Project information (This page contains the most updated deadlines. Please check here only.)
Your project consists of three phases of DBMS development that are broken down into 10 assignments. Here is a list and completion dates for each assignment. As a group, you need to submit one single report after completing each assignment. Your report must be submitted to the assigned TA during the lab hours.
Project Report format and Marking Scheme:
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Database application:
Select an application from the list provided below and try to create minimum 5-10 entities and 5-10 interesting relationships among the entities from the description that you will provide in A1. You should be familiar with the data requirements of the selected application. Designing more entities and relationships among them will show more benefits of DBMS.
The guideline that is used as a sample of DBMS design will be discussed in class and will be explained in lecture notes on the university database system.

Assignment marks and submission schedule: You have to submit each assignment in the week shown below before your lab hours, in order to be evaluated and marked by the TA during your lab time. Also during each lab, you may try working on the next assignment.

Group information: Week of Sep. 1
Inform the lab TA about your group members and the name of interested application from the list.

Start of Logical Database Design/ Phase I
Assignment 1: Week of Sep. 8
Application Description: Finalize the application in consultation with the lab TA. Prepare a report to clearly describe about the application, its functions and information you expect from it, at the level of a technical report, and submit it to the TA (6 Marks)

Assignment 2: Week of Sept 15
ER model: Prepare the ER model (12 Marks)

Assignment 3: Week of Sep 22 (6 Marks)
Schema design: Use Oracle to create the tables derived from ER/EER diagram as discussed in the class and submit the source code, **End of Phase I/**
Start of Implementation Phase/ Phase II
Database construction: Populate the tables of the database and create simple queries: use SQL- Oracle as discussed in the class and follow the examples of lecture notes topic5(SQL) create and insert statements. You can see practical-example1.1 from this book as an example of SQL implementation:
https://www.amazon.ca/Topics-Data-Science-Practical-Examples-ebook/dp/B07J1J7HLN

Assignment 4: Part (1) Week of Sept 29 and Part (2) Week of Oct 6
Demo of Designing Views/ Simple Quarries: Assignment 4 has two parts:
Part1) in this part (due Week of Sept 30) design at least 7-8 simple queries at least one for each table,
Part2) in the second part (due Week of Oct 7) create at least two VIEWs and more queries and show the snapshots of their results to the TA.
In general, use the necessary keywords such as DISTINCT, and grouping/sorting commands to produce professional report results for queries. The query results should show records in tables with meaningful titles and proper format similar to queries of lecture notes for both parts one and two. For each part, submit the source code during the lab week.
Complete assignmet4 with adding VIEWs and Join queries (Q9 of lecture notes) and advanced queries as much as you can. In Assignment 5, your completed queries should be executed at Unix Shell menu commands, so use study week to work on Unix Shell menu.
(12 Marks in Total)

Reading week: Week of Oct 13 – no formal lab – Try to complete A4 & A5

Assignment 5: Week of Oct 20
Demonstration of Advanced Queries by Unix shell Implementation: For Assignment 5, hand-in the snapshots of advanced query results. Prepare at least 5 interesting advanced queries similar to the queries 9 to 23 of the lecture notes including join and set operations, statistical and aggregation functions, and grouping queries. All queries should have clear and nice formatted results. For assignment 5 you do Application Development with shell scripts: design menus to perform the functions of application by executing related Oracle SQL commands. For UI, it is expected to use Unix shell programming and command line. In the next stages, you will develop a nice GUI interface at the frontend using Java or other Web/Windows-based tools in order to communicate with database engine at the backend (Oracle running under Linux). For assignment 5 you only need to demo Unix Shell scripts and text-based menus for creating and populating database and showing queries' results of your application as will be shown in class. (6 Marks)

Midterm Test: Saturday, Oct ~~25 (see the announcements~~ Oct 18

Assignment 6: Week of Oct 27
Normalization of the database/ Functional Dependencies: During assignments 6, 7 and 8 you should normalize all tables to be in 3NF or BCNF. Then you should create dummy data, test and validate your application and try to optimize it. For assignment 6 you should only show Functional dependencies (4 marks)

Assignment 7: Week of Nov. 3
Normalization / 3NF: For assignment 7 verify all tables being in 3NF. You can use diagram (shown in the class) or explain why your tables are 3NF. If there is any table which is not in 3NF (normalized), decompose it to 3NF tables. There will be bonus mark if you use an algorithm for making a 3NF table. (4 marks)

Assignment 8: Week Nov. 10
Normalization/ BCNF: For assignment 8 verify all tables to see whether or not they are BCNF as shown in class. You can explain why each table is BCNF by showing FDs. If you use an algorithm for making a BCNF table as shown in class, there will be 0.5 bonus marks. Note that during assignments 7 and 8 if you change any table to make it 3NF or BCNF, again you should add data in the modified tables. For both assignments 7 and 8 if you want to use algorithms and get the bonus mark, you can submit the bonus parts of the assignments during labs of assignments 9 or 10. It is recommended to start creating Java/web based UI application and menus during assignments 7 and 8. (4 marks)

Assignment 9: Week of Nov 17(Project Demo)
Demonstration of application using Java/web based UI and Individual Evaluation of the Project: The DB application should be in 3NF/BCNF and contain dummy records and brief comments in the code about any special cases and advanced reports. There will be 3 extra bonus marks for creating either JAVA (or Python) UI or web application implementation. You can make web application by Oracle Express or any other method connecting to Oracle DB on your laptop or school DB. There is a separate section for showing the bonus mark of assignment 9 which can be shown and submitted during the lab for assignment 10 as well. In this stage you will submit a soft copy of the executable application as well as the source code through D2L according to the instructions provided in the class. (3 marks) **End of Phase II/**

Start of Documentation Phase/ Phase III
Assignment 10: (week of Nov 24)
Submission of the Final Documentations: The Relational Algebra (RA) notation should be added to describe your SQL queries. Writing Report should be done while working on the project rather than waiting until its completion. When you get a feedback from each part of the project, try to modify the related reports and keep them in the project's documentation that will be submitted at the end. To verify your database being 3NF or BCNF, add concluding remarks about your design experience.

Finally collect all the documents in a binder/booklet format beginning with a table of contents and submit it to your TA in the last lab. (3 marks)

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Total: 60, including report marks and individual assessment (equal to 30% of the course mark)

Application List:
Please note your application should be unique. Your TA will inform you if someone else has already taken that application or not.
Select your application from following Database Applications List. Make sure you communicate with the TA about interested application and have a clear idea about the requirements and scope of the work during first and second weeks of the class.

Hotel Management Database Management Systems
University online student registration system
E-commerce System
Online Job bank system
Retail Banking system
Patient Information and Record Management System
Point of Sale System for Shopper Drug Marts
Document Management system
Data Center
E-ticket Reservation System
E-learning system
Online movie store
Employee performance management system
Help desk system
Library Database system
University Enrollment Application
Movie and Music Store DBMS
Equipment test center
Clothing Retail Store DBMS
Auction DBMS
Medical clinic information system
Consulting database management information system
Store sale DBMS
Customer relation system
Car Rental DBMS
Payroll Management DBMS
Hospital-pharmacy DBMS
Art gallery/convention center DBMS
Telecommunication (VoIP/VOD/IPTV) DBMS
Ice Cream Manufacturer DBMS
Photo/Video equipment rental DBMS
Soccer League DBMS
Dental clinic DBMS
Intensive Care Unit (ICU) DBMS
Museum of Hand-crafts DBMS (DB of hand-crafts of each culture)
Ride & Pickup DBMS (DB of customers to order for a ride and/or pick-up items, e.g. Uber)
Tourism Agency Booking System DBMS (DB of some attractive tourism points & booking for tours)

If you are interested to do any other application which is not listed here please confirm with your TA before the due date of assignment 1.
The above applications are common database application. However, with introduction of social networks and online marketing many database applications have been created to manage web data.

Below are the two example descriptions of such database systems which are not complete. You are welcome to select them but you have to enhance the writing and add more to their descriptions to make them larger systems with more functions.

Example 1: DBMS of Fulfillment Service of Amazon (FBA): These days, Amazon provides a resource that helps people handle their business and by helping the sellers to find new customer at their site. This service is called fulfillment by Amazon (FBA). FBA makes the products visible to millions of loyal happy Amazon customers while providing fulfillment, fast shipping and good customer service that will get the business to a whole different level.

The business owners (we call them sellers) can purchase products online from anywhere in the world and can make payment using different methods. The online store then ships the ordered products to the Amazon facilities that are located all over the world. The products are stored securely. Sellers pay Amazon for keeping the inventory. These inventory details are accessible to the sellers from any device, any location.

A seller has various attributes like its user name, password, email, seller ID and its response time. Out of all the said attributes seller ID is the primary key attribute because it's unique. A seller sends the online store all the information of the products that s/he needs to get shipped to the Amazon facility. While placing the order, it is required that the seller makes a payment of that order too. The payment ID of any payments will be a primary key attribute of all the attributes. Payments can be made through credit/debit cards or gift cards and will comprise of billing address, date and any discount codes used. The online store from where the products are picked from has an store ID as a primary key attribute, store address and phone number. Also the store can have a rating of the products that they ship. Store rating is a weak entity. The products that the store is shipping has product id as the primary key attribute. The other attributes of the products can be its name, price, description and whether or not the item is in stock. Once the product is in Amazon facility, it has its product ID and the location address... see following link for more details:
https://services.amazon.com/fulfillment-by-amazon/benefits.html

Example 2: DBMS for YouTube Channels: YouTube was first introduced in 2005 and was taken over by google in 2006. It is a video sharing website that has grown drastically in the past years. Reports show that over 1.5 billion people log in to YouTube every month and 1 billion hours of video are watched daily. This website is not limited to streaming videos. Users are able to upload videos, like, dislike or leave a comment for a video. For these actions you need to use a google account. In the recent years channels have become very popular. A YouTuber creates a channel and uploads their videos there. Other users can subscribe to the channel and be notified when a new video is uploaded.
As of May 2017, over 1500 channels have more than 1 million subscribers with the highest belonging to Pewdiepie with over 50 million subscribers. Also some media corporations such as BBC, CNN and NBC etc. have channels on YouTube.

This part focuses on a channel and its subscribers. A channel creator needs a google account and to build this account following information is needed: first name, last name, date of birth, gender and phone number. Subscribers also need to have same information to have a google account. A channel can be for personal or business purposes. Creator usually adds links of their website or their social media accounts. In the about section an email can be provided to contact the YouTuber. There are many other parts that can be added to this system such as information of videos , related videos, etc.
See the first chapter of the following book as an example of the practical project:

Topics in Data Science with Practical Examples" By Abdolreza Abhari, 2018. Available by Amazon:
https://www.amazon.ca/Topics-Data-Science-Practical-Examples-ebook/dp/B07J1J7HLN