412939444

```
select Student_id from student1
intersect
select Student_id from medical_post
where ReasonOf_disease = 'Headache'
```

$$\pi_{student\_id}(student1) \cap \pi_{student\_id}(\sigma_{ReasonOf\_disease = 'Headache'}(medical\_post))$$

19

in this query, we see how many rooms there are in the university with number 302 that have free places



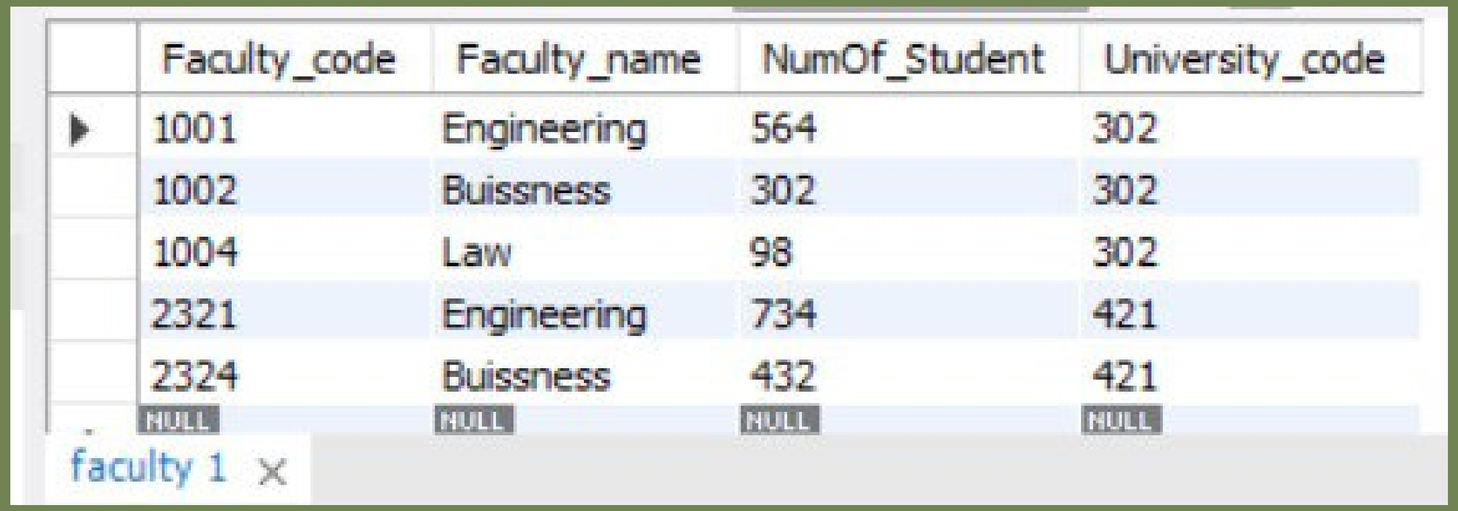
	Room_number
▶	9

```
select Room_number from dormitory
where University_code = 302
except
select Room_number from room
where NumOf_Students = NumOf_beds
```

$$\pi_{room\_num}\,\sigma_{(university\_code=302\,(dormitory))} \;-\; \pi_{room\_num}\,\sigma_{(NumOf\_Students=NumOf\_beds(room))}$$

20

Outputs only 3 faculties



Faculty_code	Faculty_name	NumOf_Student	University_code
1001	Engineering	564	302
1002	Buissness	302	302
1004	Law	98	302
2321	Engineering	734	421
2324	Buissness	432	421
NULL	NULL	NULL	NULL

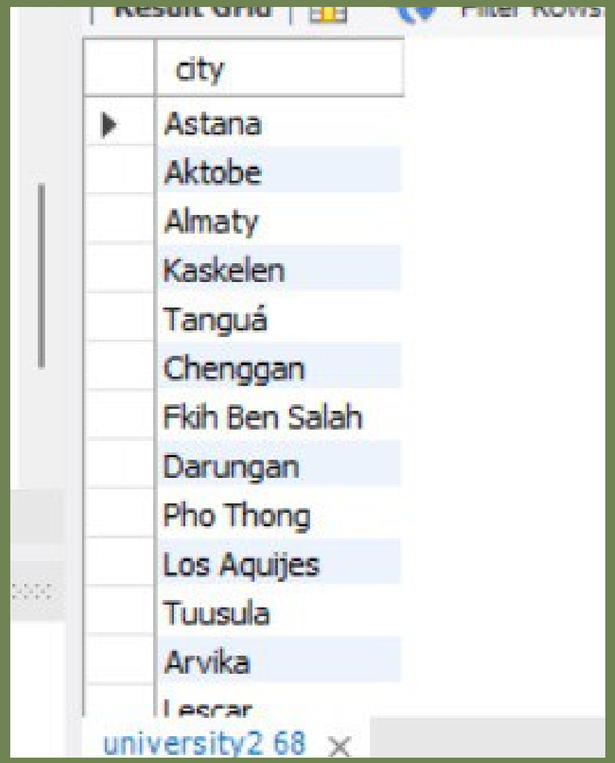
faculty 1

```
SELECT *
FROM faculty
WHERE Faculty_name IN ('Engineering', 'Buissness', 'Law');
```

$$\sigma_{\text{Faculty\_name IN ('Engineering', 'Buissness', 'Law'}}(\text{faculty})$$

21

Removes duplicates



select distinct city from university2

Indexes

Create Club_num_idx on club1(club_num)

Create Student_id_idx on grade(Student_id)

Create Student_id5_idx on medical_post(Studen_id)

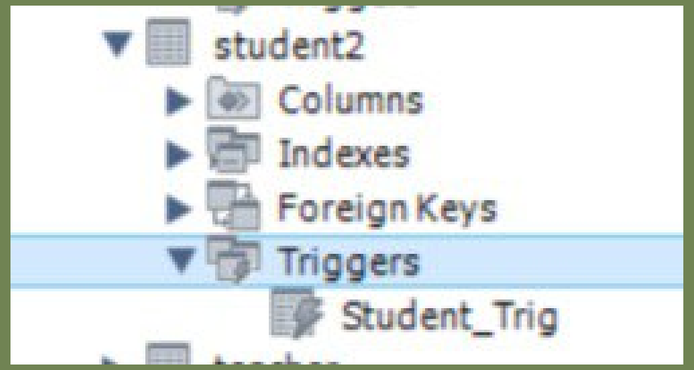
Transactions

```
DELIMITER //
START TRANSACTION;
Update data
 set year = year + 1
 where year < 4
 IF (year=4) THEN
 Rollback;
 ELSE
 'Error! ';
 END IF;
 Commit;

DELIMITER;
```

```
DELIMITER //
START TRANSACTION;
Update club2
set NumberOf_members = NumberOf_members - 15
 where  NumberOf_members > 15
 IF (NumberOf_members < 15) THEN
 Rollback;
 ELSE
 'Error! Expense_amt is not enough!';
 END IF;
 Commit;

DELIMITER;
```



Introduction to Java	Engineering	213	6	5	25000
Introduction to Java 2	Engineering	356	7	5	25000
Kazakh Language	Pedogogical	534	6	3	12000

```
Delimiter $$
CREATE TRIGGER Student_Trig
AFTER INSERT ON Student2
FOR EACH ROW
BEGIN
IF New.Faculty_name = 'Engineering' then
Update Course
set NumOf_Student = NumOf_Student + 1
where Course_name = 'Introduction to Java';
END IF;
END$$
Delimiter ;
```