## Pergunta 1

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What are the students' numbers? Return them ordered ascendingly.**

(Note that you can submit your code several times without losing any grades. Only the last submission will be considered)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `nr`<br>`----------`<br>`100`<br>`110`<br>`120`<br>`130`<br>`140`<br>`150` |

**Resposta:** (regime de penalização: 0 %)

```
1 select nr from Student order by nr ASC;
```

Pré-verificação

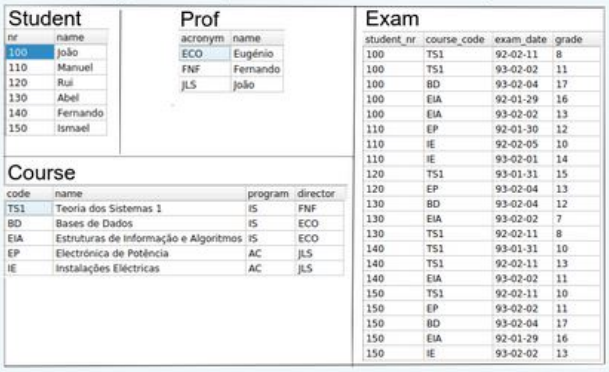
| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `nr`<br>`----------`<br>`100`<br>`110`<br>`120`<br>`130`<br>`140`<br>`150` | `nr`<br>`----------`<br>`100`<br>`110`<br>`120`<br>`130`<br>`140`<br>`150` | ✔ |

Passou em todos os testes! ✔

## Pergunta 2

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:



**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What is the code and name of the units of 'AC' program? Return the courses ordered by code alphabetically.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `code  name`<br>`----------  ----------`<br>`EP  Electrónica de Potência`<br>`IE  Instalações Eléctricas` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select code,name from Course where program='AC' order by code ASC
```

Submeter

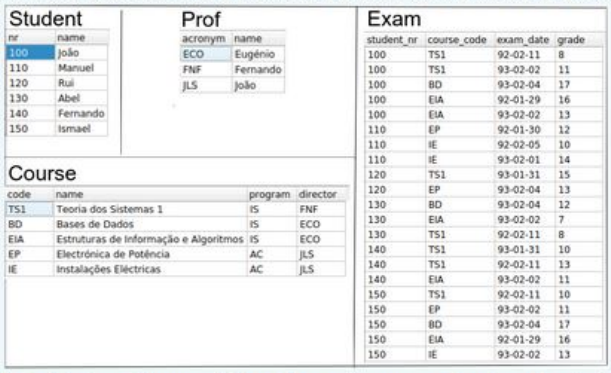
| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `code  name`<br>`----------  ----------`<br>`EP  Electrónica de Potência`<br>`IE  Instalações Eléctricas` | `code  name`<br>`----------  ----------`<br>`EP  Electrónica de Potência`<br>`IE  Instalações Eléctricas` | ✔ |
| ✔ | `-- Testing with extra rows` | `code  name`<br>`----------  ----------`<br>`AA  Test`<br>`EP  Electrónic`<br>`IE  Instalaçõe` | `code  name`<br>`----------  ----------`<br>`AA  Test`<br>`EP  Electrónic`<br>`IE  Instalaçõe` | ✔ |

Passou em todos os testes! ✔

## Pergunta 3

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:



**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **Are there common names for students and teachers? Which ones? Return the names ordered alphabetically.**

(Note that you can submit your code several times without losing any grades. Only the last submission will be considered)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `name`<br>`----------`<br>`Fernando`<br>`João` |

**Resposta:** (regime de penalização: 0 %)

```
1 select Student.name from Student, Prof where Student.name=Prof.name order by Student.name ASC
```

Pré-verificação

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `name`<br>`----------`<br>`Fernando`<br>`João` | `name`<br>`----------`<br>`Fernando`<br>`João` | ✔ |

Passou em todos os testes! ✔

## Pergunta 4

Correta Pontuação 1,000 Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What are the specific names of students, i.e. that no professors have? Return the names ordered alphabetically.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `name`<br>`----------`<br>`Abel`<br>`Ismael`<br>`Manuel`<br>`Rui` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select Student.name from Student, Prof except select Student.name from Student, Prof where Student.name=Prof.name order by Student.name ASC
```

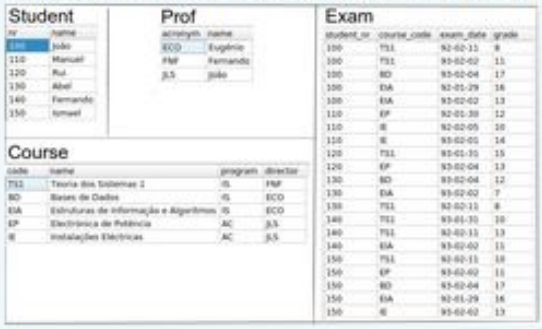
Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `name`<br>`----------`<br>`Abel`<br>`Ismael`<br>`Manuel`<br>`Rui` | `name`<br>`----------`<br>`Abel`<br>`Ismael`<br>`Manuel`<br>`Rui` | ✔ |

Passou em todos os testes! ✔

Pergunta 5 Correta Pontuação 1,000 Desassinalar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:



**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FMF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FMF |
| BD | Bases de Dados | IS | ECO |
| EA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 9 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EA | 92-01-29 | 16 |
| 100 | EA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 93-02-11 | 13 |
| 140 | EA | 93-02-02 | 11 |
| 150 | TS1 | 93-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit. Using SQL answer the question below:

**• What are the names of people related to the faculty? Return the names ordered alphabetically.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**For example:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `/***<br>----------<br>Abel<br>Eugénio<br>Fernando<br>João<br>José<br>Manuel<br>Rui` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select Student.name from Student
2 UNION
3 select Prof.name from Prof
4 order by name ASC
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✓ | `-- Testing with original db` | `/***<br>----------<br>Abel<br>Eugénio<br>Fernando<br>João<br>José<br>Manuel<br>Rui` | `/***<br>----------<br>Abel<br>Eugénio<br>Fernando<br>João<br>José<br>Manuel<br>Rui` | ✓ |
| ✓ | `-- Testing with empty db` | `/***<br>----------<br>Abel<br>Eugénio<br>Fernando<br>João<br>José<br>Manuel<br>Rui<br>Xavi` | `/***<br>----------<br>Abel<br>Eugénio<br>Fernando<br>João<br>José<br>Manuel<br>Rui<br>Xavi` | ✓ |

Passou em todos os testes! ✓

## Pergunta 6

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit. Using SQL answer the question below:

- **What are the names of students who have taken any 'TS1' exams? Return the names ordered alphabetically.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `name`<br>`----------`<br>`Abel`<br>`Fernando`<br>`Ismael`<br>`João`<br>`Rui` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select distinct Student.name from Student,(select Exam.student_nr from Exam where course_code='TS1') as Tab where Student.nr=Tab.student_nr order by Student.name ASC
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `name`<br>`----------`<br>`Abel`<br>`Fernando`<br>`Ismael`<br>`João`<br>`Rui` | `name`<br>`----------`<br>`Abel`<br>`Fernando`<br>`Ismael`<br>`João`<br>`Rui` | ✔ |

Passou em todos os testes! ✔

## Pergunta 7

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What are the names of the students with 'IS' program enrollment? Return the names ordered alphabetically.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `name`<br>`----------`<br>`Abel`<br>`Fernando`<br>`Ismael`<br>`João`<br>`Rui` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select distinct Student.name from Student,(select Exam.student_nr from Exam,(select Course.code from Course where Course.program='IS') as Tab1 where Exam.course_code=Tab1.code) as Tab2 where Student.nr=Tab2.student_nr order by Student.name ASC;
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `name`<br>`----------`<br>`Abel`<br>`Fernando`<br>`Ismael`<br>`João`<br>`Rui` | `name`<br>`----------`<br>`Abel`<br>`Fernando`<br>`Ismael`<br>`João`<br>`Rui` | ✔ |

Passou em todos os testes! ✔

## Pergunta 8

Correta Pontuação 1,000 Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What are the names of the students who completed the 'IS' program? Return them ordered ascendingly.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `name`<br>`----------`<br>`Ismael`<br>`João` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select name from Student where not exists (select * from Course where program='IS' and not exists (select * from Exam where student_nr=nr and course_code=code and grade>=10)) order by 1;
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `name`<br>`----------`<br>`Ismael`<br>`João` | `name`<br>`----------`<br>`Ismael`<br>`João` | ✔ |

Passou em todos os testes! ✔

## Pergunta 9

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | department | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit. Using SQL answer the question below:

- **What is the maximum grade in the exams?**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `max(grade)`<br>`----------`<br>`17` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select max(grade) from Exam
```

Pré-verificação

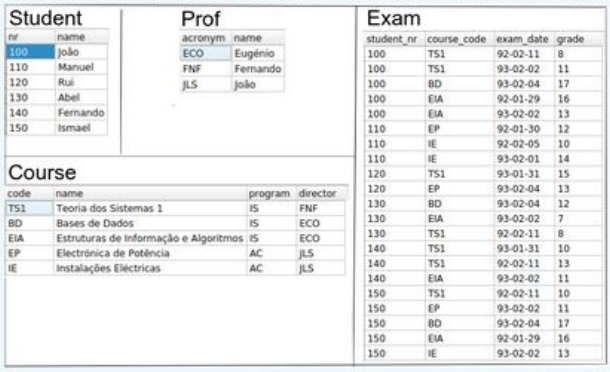
| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `max(grade)`<br>`----------`<br>`17` | `max(grade)`<br>`----------`<br>`17` | ✔ |

Passou em todos os testes! ✔

## Pergunta 10

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:



**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What is the average grade on the BD exams? Round to two decimal numbers.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `round(avg(grade), 2)`<br>`----------`<br>`15.33` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select round(avg(grade), 2) from Exam where course_code='BD'
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `round(avg(grade), 2)`<br>`----------`<br>`15.33` | `round(avg(grade), 2)`<br>`----------`<br>`15.33` | ✔ |

Passou em todos os testes! ✔

## Pergunta 11

Correta Pontuação 1,000 Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What is the number of students? Call it as 'num_students'**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `num_students`<br>`-----------`<br>`6` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 SELECT COUNT(*) as num_students
2 FROM Student;
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `num_students`<br>`-----------`<br>`6` | `num_students`<br>`-----------`<br>`6` | ✔ |

Passou em todos os testes! ✔

## Pergunta 12

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit. Using SQL answer the question below:

- **What is the number of courses in each program? Return them ordered ascendingly by the program.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `program  num_courses`<br>`---------- ----------`<br>`AC  2`<br>`IS  3` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1 select program, count(*) as num_courses from Course
2 group by program order by program ASC
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `program  num_courses`<br>`---------- ----------`<br>`AC  2`<br>`IS  3` | `program  num_courses`<br>`---------- ----------`<br>`AC  2`<br>`IS  3` | ✔ |

Passou em todos os testes! ✔

## Pergunta 13

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit. Using SQL answer the question below:

- **What is the number of exams of each student? Name the count column 'num_exams', and order the results by student number.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `student_nr  num_exams`<br>`----------  ----------`<br>`100  5`<br>`110  3`<br>`120  2`<br>`130  3`<br>`140  3`<br>`150  5` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
select TAB1.nr as student_nr,TAB1.num_exams from (select Student.nr, count(Exam.student_nr) as num_exams from Student, Exam
where Student.nr=Exam.student_nr
group by Student.nr order by Student.nr ASC) as TAB1;
```

Submeter

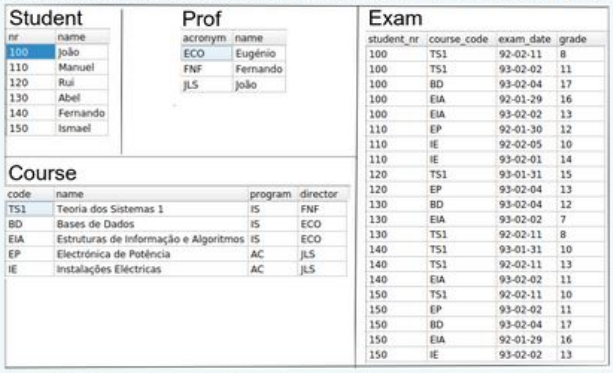
| | Teste | Esperado | | Recebido | | |
|---|---|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `student_nr  num_exams`<br>`----------  ----------`<br>`100  5`<br>`110  3`<br>`120  2`<br>`130  3`<br>`140  3`<br>`150  5` | | `student_nr  num_exams`<br>`----------  ----------`<br>`100  5`<br>`110  3`<br>`120  2`<br>`130  3`<br>`140  3`<br>`150  5` | | ✔ |

Passou em todos os testes! ✔

## Pergunta 14

Correta  Pontuação 1,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:



**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit. Using SQL answer the question below:

- **What is the average number of exams per student? Name it as 'avg_num_exams' and round to two decimal points.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `avg_num_exams`<br>`-------------`<br>`3.5` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1  CREATE VIEW TAB1 AS
2  select ROUND(COUNT(*),2) as num_exams
3  FROM Exam;
4
5  CREATE VIEW TAB2 AS
6  select ROUND(COUNT(*),2) as num_students
7  FROM Student;
8
9  select round((TAB1.num_exams/TAB2.num_students),2) as avg_num_exams
10 FROM TAB1, TAB2;
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `avg_num_exams`<br>`-------------`<br>`3.5` | `avg_num_exams`<br>`-------------`<br>`3.5` | ✔ |

Passou em todos os testes! ✔

## Pergunta 15

Correta Pontuação 2,000 Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What are the name and current average grade of each student? Calculate the average using courses that the student has passed, in any program. Name the average column as 'avg_grade' and round it to 2 decimal places. Order the results by student name alphabetically.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `name avg_grade`<br>`---------- ----------`<br>`Abel 12.0`<br>`Fernando 12.0`<br>`Ismael 13.4`<br>`João 14.67`<br>`Manuel 13.0`<br>`Rui 14.0` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
CREATE VIEW TAB1 AS
select Exam.student_nr, Exam.course_code, max(Exam.grade) as maxGrade
FROM Exam
GROUP BY Exam.course_code, Exam.student_nr
ORDER BY Exam.student_nr;

CREATE VIEW TAB2 AS
select TAB1.student_nr, round(avg(TAB1.maxGrade),2) as avg_grade
from TAB1
WHERE (TAB1.maxGrade > 9)
GROUP BY TAB1.student_nr
ORDER BY TAB1.student_nr;

select Student.name, TAB2.avg_grade
FROM Student, TAB2
WHERE (Student.nr == TAB2.student_nr)
ORDER BY Student.name;
```

Submeter

| | Teste | Esperado | Recebido | |
|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `name avg_grade`<br>`---------- ----------`<br>`Abel 12.0`<br>`Fernando 12.0`<br>`Ismael 13.4`<br>`João 14.67`<br>`Manuel 13.0`<br>`Rui 14.0` | `name avg_grade`<br>`---------- ----------`<br>`Abel 12.0`<br>`Fernando 12.0`<br>`Ismael 13.4`<br>`João 14.67`<br>`Manuel 13.0`<br>`Rui 14.0` | ✔ |

Passou em todos os testes! ✔

## Pergunta 16

Correta Pontuação 2,000 Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more programs, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **What is the maximum grade for each course and which student got it? Return results naming the columns as follows: course_code, name, max_grade. And ordered ascendingly by course_code**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Por exemplo:**

| Teste | Resultado |
|---|---|
| `-- Testing with original db` | `course_code name max_grade`<br>`----------- ---------- ----------`<br>`BD João 17`<br>`BD Ismael 17`<br>`EIA João 16`<br>`EIA Ismael 16`<br>`EP Rui 13`<br>`IE Manuel 14`<br>`TS1 Rui 15` |

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1  CREATE VIEW TAB1 AS
2  select Exam.student_nr, Exam.course_code, max(Exam.grade) as maxGrade
3  FROM Exam
4  GROUP BY Exam.course_code;
5
6  CREATE VIEW TAB2 AS
7  select Exam.student_nr, Exam.course_code, Exam.grade
8  FROM Exam, TAB1
9  WHERE (TAB1.course_code == Exam.course_code AND TAB1.maxGrade == Exam.grade)
10 ORDER BY Exam.student_nr;
11
12 select TAB2.course_code, Student.name, TAB2.grade as max_grade
13 FROM TAB2, Student
14 WHERE (TAB2.student_nr == Student.nr)
15 ORDER BY TAB2.course_code ASC;
```

Submeter

| | Teste | Esperado | | | Recebido | | | |
|---|---|---|---|---|---|---|---|---|
| ✔ | `-- Testing with original db` | `course_code` | `name` | `max_grade` | `course_code` | `name` | `max_grade` | ✔ |
| | | `BD` | `João` | `17` | `BD` | `João` | `17` | |
| | | `BD` | `Ismael` | `17` | `BD` | `Ismael` | `17` | |
| | | `EIA` | `João` | `16` | `EIA` | `João` | `16` | |
| | | `EIA` | `Ismael` | `16` | `EIA` | `Ismael` | `16` | |
| | | `EP` | `Rui` | `13` | `EP` | `Rui` | `13` | |
| | | `IE` | `Manuel` | `14` | `IE` | `Manuel` | `14` | |
| | | `TS1` | `Rui` | `15` | `TS1` | `Rui` | `15` | |

Passou em todos os testes! ✔

## Pergunta 17

Correta  Pontuação 2,000  Destacar pergunta

Consider the following database of the grades obtained in the various exams taken by students in the curricular units (courses) of one or more departments, with the following tables and instances shown in the figure below:

**Student**

| nr | name |
|---|---|
| 100 | João |
| 110 | Manuel |
| 120 | Rui |
| 130 | Abel |
| 140 | Fernando |
| 150 | Ismael |

**Prof**

| acronym | name |
|---|---|
| ECO | Eugénio |
| FNF | Fernando |
| JLS | João |

**Course**

| code | name | program | director |
|---|---|---|---|
| TS1 | Teoria dos Sistemas 1 | IS | FNF |
| BD | Bases de Dados | IS | ECO |
| EIA | Estruturas de Informação e Algoritmos | IS | ECO |
| EP | Electrónica de Potência | AC | JLS |
| IE | Instalações Eléctricas | AC | JLS |

**Exam**

| student_nr | course_code | exam_date | grade |
|---|---|---|---|
| 100 | TS1 | 92-02-11 | 8 |
| 100 | TS1 | 93-02-02 | 11 |
| 100 | BD | 93-02-04 | 17 |
| 100 | EIA | 92-01-29 | 16 |
| 100 | EIA | 93-02-02 | 13 |
| 110 | EP | 92-01-30 | 12 |
| 110 | IE | 92-02-05 | 10 |
| 110 | IE | 93-02-01 | 14 |
| 120 | TS1 | 93-01-31 | 15 |
| 120 | EP | 93-02-04 | 13 |
| 130 | BD | 93-02-04 | 12 |
| 130 | EIA | 93-02-02 | 7 |
| 130 | TS1 | 92-02-11 | 8 |
| 140 | TS1 | 93-01-31 | 10 |
| 140 | TS1 | 92-02-11 | 13 |
| 140 | EIA | 93-02-02 | 11 |
| 150 | TS1 | 92-02-11 | 10 |
| 150 | EP | 93-02-02 | 11 |
| 150 | BD | 93-02-04 | 17 |
| 150 | EIA | 92-01-29 | 16 |
| 150 | IE | 93-02-02 | 13 |

The key of the Exam table is composed of the attributes student_nr, course_code, and exam_date, allowing the storage of the result of more than one exam per unit. Assume that all students enrolled in a unit have taken at least one exam for that unit.
Using SQL answer the question below:

- **Obtain the ordered list by programs of the names of the graduated students. Return them ordered ascendingly by program and student name.**

(Note that you can submit your code several times. However, you lose 10% of the grade with every wrong submission)

**Resposta:** (regime de penalização: 10, 20, ... %)

```
1  CREATE VIEW TAB1 AS
2  select Course.program, count(Course.code) as num_courses
3  FROM Course
4  GROUP BY Course.program;
5
6
7  CREATE VIEW TAB2 AS
8  select Exam.student_nr, Exam.course_code, Course.program, Exam.grade
9  FROM Course, Exam
10 WHERE (Course.code == Exam.course_code);
11
12 CREATE VIEW TAB3 AS
13 select * from TAB2
14 WHERE (TAB2.grade > 9);
15
16 CREATE VIEW TAB4 AS
17 select TAB3.student_nr, TAB3.course_code, TAB3.program, max(TAB3.grade) as maxGrade from TAB3
18 GROUP BY TAB3.student_nr, TAB3.course_code;
19
20 CREATE VIEW TAB5 AS
21 SELECT TAB4.student_nr, count(TAB4.course_code) as courses_passed, TAB4.program, round(avg(TAB4.maxGrade),2) as average
22 FROM TAB4
23 GROUP BY TAB4.student_nr, TAB4.program;
24
```

Submeter

| | Teste | Esperado | | Recebido | | |
|---|---|---|---|---|---|---|
| ✔ | -- Testing with original db | program | name | program | name | ✔ |
| | | AC | Ismael | AC | Ismael | |
| | | AC | Manuel | AC | Manuel | |
| | | IS | Ismael | IS | Ismael | |
| | | IS | João | IS | João | |

Passou em todos os testes! ✔