

Università degli studi di Bologna

Department of Statistical Science

Master degree in *Statistics, Economics and Business*

INFORMATION SYSTEMS AND DATABASE MANAGEMENT



Academic year 2021/2022

A University orienteering Event database

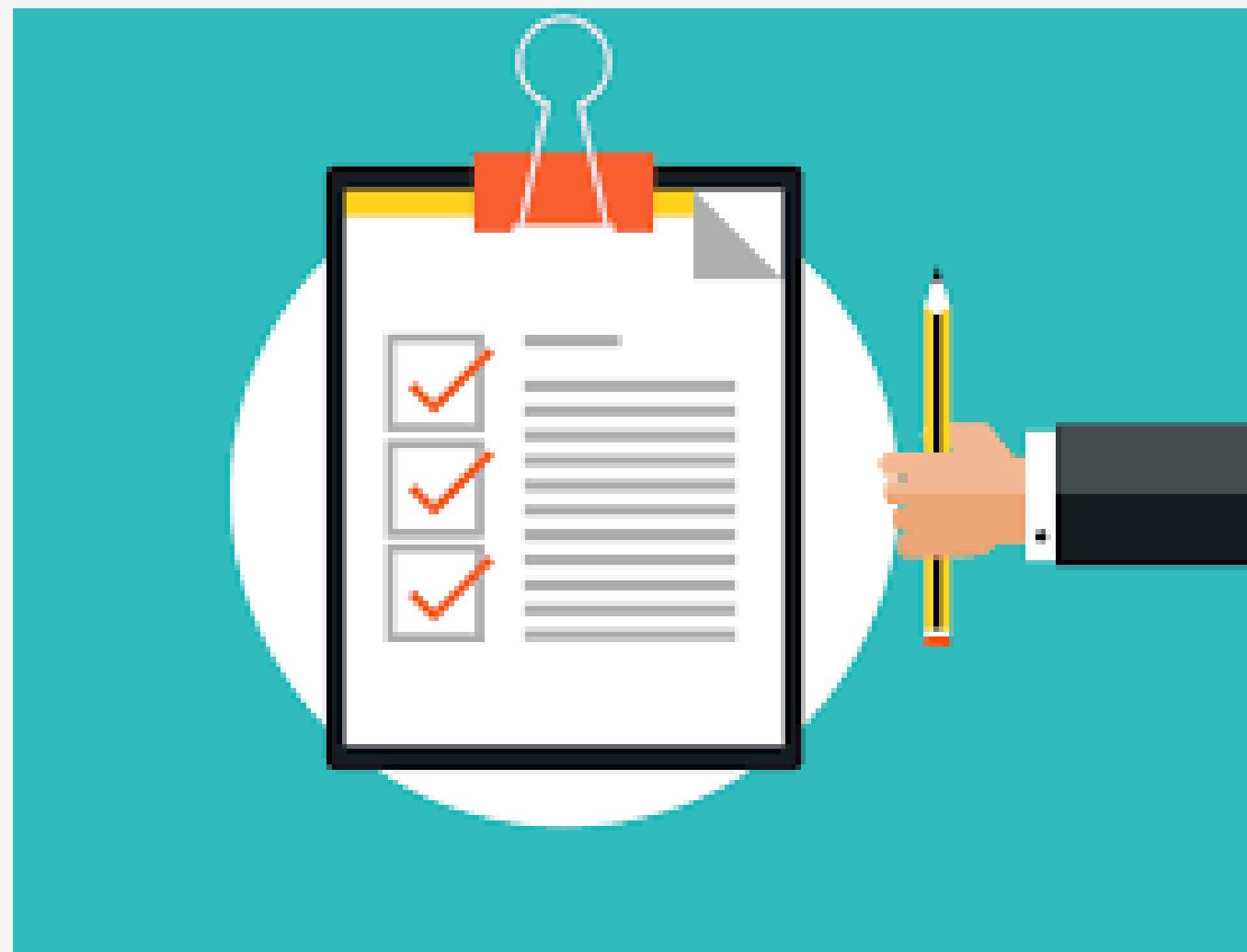
Students:

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GAIA BACCANI

Professor:

Alessandro Lubisco

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- **The business problem**
- **The relationship design**
- **SQL: DDL**
- **SQL: DML**
- **Conclusions and what we have learnt**

THE EVENT



L'occasione sull'orientamento universitario vedrà i diplomandi confrontarsi sul futuro

JESI, 31 marzo 2022 – Orientamento universitario a cura dell'associazione **Impact** nei prossimi giorni di oggi e domani su *Google Meet*.

azazione jesina, organizzazione culturale no profit

**Jesi, al via “What's next?”
2022, evento di orientamento universitario**



JESI – A seguito del successo dello scorso anno, l'Associazione ImpAct di Jesi, organizzazione culturale no profit di giovani, è lieta di segnalare

THE ISSUE

A great amount of data to organize

On the occasion of a four-day national event about University orienteering, we wanted to create a database to store data about:

- STUDENTS
- UNIVERSITIES REPRESENTED
- COURSES REPRESENTED
- ORGANIZATION OF THE SINGLE DAILY EVENTS



THE STRATEGY

It's time to build a database



Store data

To provide
a repository for storing data



Provide an organizational structure for data

To provide an organised structure into
which that data can be placed



Provide a mechanism for querying, creating, modifying, and deleting data

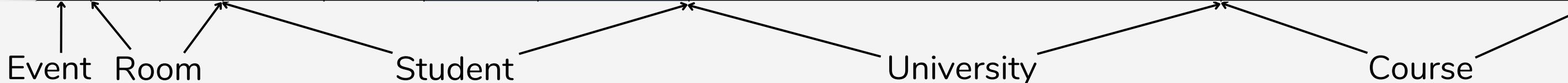
To perform efficiently the CRUD
operations

THE TRANSITION TO A BETTER SYSTEM

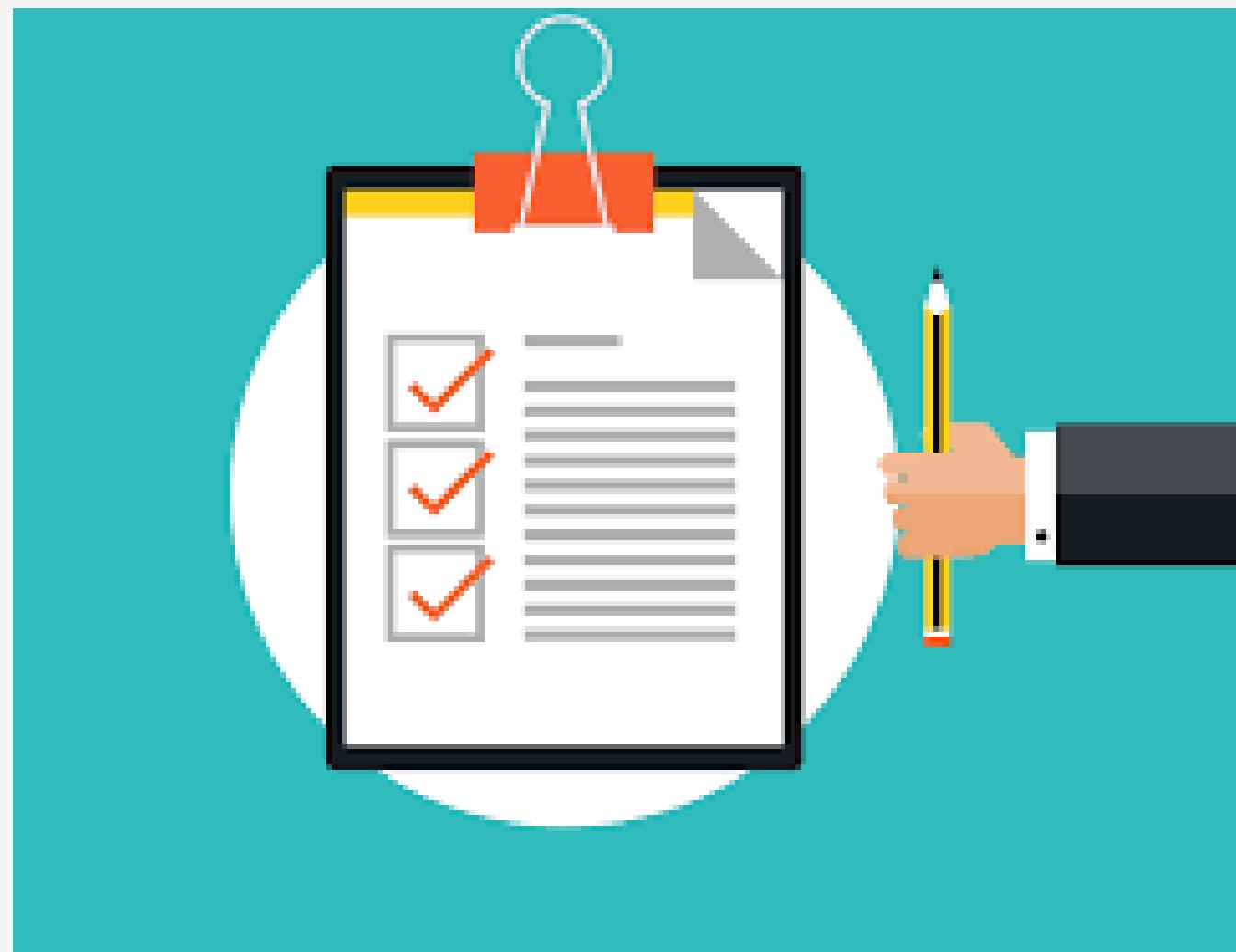
Avoiding redundancy, multiple themes and modification issues of the Excel lists

1	day	orario	room	name	surname	birthday	region	university	course
2	1	14	Giuri	Viola	Ferrantino	23/05/1997	Veneto	Luiss Guido Carli	Giurisprudenza
3	1	14	Giuri	Elia	Peruzzo	21/10/1999	Friuli-Venezia Giu	Università degli Studi di Macerata	Giurisprudenza
4	1	14	Giuri	Mariangela	Gastaldello	21/09/1997	Basilicata	Università degli Studi di Macerata	Giurisprudenza
5	1	14	Giuri	Emma	Agosti	17/08/1998	Trentino-Alto Adig	Alma Mater Studiorum Università di Bologna	Giurisprudenza
6	1	14	Giuri	Claudio	Andreoni	05/08/1997	Lombardia	Università Bocconi	Giurisprudenza
7	1	14	Giuri	Giulia	Emma	04/04/1997	Friuli-Venezia Giu	Università degli Studi di Trento	Giurisprudenza
8	1	18	Med	Michela	Figini	04/11/1999	Trentino-Alto Adig	Università Degli Studi Di Ferrara	Medicina e Chirurgia
9	1	18	Med	Elisa	Asciolla	19/06/1999	Campania	Università degli Studi di Padova	Medicina e Chirurgia
10	1	18	Med	Melania	Quarta	08/05/1999	Emilia-Romagna	Università degli Studi di Roma "Tor Vergata"	Medicina e Chirurgia
...									

130	4	18	Pol	Giovanni	Rossetti	05/08/1999	Marche	Università degli Studi Padova	Scienze Politiche
131	4	18	Pol	Greta	Sclippa	12/07/1998	Lazio	Alma Mater Studiorum Università di Bologna	Scienze Politiche e Internazionali
132	1	16	Socio_I	Giada	Pellegrini	12/03/1997	Sicilia	Alma Mater Studiorum Università di Bologna	Sociologia
133	1	16	Socio_I	Sabrina	Morici	20/10/1997	Lombardia	Università degli Studi di Macerata	Scienze della Formazione Primaria
134	1	16	Socio_I	Irene	Alessandrini	05/09/1997	Emilia-Romagna	Università degli Studi di Urbino Carlo Bo	Scienze della Formazione Primaria
135	1	16	Socio_I	Sara	Pirrotta	11/02/1998	Friuli-Venezia Giu	Università degli Studi di Macerata	Scienze dell'Educazione

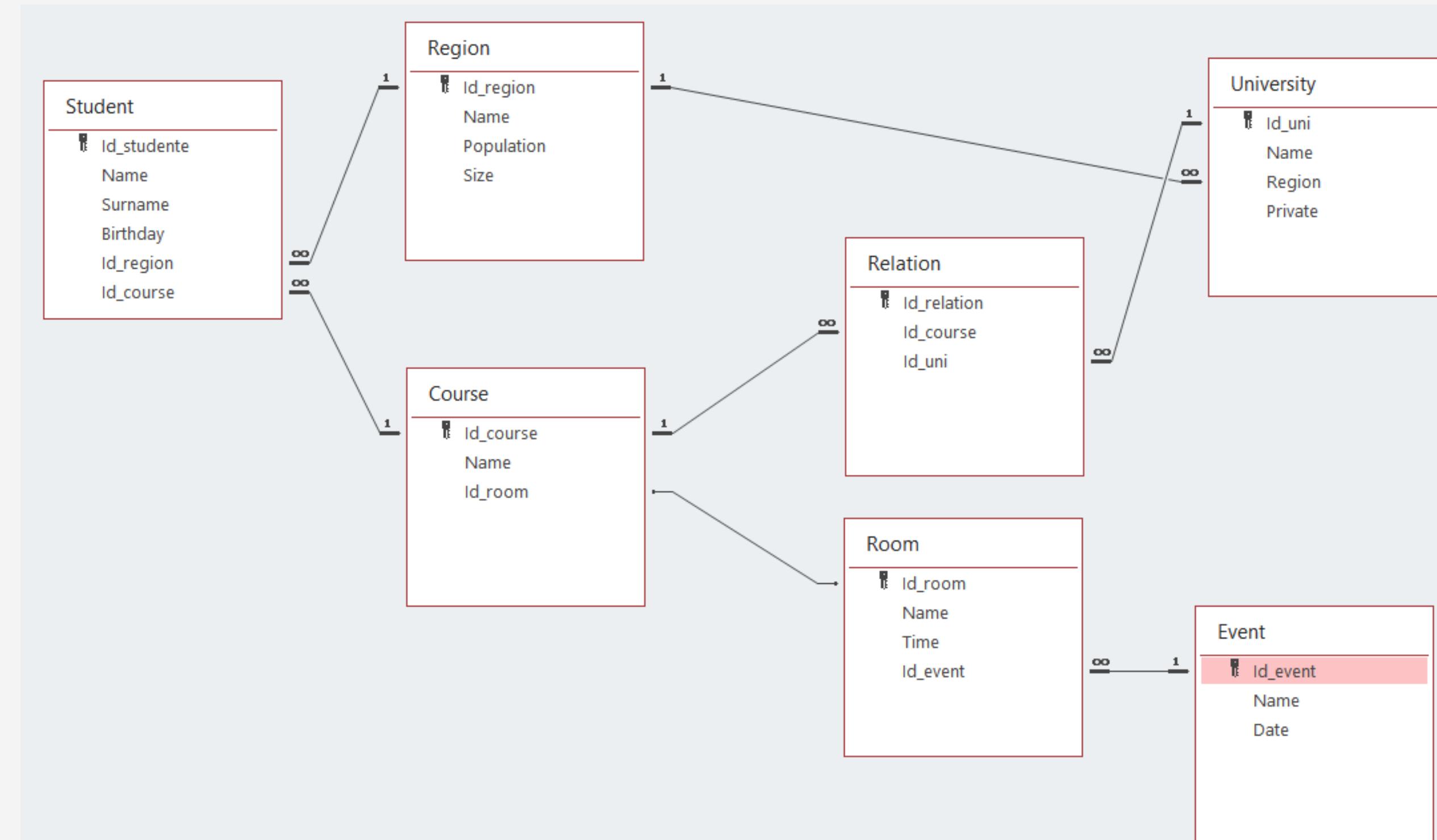


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- Conclusions and what we have learnt

THE RELATIONSHIPS DESIGN



STUDENT TABLE

Id_studente	Name	Surname	Birthday	Id_region	Id_course
1	Mariangela	Gastaldello	21/09/1997	1	1
2	Emma	Agosti	17/08/1998	16	1
3	Claudio	Andreoni	05/08/1997	1	1
4	Giulia	Emma	04/04/1997	15	1
5	Michela	Figini	04/11/1999	16	2
6	Elisa	Asciolla	19/06/1999	3	2
7	Melania	Quarta	08/05/1999	6	2
8	Alberto	Guerrazzi	30/04/1998	2	2
9	Edoardo	Basili	09/05/1999	5	2
10	Benedetta	Tozzi	02/05/1998	2	2
11	Carlo	Palpacelli	16/08/1998	9	3
12	Emily	Cecere	02/11/1999	7	3
13	Federica	Gerboni	06/10/1997	4	4
14	Marta	Felice	05/04/1998	1	5
15	Giovanni	Stronati	20/03/1998	4	6
16	Eleonora	Giacani	06/06/1998	9	7

REGION TABLE

	Id_region	Name	Population	Size
[+]	1	Lombardia	9 965 046	23 863
[+]	2	Lazio	5 715 190	17 232
[+]	3	Campania	5 590 681	13 671
[+]	4	Veneto	4 854 633	18 345
[+]	5	Sicilia	4 801 468	25 832
[+]	6	Emilia-Romagna	4 431 816	22 453
[+]	7	Piemonte	4 252 279	25 387
[+]	8	Puglia	3 912 166	19 541
[+]	9	Toscana	3 676 285	22 987
[+]	10	Calabria	1 844 586	15 221
[+]	11	Sardegna	1 579 181	24 100
[+]	12	Liguria	1 507 438	5 416
[+]	13	Marche	1 489 789	9 427
[+]	14	Abruzzo	1 273 660	10 831
[+]	15	Friuli-Venezia Giulia	1 197 295	7 924
[+]	16	Umbria	1 077 932	13 616
[+]	17	Marche	859 572	8 464
[+]	18	Basilicata	539 999	10 073
[+]	19	Molise	290 769	4 460
[+]	20	Valle d'Aosta	123 337	3 261

THE UNIVERSITY, COURSE AND THEIR CHILD TABLE

Course

Id_course	Name	Id_room
1	Giurisprudenza	1
2	Medicina e Chirurgia	2
3	Design del Prodotto Industriale	3
4	Arte e Design	3
5	Canto e Musica Elettronica e Sound Design	3
6	Fotografia	3
7	Fashion Design	3
8	Ingegneria Aerospaziale	4
9	Ingegneria Energetica	4
10	Ingegneria Edile-Architettura	4
11	Ingegneria Meccanica	4
12	Bionics Engineering	15

University

Id_uni	Name	Region
1	Luiss Guido Carli	2
2	Università degli Studi di Macerata	13
3	Alma Mater Studiorum Università di Bologna	6
4	Università Bocconi	1
5	Università degli Studi di Trento	16
6	Università Degli Studi Di Ferrara	6
7	Università degli Studi di Padova	4
8	Università degli Studi di Roma "Tor Vergata"	2
9	Università degli Studi di Verona	4
10	Università Politecnica delle Marche	13
11	Saint Camillus International University of Health Sciences	2
12	Libera Università di Bolzano	16

Relation

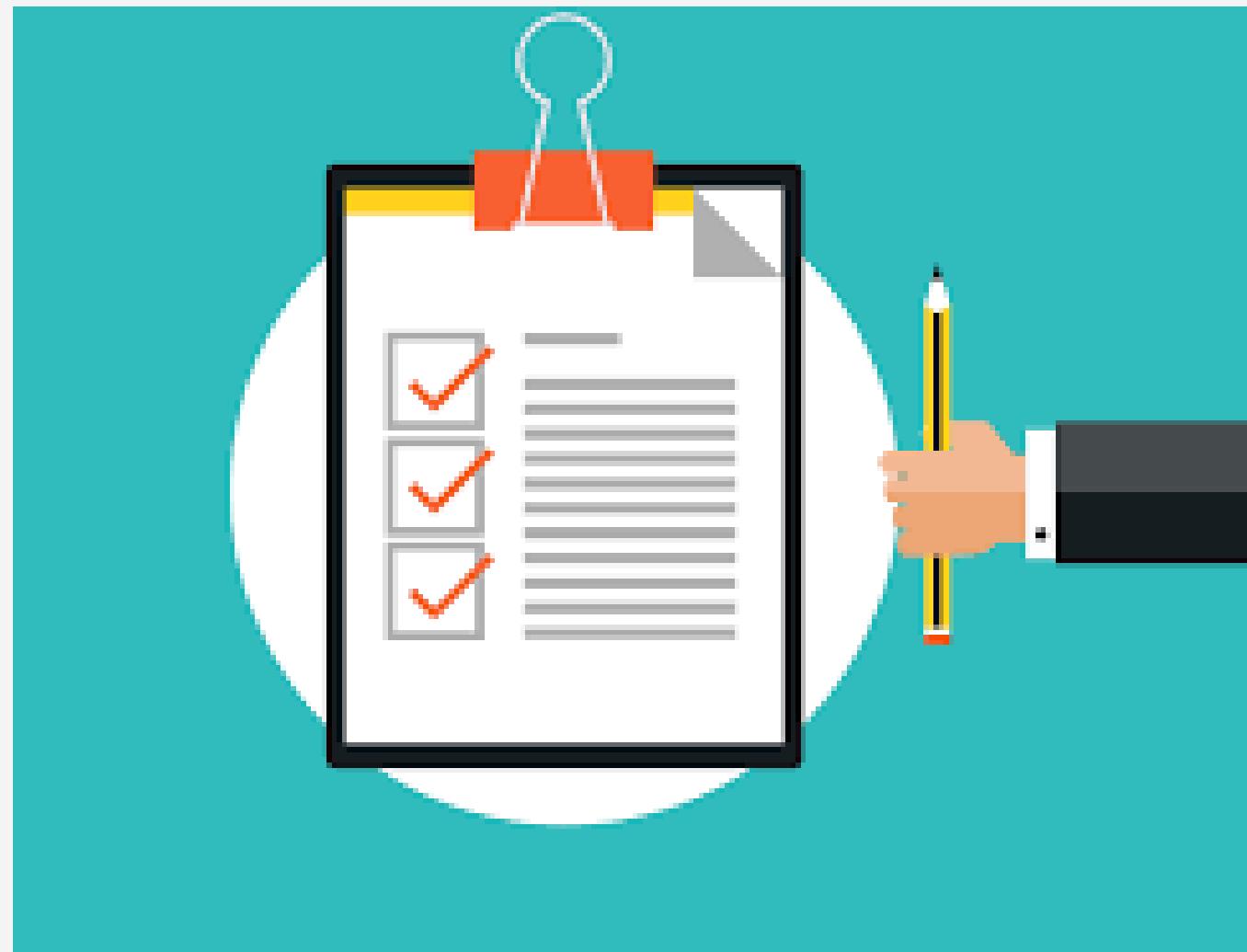
Id_relation	Id_course	Id_uni
1	1	1
2	1	2
3	1	3
4	1	4
5	1	8
6	1	5

THE EVENT AND ROOM TABLES

	Id_event	Name	Date
[+]	1	OrientYou	30/03/2022
[+]	2	What's Next?	31/03/2022
[+]	3	Passion as compass	1/04/2022
[+]	4	After the High School	2/04/2022

	Id_room	Name	Time	Id_event
[+]	1	Giuri	14	1
[+]	2	Med	18	1
[+]	3	Art1	19	1
[+]	4	Ing	16	2
[+]	5	Fil_Sto	14	3
[+]	6	Prof_Sanit	18	3
[+]	7	Com	15	4
[+]	8	Eco1	18	2
[+]	9	Lin_Let	17	2
[+]	10	Sci	19	2
[+]	11	Fisio_ScMot	19	4
[+]	12	Eco 2	16	4
[+]	13	Art 2	18	3
[+]	14	Psico	17	3
[+]	15	Bio_Farm	16	3
[+]	16	Pol	18	4
[+]	17	Socio_Form	16	1

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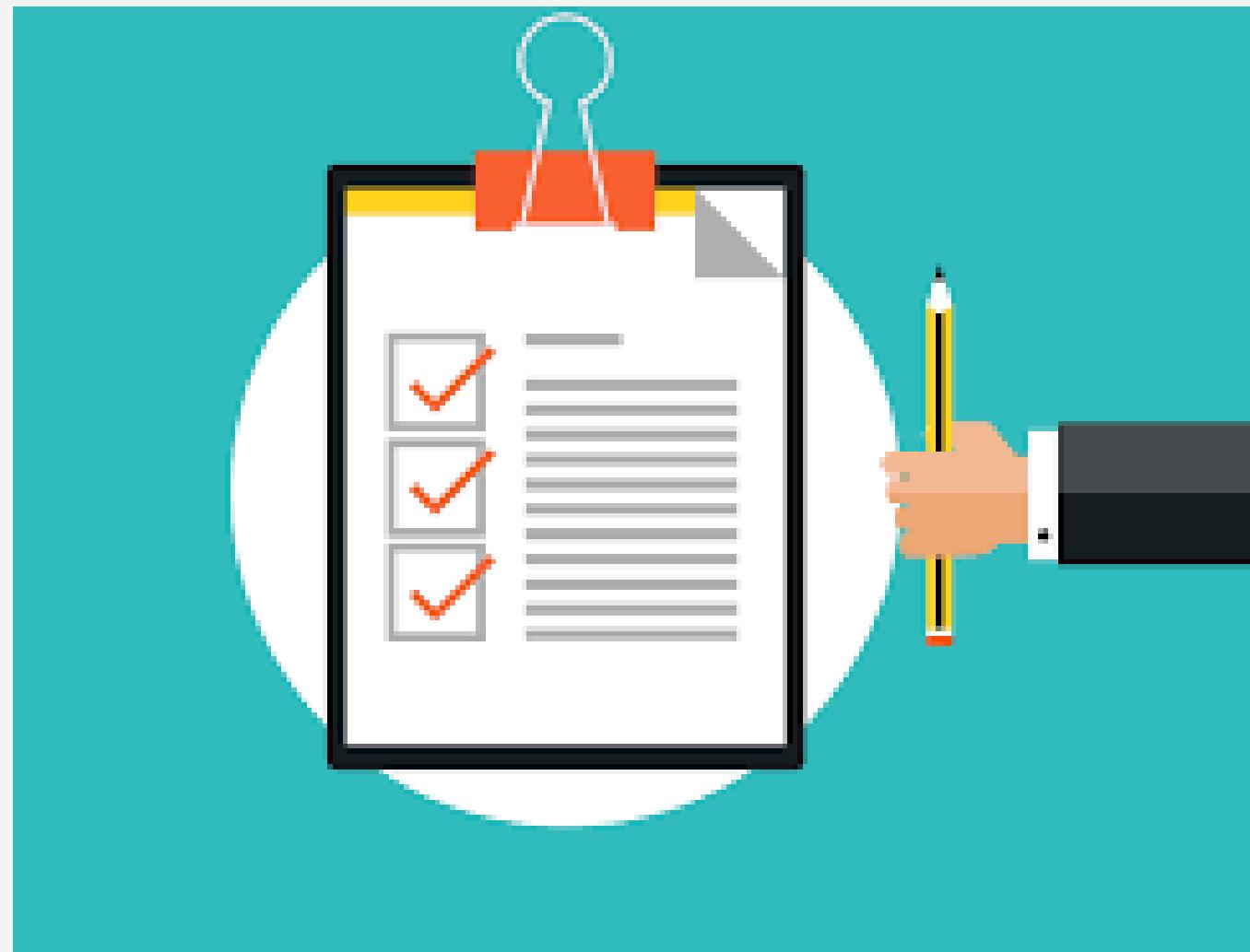
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THE QUERIES: DDL

```
CREATE TABLE students (
    id_student int NOT NULL,
    name varchar(30) NOT NULL,
    surname varchar(30) NOT NULL,
    birthday DATE,
    id_course int NOT NULL,
    id_region int NOT NULL,
    PRIMARY KEY (id_student),
    FOREIGN KEY (id_course) REFERENCES course(id_course),
    FOREIGN KEY (id_region) REFERENCES region(id_region)
);
```

```
ALTER TABLE student ADD COLUMN Notes varchar(25);
```

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Insert and update data about a student



INSERT NEW STUDENT

Id_studente	<input type="text" value="7"/>
Name	<input type="text" value="Michela"/>
Surname	<input type="text" value="Figini"/>
Birthday	<input type="text" value="04/11/1999"/>
Region	<input type="text" value="Trentino-Alto Adige"/>
Course	<input type="text" value="Medicina e Chirurgia"/>

[Add a new student](#)

```
INSERT INTO Student ( Id_studente, Name, Surname, Birthday, id_region, id_course)
VALUES (400, 'Riccardo', 'Bellide', #25/08/1998#, 12, 12);
```

```
UPDATE student SET name = 'Alfred', surname = 'Frankfurt'
WHERE id_studente=40;
```

How many represented universities per region?

Num_uni	Region_name
1	Campania
4	Emilia-Romagna
1	Friuli-Venezia Giulia
4	Lazio
8	Lombardia
3	Marche
2	Piemonte
1	Puglia
1	Sicilia
1	Toscana
2	Trentino-Alto Adige
3	Veneto

```
SELECT Count(*) AS Num_uni, Region.name AS Region_name  
FROM Region INNER JOIN university ON Region.Id_region = university.Region  
GROUP BY Region.name;
```

How many represented private universities in Lombardia?

Private_uni_lomb
Università Bocconi
NABA Nuova Accademia di Belle Arti Milano
IED Milano
IULM Milano
Università Cattolica del Sacro Cuore

```
SELECT University.Name AS Private_uni_lomb
FROM Region INNER JOIN University ON Region.Id_region = University.Region
WHERE ((Region.Name)="Lombardia") AND ((University.Private)=1));
```

Which is the region from which the students most come from?

region	population	size
Lombardia	9 965 046	23 863

```
SELECT region.name AS region, region.population, region.size  
FROM region  
WHERE ((region.id_region)=(SELECT top 1 id_region FROM student GROUP BY id_region  
ORDER BY COUNT(id_region) DESC));
```

Which courses are "Sciences"?

Science_courses
Scienze della Comunicazione
Scienze Motorie
Scienze Statistiche
Scienze Biologiche
Scienze e Tecnologie Agrarie
Scienze Internazionali e Diplomatiche
Scienze della Formazione Primaria
Scienze dell'Educazione

```
SELECT Course.Name AS Science_courses  
FROM Course  
WHERE (((Course.Name) Like "Scienze*"));
```

Which event will attend and which course will represent the student Alice Gallagher?

Student.Name	Surname	Event.Name	Date	Time	Room.Name	Course.Name
Alice	Gallagher	Passion as compass	1/04/2022	18	Art 2	Pittura e Arti Visive

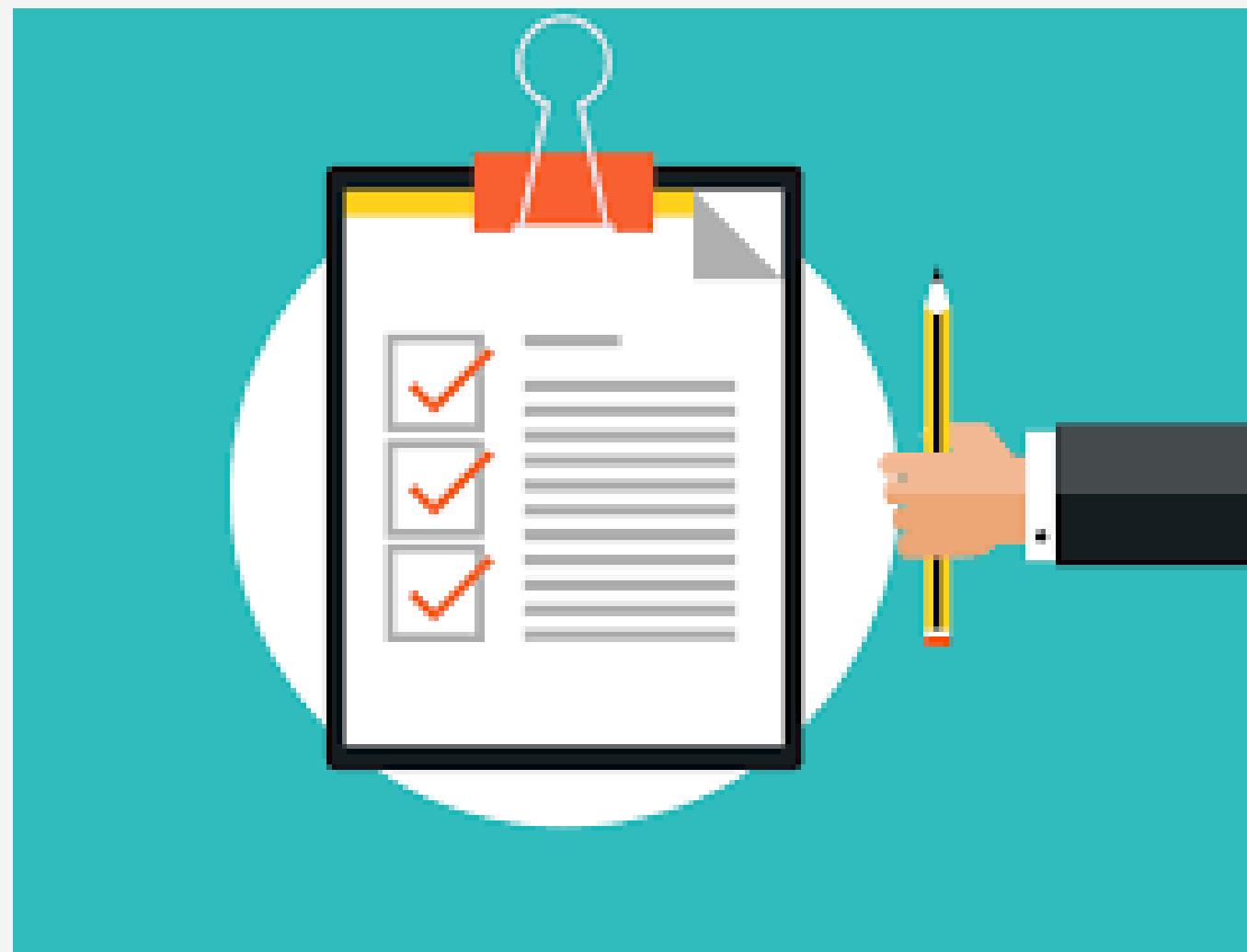
```
SELECT Student.Name, Student.Surname, Event.Name, Event.Date, Room.Time, Room.Name, Course.Name
FROM Event INNER JOIN ((Course INNER JOIN Room ON Course.Id_room = Room.Id_room)
    INNER JOIN Student ON Course.Id_course = Student.Id_course) ON Event.Id_event = Room.Id_event
WHERE (((Student.Name)="Alice") AND ((Student.Surname)="Gallagher"));
```

How many students will present on each event?

Name	Number_of_
After the High School	30
OrientYou	22
Passion as compass	38
What's Next?	44

```
SELECT Event.Name, Count(Student.id_studente) AS Number_of_students
FROM Event INNER JOIN (room INNER JOIN (Course INNER JOIN Student ON Course.Id_course = Student.id_course)
ON room.ID_room = Course.Id_room) ON Event.Id_event = room.Id_event
GROUP BY Event.Name;
```

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A H Evento_stud... : Database- C:\Users\rbell\Downloads\Evento_stud... (formato di file Access 2007 - 2016) - Access

File Home Crea Dati esterni Strumenti database Guida Cosa vuoi fare?

Visualizza Incolla Taglia Copia Copia formato Filtro Ordina e filtra

Annula Visualizzazioni Appunti Aggiorna tutto Nuova Salva Elimina

Tutti gli og... Student X

Cerca... Tabelle

- Course
- Event
- Region
- Relation
- Room
- Student
- University

Query

- Add student
- Update_name
- Alter table
- Create table
- Num uni per regione
- Private in lombardia
- Region_most_students
- Sciences courses
- Student Query
- Student_time
- Students_per_event

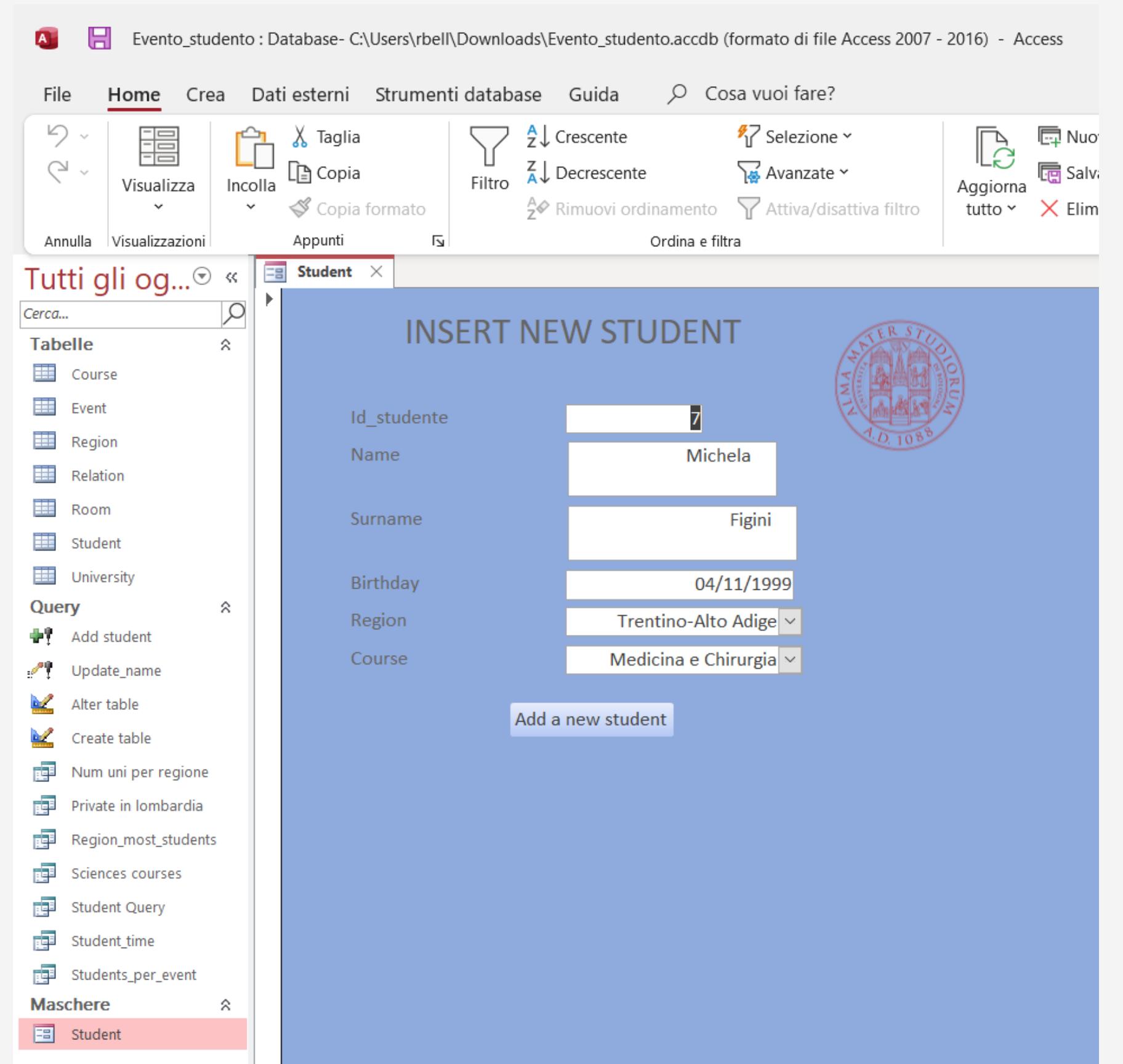
Maschere

- Student

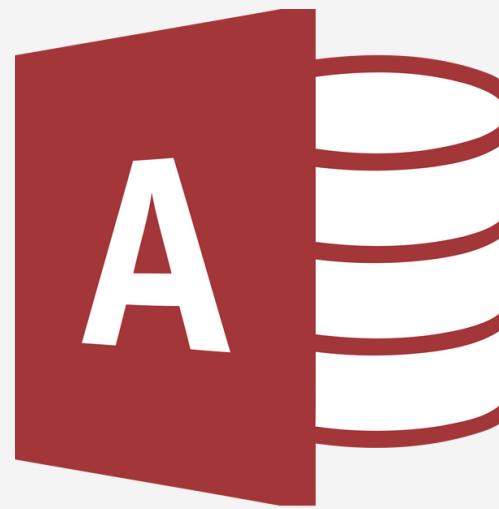
INSERT NEW STUDENT

Id_studente: 7
Name: Michela
Surname: Figini
Birthday: 04/11/1999
Region: Trentino-Alto Adige
Course: Medicina e Chirurgia

Add a new student



The technology we have used



What we have learnt

- 01 This data must be accessed at the same time by several organizators, a list on an Excel file wasn't suited for that
- 02 Changes made to the data must be applied consistently, a relational database was an optimal choice
- 03 Privacy is important, access to certain parts of the data must be restricted, volunteers must not have the same grants as the organizators



**Thanks for your
attention!**

