# HW 2 – Databases

## Guidelines:

### Submissions:

* The assignment must be submitted by 18.6.22 at 23:59.
* The solution will be submitted through the model in a PDF file only.
* The solution file should be written in a word processor (e.g., Word or Pages) or in a clear handwritten.
* The submission is in pairs only, the ID number of each one must be stated in the solution.
* The file name will be of the form EX2\_ID1\_ID2.pdf.
* Only one group member is required to upload the solution.
* Any deviation from these principals, without a written approval of the course staff, will resolve in reducing points from the assignment.

### Questions and solutions:

* Read the questions carefully and answer exactly what you were asked to do.
* The style of the solutions should be in line with what is learned in the course.
* Do not copy solutions! Copying solutions will resolve of a zero grade for the task.
* Administrative emails on work-related questions should be sent to jiayu.guan01@post.runi.ac.il (no technical questions).
* A forum for technical question is available on Piazza, please check if there is already the same question you want to ask.
* For clarifications or any other assistance, reception hours are also available by appointment.

### Checking:

* Only predetermine questions are graded. Empty answers will resolve in reducing points from the assignment.

Here is a relational data schema for a regional clinic:

Data of the physicians: **Physicians** (physician ID, password, first name, last name, degree, year of certification, telephone, address)

Expertise domains: **Therapist’s expertise** (physician ID, expertise)

Physicians shift data: **Shifts** (physician ID, date, start time, end time)

Patient data: **Patients** (patient ID, password, first name, last name, date of birth, address, telephone, father's name, mother's name)

Treatment types: **Treatment** (treatment code, treatment name, treatment description)

Test types: **Tests** (test code, test name, test description)

Tests performed on patients: **Patient tests** (test code, patient ID, test date, result)

Treatments given to patients: **Patient treatments** (patient ID, treatment code, physician ID, start date, end date)

Data on the progress of patient treatment: **Patient progress** (patient ID, treatment code, physician ID, Initial status description, current status description, treatment end date)

Question 1 – Database schema:

Data Definition commands must be written to define the database schema: For each column (attribute) in the relation you should define, a data type / value range (domain); a default value, if necessary, must have value (not null), does require additional constraint, etc.

You should define referential integrity constraints that are required and appropriate for this organization, in your opinion - including what to do in case of deletes and updates. In average, you should define at least three constraints in each table, in addition to defining data ranges and primary keys

Question 2 – Relational algebra queries:

Write relational algebra queries that meet the following requirements:

1. Names of physicians who were on duty on 01/01/2011.
2. Details of the physicians (physician ID, first name, last name) who were on duty on 01/01/2011 and started to work at 13:00.
3. The names of the patients and the names of the tests performed on them on 01/01/2011.
4. Show the expertise domain of the physicians: "Dana", and "Alice".
5. Show of the physician’s details (physician ID, first name, last name) who has the most expertise domains.
6. Show patients' details (patient ID, first name, last name) that were preformed tests, but they did not receive any treatments.
7. Show physician’s details (physician ID, first name, last name) who treated the most (different) patients.

Question 3 – SQL queries:

Write SQL queries that meet the following requirements:

1. Names of physicians who were on duty on 01/01/2011.
2. Details of the physicians (physician ID, first name, last name) who were on duty on 01/01/2011 and started to work at 13:00.
3. Show the expertise domain of the physicians: "Dana", and "Alice".
4. Show of the physician’s details (physician ID, first name, last name) who has the most expertise domains.
5. Show the patient (patient ID, first name, last name) who received the most (different) treatments.
6. Details of the patients (patient ID, first name, last name) who received more than three different treatments.
7. Details of the patients (patient ID, first name, last name) who did not receive any treatment.
8. Details of patients who have not made any progress in their treatment. (No comment on progress in the **Patient progress** table)
9. The patient in whose condition the most progress has been made. (Appears most often comments on his progress in the **Patient progress** table)
10. Add a new record to the patient progress table (details as you wish)
11. Update the degree of an employee whose patient ID is '222' to 'Phd'.