

## CSE 5330: Database Systems I

### ***“Development of a web app for the management of a videogames collection”***

**Deadline:** November 23, 2014, via Blackboard

**Goal:** There are vintage videogames which have followers who collect them and want to track-down the value of the games. We need to create a database based on the following mini world requirements and furthermore integrate this to a simple web application.

#### **The overall procedure**

Each of the videogames has been designed for a specific games console. There have been released many different game consoles since the late 70s.

There are some titles though, which are multiplatform. For example the game “Pac-Man” has been published for console A and console B too.

Each one of the videogames belongs to a specific category: there are the following game categories:

- role playing
- action
- sports
- adventure

The collector (in our database is only one specific person) may have a specific videogame more than one time in his/her collection. A game has the cartridge/CD/DVD, its instructions, its box and sometimes additional bonus content. We need to track down the completeness of the videogames: for example a game may be missing its manual but is still inside its box, while in another case it may have its manual, but the box is missing. So, if C is for Cartridge, I is for Instructions and B is for box, an item in the person’s collection can either be ‘C’, ‘CI’, ‘CB’ or ‘CIB’.

Another attribute of the videogames is the condition: a game can be in new condition, mint condition, very good, good, acceptable or poor condition.

Each videogame has been purchased by the collector for a specific amount of \$ at a specific date. The videogames currently have a specific market value: the market value is based on the games’ completeness. A ‘CIB’ Pac-Man copy is more expensive than the cartridge ‘C’ alone. We need to track down the current market value only.

**Task 1 (11 points)**

Provide the appropriate Entity-Relational Diagram which conceptualized the above process. Please use all the appropriate notations on your ERD.

**Task 2 (11 points)**

Apply the ERD to relational algorithm in order to transform the ERD to a relational schema and present the relational schema (still at this point your task is DBMS independent). Describe, in detail, step by step your decisions.

**Task 3 (12.5 points)**

Write appropriate CREATE SQL code to design your database schema. The schema must be based on what your colleague designed in Task 2. In your code, define all the appropriate constraints, including ON DELETE and ON UPDATE constraints. Please, deliver, alongside with your code, the schema, with the use of the reverse engineering functionality.

**Task 3.1 (5 points)**

Insert Synthetic Data:

For each games console, you need to insert 2-3 videogames into the collector's collection, alongside with information about the completeness and condition. Anything more than this is welcome but not required. Also, please add the current values for the games you have added in the collector's collection. This data is useful for you, in order to be able to evaluate the correctness of your queries. You need to provide your INSERT code.

**Task 4 (17.5 points)**

**Develop appropriate queries for the following**

1. The number of unique games per system
2. A list with the duplicate games in the collection
3. The total cost of the person's collection
4. The collector's complete games and the games missing something (box and/or manual)
5. The collector's most expensive game (based on the current market value)
6. The games that the collector purchased for a price lower than the current market price
7. The game that has the highest increase in value (current value minus money paid) for and what is this increase.

### Task 5 (32 points)

Develop a web application (using java preferably) based on your database, and queries with the following functionalities

- (i) A form where the user can insert new games in his collection.
- (ii) Navigation to the games the collector OWNS: The user chooses from the menu one game console and is presented with a list of his games with information on the date of purchase, money paid, condition completeness, money paid and current value.
- (iii) Presentation of the results of the queries in task 4 into a separate web page.

**12 points: evaluation of 15 minute in-class presentation (3 points per student)**

### Technical considerations

Your DBMS should be MySQL Server. Your web application can be built with any programming language you prefer. Java can be a good option. Do not use tools like i.e. PowerBuilder.

### Deliverables (via Blackboard)

- 1. A word document with the name Team\_X\_Database (X is the number of your team) which is going to include the following:**
  - a. The ERD of the process
  - b. Description of the transformation of the ERD to relational algorithm
  - c. The SQL Create code and the relational diagram (via reverse engineering)
  - d. The INSERT code
  - e. The SQL code for your queries and screenshots with the output of each query.
- 2. A word document (1.5 – 2 pages) with the name Team\_X\_Web\_Application (X is the number of your team) which describes the technical considerations for your web application. Refer to the following:**
  - a. Language you used for the web development
  - b. Methodology for the connection of your database with the web application
  - c. Instructions on how to setup the application on a new machine.
- 3. A folder with the name Team\_X\_Source (X is the number of your team) including:**
  - a. SQL script files for your schema and data insertion.
  - b. The files with the source code of your web application

Compress the above 1, 2 and 3 into a zip file with the name Team X Project2 Submission (X is the number of your team) and upload this zip file on the Blackboard before the deadline.

## **Grading Policy for Project 2**

Each one of the four members of the team has a very distinct role

Student 1: tasks 1 and 2 (22 + 3 points for the presentation =25 maximum)

Student 2: task 3, task 4 and queries 6-7 (22 + 3 points for the presentation =25 maximum)

Student 3: queries 1-5 and collaboration with student 4 (approximately one third of the effort) for the task 5 (22 + 3 points for the presentation =25 maximum)

Student 4: task 5, approximately two thirds of the effort required for the web app development (22 + 3 points for the presentation =25 maximum)

Good luck!