

# COMP 306 – Database Application Project

## *Find My Master's*

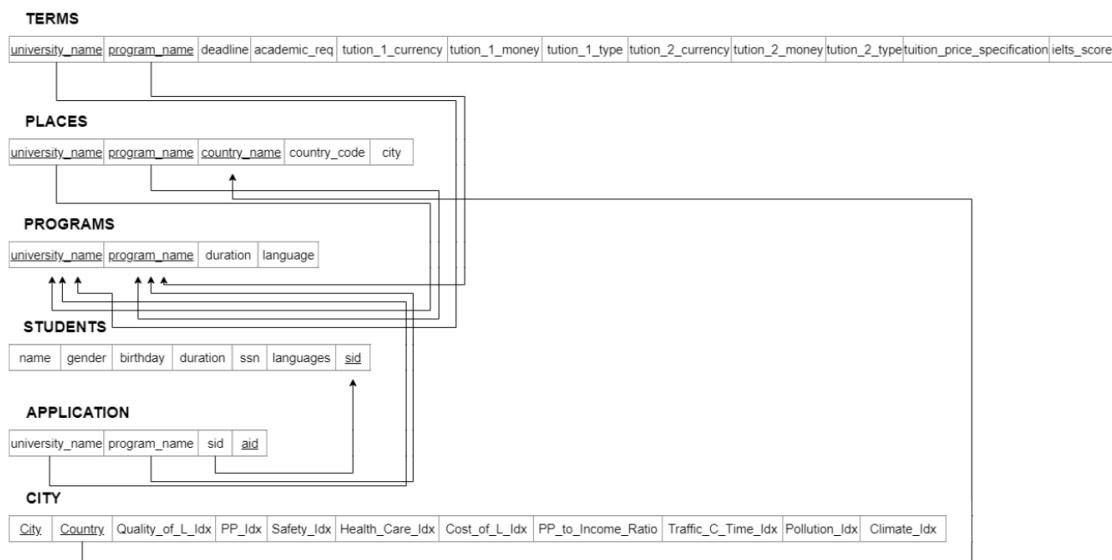
### 1. Introduction

In this project, we created a mobile application *Find My Master's* that aims to help students to discover their future by showing the best Master's Degree options for them. We have three main parts in the application, i.e. Explore, Decide and Apply. Explore part is there to see popular or recently added programs. In the Decision part, you can filter your search by selecting the country that you want to live in, specific requirements you may need, or the application deadline. In addition, in the Apply part, you can apply for a selected Master's Degree program. Finally, you are ready to go!



*Find My Master's logo*

### 2. Relational Database Schema



### 3. Lists of tables

We have 6 tables, i.e. TERMS, PLACES, PROGRAMS, STUDENTS, APPLICATION and CITY. You can found the specifications in the below:

```
CREATE TABLE TERMS (
    university_name TEXT NOT NULL,
    program_name TEXT NOT NULL,
    deadline TEXT NOT NULL,
    academic_req TEXT NOT NULL,
    tution_1_currency TEXT NOT NULL,
    tution_1_money      INTEGER NOT NULL,
    tution_1_type TEXT NOT NULL,
    tution_2_currency TEXT NOT NULL,
    tution_2_money INTEGER NOT NULL,
    tution_2_type TEXT NOT NULL,
    tuition_price_specification TEXT NOT NULL,
    ielts_score INTEGER NOT NULL,
    PRIMARY KEY (university_name, program_name)
    FOREIGN KEY (university_name, program_name)
        REFERENCES PROGRAMS (university_name, program_name)
);
```

```
CREATE TABLE PLACES (
    university_name TEXT NOT NULL,
    program_name TEXT NOT NULL,
    country_name TEXT NOT NULL,
    country_code TEXT NOT NULL,
    city TEXT NOT NULL,
    PRIMARY KEY (university_name, country_name, program_name)
    FOREIGN KEY (university_name, program_name)
        REFERENCES PROGRAMS (university_name, program_name)
);
```

```
CREATE TABLE PROGRAMS (
    university_name TEXT NOT NULL,
    program_name TEXT NOT NULL,
    duration TEXT NOT NULL,
    language TEXT NOT NULL,
    PRIMARY KEY (university_name, program_name)
);
```

```
CREATE TABLE STUDENTS (
    name TEXT NOT NULL,
    gender TEXT NOT NULL,
    birthday DATE NOT NULL,
    ssn INTEGER NOT NULL,
    languages TEXT NOT NULL,
    sid INTEGER PRIMARY KEY
);
```

```
CREATE TABLE APPLICATION (
    university_name TEXT NOT NULL,
    program_name TEXT NOT NULL,
    sid INTEGER NOT NULL ,
    aid INTEGER PRIMARY KEY,
    FOREIGN KEY (sid)
        REFERENCES STUDENTS (sid)
    FOREIGN KEY (university_name, program_name)
        REFERENCES PROGRAMS (university_name, program_name)
);
```

```
CREATE TABLE CITY (
    City TEXT NOT NULL,
```

```

Country TEXT NOT NULL,
Quality_of_Life_Index REAL NOT NULL,
Purchasing_Power_Index REAL NOT NULL,
Safety_Index REAL NOT NULL,
Health_Care_Index REAL NOT NULL,
Cost_of_Living_Index REAL NOT NULL,
Property_Price_to_Income_Ratio    REAL NOT NULL,
Traffic_Commute_Time_Index REAL NOT NULL,
Pollution_Index      REAL NOT NULL,
Climate_Index REAL NOT NULL,

PRIMARY KEY (city, country)
FOREIGN KEY (Country)
    REFERENCES PLACES (country_name)
);

```

#### 4. How did we populate our database?

The main body of our data came from a Master's and Ph.D. program data set from Kaggle. The content originates from mastersportal.com. Also, city data, including both cost and life characteristics of cities were constructed alongside the main data, from numbeo.com. We basically divided a portion of the original 23 columned master data and create tables, and then added another table as explained city data. Afterward, 'students' and 'applications' tables were constructed as well, for user functionalities on the app. We had to make our data much smaller than it originally was since it was close to 170 MB and our app uses SQLite, i.e., a local database for the clients. We first eliminated some columns that were rather irrelevant to us and then continued to eliminate empty or null values containing rows. Furthermore, we parsed some HTML code a 'requirements' column had, and also corrected some data formats to make the data more friendly to code on our app. We performed similar data format corrections on the discussed 'city' data as well.

#### 5. Complex SQL Queries

##### 1- For the given program, find the cheapest 3 (if exists) Master's option for every country

```

SELECT      *
FROM
    (SELECT      tution_1_currency AS currency,
    tution_1_money+tution_2_money AS total, country_name, university_name,
    program_name
    FROM        TERMS

```

```

NATURAL JOIN PLACES
WHERE program_name LIKE '% \(%program_name)%'
GROUP BY country_name, total) as q
WHERE 2 >=
(SELECT count(*)
FROM
(SELECT tution_1_currency as currency
,tution_1_money+tution_2_money as
total, country_name, university_name, program_name
FROM TERMS
NATURAL JOIN PLACES
WHERE program_name LIKE '% \(%program_name)%'
GROUP BY country_name, total) as q2
WHERE q.country_name = q2.country_name
AND q2.total < q.total)
ORDER BY total DESC;

```

**2- For those who are not definitive about their programs, find all programs including the given 2 keywords**

```

SELECT tution_1_currency AS currency, tution_1_money + tution_2_money AS total,
university_name, program_name
FROM TERMS
WHERE total >0
AND program_name IN
(SELECT program_name from terms
WHERE program_name LIKE '% \(%program_name)%'
OR program_name LIKE '% \(%program_name)%' )
GROUP BY total, currency
ORDER BY total desc;

```

**3- For quick and last minute applications, list programs that have deadlines that are still not expired and are programs that has duration of 2 years (24 months), and has ielts score less than or equal to given input**

```

SELECT DISTINCT university_name, program_name, deadline, language, duration, city, country_name,
tution_1_money + tution_1_money AS total, tution_1_currency, academic_req, ielts_score AS score
FROM TERMS
NATURAL JOIN PLACES
NATURAL JOIN PROGRAMS
WHERE strftime('%s', 'now') - strftime('%s', deadline) < 0
AND CAST(score AS REAL) <= \(ielts_score)

```

```

AND           PROGRAMS.duration IN
              (SELECT      PROGRAMS.duration
               FROM        PROGRAMS
               WHERE       duration LIKE '24%')
ORDER BY      total DESC, score DESC;

```

**4- Other than the name of the program name, user gives 4 criteria in importance order to obtain a consecutively ordered selection, first 2 from ‘terms’, second 2 from ‘city’ table**

```

SELECT          tution_1_currency AS currency ,tution_1_money + tution_2_money AS total,
ielts_score AS score, Traffic_Commute_Time_Index AS traffic, Purchasing_Power_Index AS power,
country_name, university_name, program_name
FROM            TERMS
NATURAL JOIN   PROGRAMS
NATURAL JOIN   CITY
NATURAL JOIN   PLACES
WHERE           program_name LIKE '% \$(program_name) %'
ORDER BY        total DESC ,score DESC, traffic, power limit -100;

```

**5- For the given 2 countries and given 2 programs, find the programs with some relevant information**

```

SELECT          tution_1_currency AS currency ,tution_1_money + tution_2_money AS total,
university_name,program_name
FROM            TERMS
NATURAL JOIN   PLACES as p
WHERE           total >0
AND             program_name IN
                  (SELECT      program_name
                   FROM        TERMS
                   WHERE       program_name LIKE' % \$(program_name) %'
                   OR
                   program_name LIKE ' % \$(program_name)%' )
AND             country_name IN
                  (SELECT      country_name
                   FROM        PLACES
                   WHERE       country_name = \$(country_name)
                   OR
                   country_name = \$(country_name) )
GROUP BY        total,currency
ORDER BY        total DESC;

```

## 6. Final System Prototype

The screenshots illustrate the CandySearch mobile application's user interface across six different screens:

- Explore Screen (Top Left):** Shows a red header "Explore". Below it are tabs: "Featured" (red underline), "Countries", and "Programs". Under "Popular" are two program cards: "Cyber Security" from Koç University and another "Cyber Security" from Koç University. Each card has a thumbnail image, the title, the university name, and a "See city details" button.
- Explore Screen (Bottom Left):** Shows a red header "Explore". Below it are tabs: "Featured", "Countries" (red underline), and "Programs". A list of countries is displayed with their flags: Andorra, United Arab Emirates, Afghanistan, Antigua & Barbuda, Anguilla, Albania, Armenia, Angola, Argentina, American Samoa, and Austria. At the bottom are "Explore", "Decide", and "Apply" buttons.
- Program Details Screen (Top Middle):** Shows a black header "Flinders University Physics". Below it are sections for "Duration" (24 months), "Tuition fee" (\$32000 AUD), "Deadline" (17 Nov 2030), and "Language" (English). It also shows the "CITY" section with "Adelaide Australia" and a "See city details" button. A "Quick Apply" button is at the bottom.
- Program Details Screen (Bottom Middle):** Shows a black header "Search Programs in Dubai". Below it are tabs: "name", "university", "duration", and "language". A list of programs from Canadian University of Dubai follows, such as "Master of Business Administration" and "Master of Business Administration - Finance". At the bottom are "Explore", "Decide", and "Apply" buttons.
- Explore Screen (Top Right):** Shows a red header "Explore" and a location "United Arab Emirates". Below it are three cities: Abu Dhabi, Dubai, and Sharjah, each with a right-pointing arrow. At the bottom are "Explore", "Decide", and "Apply" buttons.
- Explore Screen (Bottom Right):** Shows a red header "Explore". Below it are tabs: "Featured", "Countries", and "Programs" (red underline). A search bar "Search Programs" is followed by tabs: "name", "university", "duration", and "language". A list of programs from Australian National University follows, such as "Accounting" and "Actuarial Practice". At the bottom are "Explore", "Decide", and "Apply" buttons.

**Explore**

Featured Countries Programs

Search bar: Koc University

Results:

- Archaeology and History of Art Phd  
Koc University
- Biomedical Sciences and Engineering Phd  
Koc University
- Chemical and Biological Engineering Phd  
Koc University
- Comparative Studies in History and Society  
Koc University
- Comparative Studies in History and Society...  
Koc University
- Computational Sciences and Engineering Phd  
Koc University
- Computer Science and Engineering Phd  
Koc University
- Critical Care Nursing  
Koc University

Buttons: Explore, Decide, Apply

**Explore**

Featured Countries Programs

Search bar: Turkish

Results:

- Islam in the Modern World  
Australian National University
- Islam in the Modern World (Advanced)  
Australian National University
- International Logistics Management  
Yasar University
- Aided Architectural Design  
Yildiz Technical University
- Architectural Design  
Yildiz Technical University
- Automation and Control Engineering  
Yildiz Technical University
- Bioengineering  
Yildiz Technical University
- Building Physics  
Yildiz Technical University

Buttons: Explore, Decide, Apply

**Explore**

Featured Countries Programs

Search bar: Cyber Sec

Results:

- Cyber Security  
University of New South Wales
- Applied Cyber Security  
Queen's University Belfast
- Cyber Security and Big Data  
Loughborough University
- Information Technology Concentration in Cy...  
Zayed University
- Cyber Security  
Edge Hill University
- Cyber Security  
Tallinn University of Technology
- Cyber Security  
Carlos III University of Madrid
- Cyber Security  
IE

Buttons: Explore, Decide, Apply

**Australian National University**  
**Accounting**

Duration: 24 months | Tuition fee: 41040 AUD

Deadline: 17 Dec 2015 | Language: English

CITY: Canberra, Australia

See city details

**Academic Requirements**

- A Bachelor degree or international equivalent with a minimum GPA of 5.7.
- All applicants must meet the University's English Language Admission Requirements for Students.
- Applicants with a Bachelor degree in a cognate discipline may be eligible for 24 units (1 semester) of credit.
- Applicants with a Graduate Diploma or Honours in a cognate discipline may be eligible for 48 units (1 year) of credit.

Quick Apply

**Australia**  
**Canberra**

QUALITY OF LIFE INDEX: 201.46

PURCHASING POWER INDEX: 93.73

SAFETY INDEX: 77.93

HEALTH CARE INDEX: 81.44

COST OF LIVING INDEX: 83.54

PROPERTY PRICE TO INCOME RATIO: 5.6

TRAFFIC COMMUTE TIME INDEX: - - -

**Economics Science**

**Agricultural Economics**  
University of Copenhagen | Total: 4000 EUR

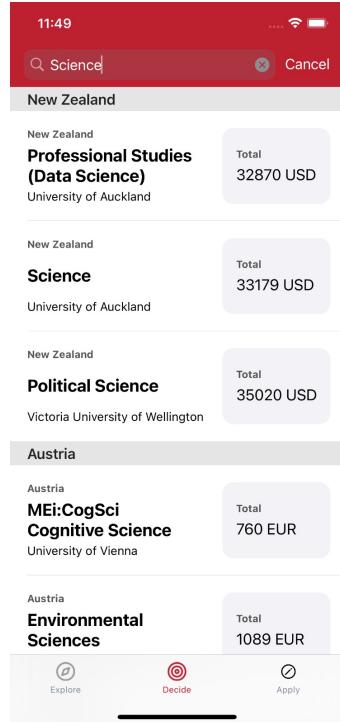
**Computer Science (Artificial Intelligence)**  
Warsaw University of Technology | Total: 4200 EUR

**Managerial Economics**  
University of Wroclaw | Total: 4500 EUR

**Financial Economics**  
ISM University of Management... | Total: 4950 EUR

**International Graduate Program Medical Neu...**  
Freie Universität Berlin | Total: 5000 EUR

Explore, Decide, Apply



## 7. References

- <https://hasancaslan.github.io/FindMyMasters/>
- <https://www.kaggle.com/anasfullstack/mastersportal-programs>
- <https://www.numbeo.com/>