UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

COS 221 Practical Assignment 3

- Date Issued: **20th March 2019**
- Date Due: **10th April 2019** before **8:00 (in the morning)**
- Submission Procedure: **Upload to the web server (`whaetley`) and CS web**
- This assignment consists of **8 tasks** for a total of **100 marks**.

1 Football Team Statistics

1.1 Concept areas

1. Applying concepts to database models
2. Transitioning from design concept to database
3. Modifying and managing tables
4. Database normalization
5. Inserting and retrieving information from database using PHP and HTML forms.
6. Restricting and sorting data using SQL

1.2 Scenario

Our University football team would like you to create a database to maintain records on player statistics for all team members. They would also like complete records of every game. Statistics need to be kept for each player on both offense and defense. Offensive statistics include: passing attempts, complete passes, passing yards, interceptions, rushing yards, receiving yards, receptions, touchdowns, fumbles, field goals attempted, field goals made. Defensive statistics include: tackles, interceptions, sacks.
IMPORTANT NOTE: If you are a beginner to National Football League (NFL), you will be required to read about the basic stats or watch some highlights of the game.

1.3 Big Question

What is the best way to create a database to accomplish the task?

1.4 Focused Questions

- Will you need to create a data model? **Yes.** You're required to draw an Extended Entity Relationship (EER) diagram to illustrate the requirements for this database.
- How many tables will the database need?
- How will you normalize the database?
- How will you enter information into the database using PHP and HTML forms?

- How do you retrieve specific information from the database?
- Do your NOT NULL restraints work?
- Do your foreign key relationships work?
- Do your primary key constraints work?

After successful completion of this assignment you should be able to:

- develop a simple web based online system using php for both front-end and back-end development,
- design a database for any system,
- draw entity relationship diagram (ERD) to show the relationships of entity sets stored in a database.
- structure a relational database in accordance with normal forms in order to reduce data redundancy and improve data integrity.
- apply web database programming techniques by specifying and executing SQL constructs in PHP.

2 Constraints

1. You must complete this assignment individually.
2. The system which include, all code developed, database schemas and queries designed and implemented will be marked.
   (a) Systems which run and perform what they are supposed to do get full marks
   (b) System which run but do not perform as required, will receive partial marks
   (c) Systems which do not run will be allocated partial marks based on the functionality they would have exhibited.
3. You may ask the Teaching Assistants for help but they will not be able to give you the solutions.
4. You may utilise any text editor or IDE, upon an OS of your choice. In the Informatorium, you will use either MySQL Workbench or JetBrains DataGrip to create the system database on `wheatley web server`. All files and scripts must be uploaded and run on wheatley for demonstration purposes.
5. You are required to apply the knowledge acquired from the previous lectures and suggested online resources or other related technologies in your implementation.

3 Submission Instructions

You are required to upload all your source files and mySQL dump (in an archive) to the Computer Science web-portal. You also need to make sure that `wheatley` mirrors what you uploaded to CS web and works on the web server before the deadline. No late submissions will be accepted, so make sure you upload in good time. You will be required to download the files you uploaded to CS web and load them onto `wheatley` as part of the assessment for this practical assignment.

4 Online resources

National Football League - STATS LAB: `http://www.nfl.com/stats/statslab`

HMTL5 Tutorial: `https://www.w3schools.com/html/default.asp`

CSS Tutorial: `https://www.w3schools.com/css/default.asp`

JavaScript Tutorial: `https://www.w3schools.com/js/default.asp`

SQL Tutorial at: `https://www.w3schools.com/sql/default.asp`

PHP 5 Tutorial: `https://www.w3schools.com/php/default.asp`

PHP Connect to MySQL:`https://www.w3schools.com/php/php_mysql_connect.asp`

Bootstrap documentation: `https://getbootstrap.com/docs/4.1/getting-started/introduction/`

Materialize documentation: `https://materializecss.com/getting-started.html`

Reliable YouTube channel to "black-belt your web skills": **The Net Ninja** `https://www.youtube.com/channel/UCW5YeuERMmlnqo4oq8vwUpg/featured`

There are many other resources online for example Stack overflow – `https://stackoverflow.com/` a platform for developers to learn, share knowledge and build a career.

IMPORTANT NOTE: Make use of your textbook[1] as well.

5 Rubric for marking

System functionality	
Registration of players	5
Updating information about players	5
Sorting of statistics and reporting of top 5 players	10
Database schema and ER Diagram	10
Creating your database and tables on `wheatley`	10
Database normalization	10
Using PHP/CSS/HTML/JAVASCRIPT	
Front-end development (Forms, dashboard)	15
Back-end development	10
SQL	
Correct use of SQL constructs	10
Implementation of constraints	5
Bonus	10
Total	100

[1] Some of the source code examples and database design techniques are discussed in the prescribed textbook [1]

6 Assignment Instructions

Task 1: Determine functional requirements ..... (10 marks)
You are required to elicit the functional requirements from the scenario and according to the basics of the game.

Task 2: Design the database ..... (20 marks)
Develop a design for your database by developing a conceptual model which you map to a logical model.

You must include appropriate attributes in your tables.

Task 3: Database normalization ..... (10 marks)
Perform database normalization to reduce data redundancy and improve data integrity.

Task 4: Interface development ..... (20 marks)
Develop interfaces for the coach and users. The interfaces for the coach must provide for registering players, updating players information, capturing all the above mentioned statistics and extracting reports about players overall performance. Users interface must make provision for registering for online viewing of the statistics. All interfaces should be developed in PHP/JavaScript/CSS. You are allowed to use modern responsive CSS frameworks such as bootstrap and Materialize.

Task 5: Registration and updating information ..... (10 marks)
Only staff members fore instance the coach should be able to register the players and add their statistics. Players and fans should be able to retrieve their preferred statistics by either selecting the players name or specific statistics to retrieve associated players.

Task 6: Dashboard design ..... (10 marks)
Devise a way of designing and presenting statistical results to fans or viewers. Use the link: `http://www.nfl.com/stats/statslab?icampaign=statsLab_Nav` as a resource to guide your design choices.

Task 7: Reporting system ..... (10 marks)
Your are required to sort all retrieved results and provide a mechanism of exporting them to the file system in either `.txt` or `.csv` format. A dump file will also be required in this case to report the state and structure of your database.

Task 8: Bonus ..... (10 marks)
Bonus marks will be assigned to non-functional requirements such as good interface designs, user friendly system, quality, performance of the entire system and plots.

IMPORTANT NOTE: Please refer to the rubric for the detailed allocation of marks.

References

[1] R. Elmasri and S. Navathe, *Fundamentals of database systems*, 6th ed. Addison-Wesley Publishing Company, 2010.