**COMP 3005**  
**Assignment #2**  
**Due: Oct. 10 @11:59PM**

**Instruction**

1. Do the assignments independently. Copying is not allowed.
2. The database for this assignment is the same as in Assignment #1. Do this assignment directly on this document and rename it with your last + first name and submit to **brightspace**. Scanned handwritten documents *won’t* be accepted. Make sure your uploaded file can be opened.
3. You need to download and install Oracle VM version 3 on your personal computer running intel chips in order to run TRC and DRC. Note that they only work partially.

**Part 1 Concepts (20 marks)**

Explain the following concepts based on the definitions given in the lecture notes. Different answers found online will be marked wrong. The explanation should be complete; i.e, it does not contain any concept not explained here. Each concept is 2 marks.

1. Atomic Value

An atomic value is a value that cannot be divided.

1. Tuple

A tuple is a record that is grouped into files (tables in this case). It represents a row in a table.

1. Mini World

A mini world is some part of the real world that is stored in the database.

1. Database

A database is an oracle of stored data that is represented as relations that relate to each other.

1. Database System

A database systems is a database that is created using a DBMS where information is stored in tables.

1. DBA
2. End User
3. Data Model
4. Relational Data Model
5. Database Schema

**Part 2 (80 marks)**

|  |  |  |
| --- | --- | --- |
| **Workon** | | |
| **E#** | **P#** | **Hours** |
| E1 | P1 | 700 |
| E2 | P1 | 300 |
| E2 | P2 | 200 |
| E3 | P1 | 100 |
| E3 | P2 | 200 |
| E3 | P3 | 300 |
| E4 | P1 | 100 |
| E4 | P2 | 200 |
| E4 | P3 | 300 |
| E6 | P1 | 200 |
| E6 | P2 | 300 |
| E6 | P3 | 400 |
| E6 | P4 | 500 |

Given the employees and projects databases the same as in Assignment #1. Use both Tuple Relational Calculus (TRC) and Domain Relational Calculus (DRC) to express the same queries as in Assignment Submit your query expressions for each query as well as the query result. Each query is 8 marks, 4 for TRC and 4 for DRC. (80)

|  |  |  |
| --- | --- | --- |
| **Projects** | | |
| **P#** | **Name** | **Location** |
| P1 | CPU | B1 |
| P2 | GPU | B2 |
| P3 | GPU | B2 |
| P4 | SSD | B3 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Employees** | | | |
| **E#** | **Name** | **Age** | **Manager** |
| E1 | Adams | 50 |  |
| E2 | Blake | 40 | E1 |
| E3 | Clark | 35 | E1 |
| E4 | David | 30 | E3 |
| E5 | Emily | 25 | E4 |
| E6 | Last | 20 | E5 |

1. Get the age of Last.
2. Get the name of Last’s manager
3. Get the name of the employee who works on GPU project.
4. Get the name of the employee who does not work on any project.
5. Get the pair of employee name and project name such that the employee works on the project less than 300 hours.
6. Get the name of the employee who works on every project
7. Get the name of the employee who works on every project except SSD.
8. Get the name of the employee who works on every project that Clark works on.
9. Get the name of the employee who works on the same projects that Clark works on.
10. Get the name of the employee who works on more than two projects.