



# Inter-Collegiate Programming Competition

## 1 ICPC

The International Collegiate Programming Contest is an algorithmic programming contest for college students. Teams of three, representing their university, work to solve the most real-world problems, fostering collaboration, creativity, innovation, and the ability to perform under pressure. Through training and competition, teams challenge each other to raise the bar on the possible. Quite simply, it is the oldest, largest, and most prestigious programming contest in the world.

The ICPC traces its roots to 1970 when the first competition was hosted by pioneers of the Alpha Chapter of the UPE Computer Science Honor Society. The initiative spread quickly within the United States and Canada as an innovative program to raise increase ambition, problem-solving aptitude, and opportunities of the strongest students in the field of computing.

Over time, the contest evolved into a multi-tier competition with the first championship round conducted in 1977. Since then, the contest has expanded into a worldwide collaborative of universities hosting regional competitions that advance teams to the annual global championship round, the ICPC World Finals. The brand and the model of each car are also recorded, which we call as the make of the car.

The International Collegiate Programming Contest (ICPC) is the premier global programming competition conducted by and for the world's universities. The ICPC is affiliated with the ICPC Foundation.

### 1.1 Regions and Sites

To qualify for the World Final, teams have to first compete in regional competitions. There are 8 regions in total, but not all of them are captured in our database. Each region may have multiple sites. Each site may host at most one contest each year.

Universities will then send teams to these contests. To qualify, they must become the champion in at least one regional in which the university is located in. So, a university in Europe may not qualify by competing in North America. As such, universities only send team to contests within their region. In some rare cases, a team may be invited to participate in a contest outside of their region.

### 1.2 Contest

In each contest, teams compete for 5 hours trying to solve over 10 questions. The teams are sorted according to the following.

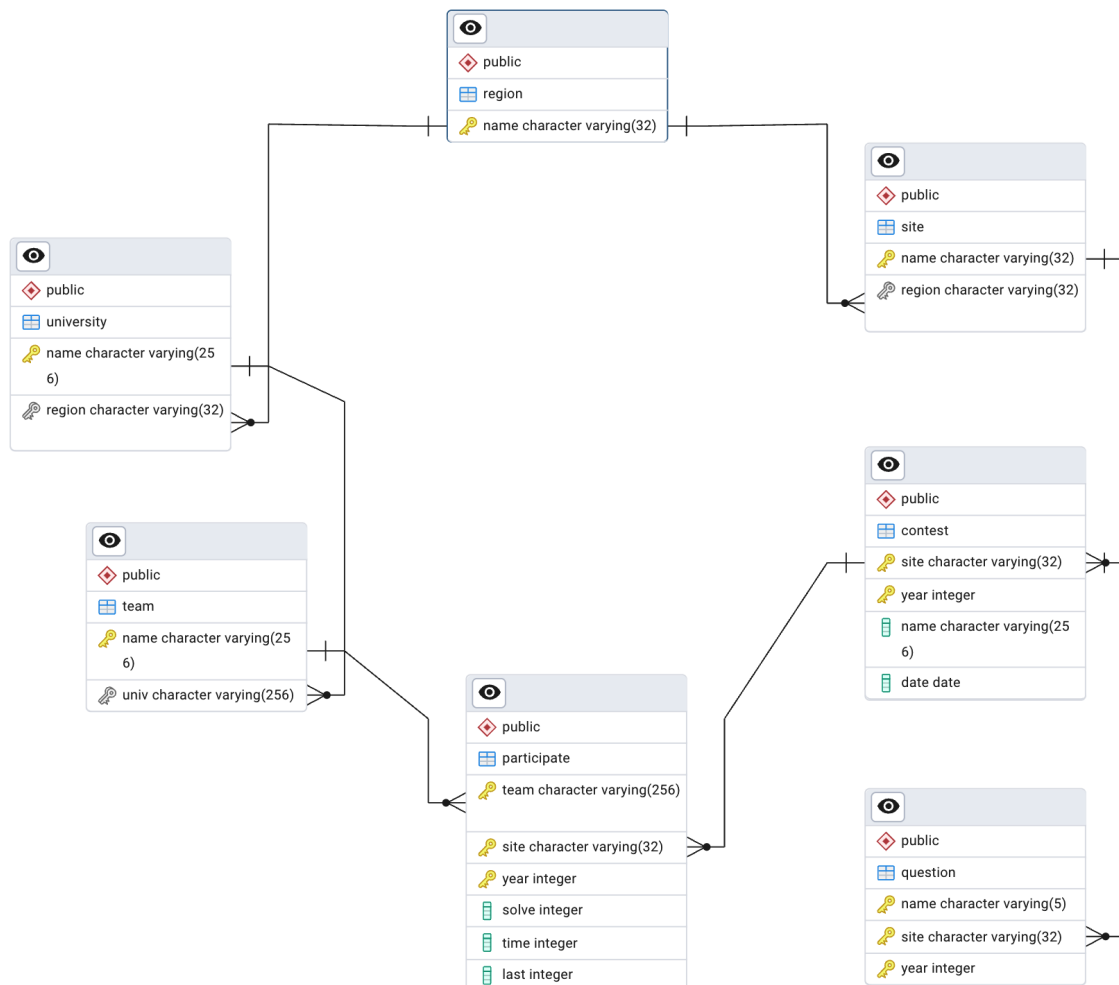
1. By number of problem solved in descending order (i.e., **solve**). In other words, the more problem solved, the higher the rank.
2. If there are ties, then by total time penalty in ascending order (i.e., **time**). In other words, the smaller the time penalty, the higher the rank.
3. If there are still ties, then by the time of the last problem solved in ascending order (i.e., **last**). In other words, the faster they solve the last problem, the higher the rank.
4. If there are still ties, then by the alphabetical order in ascending order. This is extremely rare but may happen.

## 2 Data

The database contains the result of regional competitions from Europe and North America from 2023 to 2024 obtained from `icpc.global`. However, it also contains some miscellaneous data for the purpose of testing. To download the database and to import it into your local PostgreSQL installation, we provide 4 `.sql` files to make this process easy.

1. `ICPC_clean.sql`: Drops all tables from the database.
2. `ICPC_schema.sql`: Create all tables in the database.
3. `ICPC_data.sql`: Insert all rows/tuples into all tables.
4. `ICPC_check.sql`: Checks if all data has been correctly inserted.

If you have problems with the data import or any question about the database, you can post your questions to the Canvas Discussion on Assessment DB. We provide the logical diagram to help you understand the tables, their columns, primary keys, as well as foreign keys. This diagram is generated using pgAdmin.



## 2.1 Correctness

Since the data has been collected from the official website of ICPC, you can use the site `icpc.global` to verify. However, the data in the assessment database may be slightly inaccurate. More importantly, the data is incomplete as they are too large to meaningfully check.

It is important to note that **only the data we provide via the assessment database matters**. For example, if team A solved 10 problems according to the original source but it is recorded as 11 problems, then as far as we are concerned, team A solved 11 problems. All examples in this note is obtained from this assessment database.

## 2.2 Complete Output

As some results may consist of over 900 rows, we provide additional files `Q1.csv` to `Q5.csv` corresponding to the complete result for each question. Due to the different **collation**, we provide two versions in `Data.zip`. One set of data is for **Windows** (*inside Win*) and another for **Macintosh** (*inside Mac*).

## 3 questions

Note that unless specified, we will consider all available years. For instance, in question 1 and 2, we only consider specific year. However, for question 3 to 5, we consider all available years. In this case, only 2023 and 2024. However, your data should work for any number of years.

1. Find the different team name that retired in 2023. In other words, the team participated in some contest in 2023 but they did not participate in any contest in 2024. Order the result in ascending order of team name.

The result contains 923 rows with the first 5 rows shown below. Note that the first team below actually starts with a whitespace.

team
' Codedem Innit'
'#000000'
'#40E0D0'
'#911992'
'#FFBF00'

2. Reconstruct the scoreboard for the contest at 'Central Europe' in 2023. In other words, sort the data according to the ICPC ranking. Show only the team name and the number of problems they solve.

The result contains 60 rows with the first 5 rows shown below.

team	solve
'Jagiellonian teapots'	10
'UW5'	9
'UWr 1'	9
'Zagreb 1'	8
'UW1'	8

3. Find all the teams that solves the most number of questions in the contest that they participated in. Show only the team name and the university name. Order the result in descending order of University name followed by ascending order of team name.

Some team may actually solve the most number of questions in multiple contests. In this case, the team will appear multiple times. We exclude team that do not participate in any contest.

The result contains 51 rows with the first 5 rows shown below.

team	university
'Yale Ladybug'	'Yale University'
'Down The Dictator'	'Vanderbilt University'
'Zagreb 1'	'University of Zagreb'
'Gryffindor'	'University of Wisconsin-Madison'
'Re:ZERO -Starting From Zero Once Again in ICPC-'	'University of Wisconsin-Madison'

4. Find the different team name that managed to solve all problems in at least one contest they participated in. Order the result in ascending order of team name.

The result contains 25 rows with the first 5 rows shown below.

team
'Bill Poucher'
'Columbia-CU Again'
'Down The Dictator'
'Forgetful functors'
'GT Iridescent'

5. For each region, find all the Universities that has sent the most number of distinct team name to participate in contest. Note the following important points: (i) we only consider teams that participate in at least one contest, and (ii) we only count each team name exactly once. In particular, if team A is sent to two different sites, we only count it once. Similarly, if team B is sent in both 2023 and 2024, we still only count it once.

Exclude region without university and region without contest. Some regions may have multiple universities with the same number of teams sent. In this case, the region will appear multiple times. Show the region name, university name, and the number of distinct team name the university has sent.

The result is as shown.

region	university	count
'North America'	'Rutgers University'	29
'Europe'	'Czech Technical University in Prague'	7
'Europe'	'Jagiellonian University in Krakow'	7
'Europe'	'Kharkiv National University of Radio Electronics'	7
'Europe'	'University of Bucharest'	7

## 4 Submission

Submit the file named `Assignment01.sql` to Canvas. Your answer should consist of only SQL queries. This means, you are restricted from creating tables regardless of whether it is permanent or temporary. Also, you are not allowed to create `VIEW`. Your code will be executed as a user that can only perform `SELECT` operation.

Ensure that each query is in the correct section of the file `Assignment01.sql`. Further ensure that your code can be executed. Code that cannot be executed may receive 0 mark immediately. Additionally, please write your matric number in the space provided.

## References

- [1] Icp global. <https://icpc.global/>. Visited on 31 January 2025.
- [2] thisisadiyoga database checker. <https://thisisadi.yoga/Database//Tools/A01/>. Visited on 31 January 2025.