# Database Project Instructions

COMP 2650
Prof. Nguyen Thai

# Database Project Timeline

| Activities | Credit | Assign* | Due |
|---|---|---|---|
| ▪ Form team | 5% | 9/22/2021 | 9/22/2021 |
| ▪ Project topic | 5% | 9/22/2021 | 9/26/2021 |
| ▪ Business statement | 15% | 9/29/2021 | 10/10/2021 |
| ▪ Data modeling | 20% | 10/13/2021 | 10/24/2021 |
| ▪ Database design | 20% | 10/27/2021 | 11/07/2021 |
| ▪ Database implementation | 20% | 11/10/2021 | 11/21/2021 |
| ▪ Project report | 15% | 11/22/2021 | 11/28/2021 |

*\* Project assignments and discussions are done online*

# Database Project Topic

- In this semester, you are developing a database for a restaurant company

- You are to be working as a team of two students

- You and your teammate are to choose a traditional restaurant for your project
  - Non-traditional restaurant food services such as coffee shops, bakeries, fast foods, buffets and food trucks are not allowed
  - A sit-down restaurant with waiter/waitress is required

# Database Project Topic Examples

- Here are some examples of the traditional restaurant types
  - Italian restaurants
  - Greek restaurants
  - Mexican restaurants
  - Chinese restaurants
  - etc.
- You need to pick a name for your restaurants
- Do not use the name of real restaurants

# Database Project Document

- After you have chosen the type of food and named your restaurants, create a Word document called *database_project_document.docx*

- All your works on the database project are to be captured in the *database_project_document.docx*

- I will grade only the *database_project_document.docx*, unless I ask for other materials to be submitted

- For each submission, append your new work to the end of the *database_project_document.docx*.  Do not delete works in the document you have previously submitted

# Database Project Document Title Page

- On the first page of the document, create a title page
- Title page format
  - Restaurant name
  - School name
  - Course name
  - Course number
  - Professor name
  - Date of submission
  - Your name and teammate's name

# Restaurant Services Definition Page

- On the second page, write one to two paragraphs describing the type of food and services your restaurants provide

- Page format
  - 12-points Arial fonts
  - Double-line spacing
  - 1-inch page margins

# Project Submission

- Each student must submit a copy of the *database_project_document.docx* to Brightspace to get credit
  - o Must submit the actual Word document
  - o Do not submit links, zip files or images
  - o I grade only the Word document
- You will not get credit for your work if you failed to submit your copy, even though your teammate submitted his/her copy on time
- If you and your teammate submitted different works, the lower grade will be given to the whole team
- Due 9/26/2021

# Business Statement

- Imagine you and your teammate have been hired by the restaurant company as database engineers to help improve their business profits.

- Your team is given the task to develop a database for the restaurant company that owns multiple restaurant locations.

  - More than one restaurant location.

# Business Statement

- Your database should be designed and developed with the objective to help improve the current business operations.

- The database should be well structured and ease of use.

- Your first assignment in developing the database for the company is to learn and understand how the business operates and then document the business operation rules via a business statement.

# Business Statement Criteria

- Your business statement must contain the following five criteria

- The questions given are some ideas to help your thinking. Do not just answer the questions.

1. Identify key components of the business operations.

   a. What products does each restaurant provide?
      - Pasta, meats, sandwiches, soups, etc.
   b. What facilities and equipment are used in the business operation?
      - Cooking wares, storages, etc.
   c. How are employees and company finance managed?
      - Full time and/or part time employees, mortgage, etc.

# Business Statement Criteria

2. Identify the business operation rules that are used to manage the business.

   a. Does the company buy certain food and make certain food?
   b. Restaurant operations:
      i. What types of food are served in all restaurants?
      ii. Are all products prepared at each restaurant?
      iii. Do all employees work only in a single restaurant location?
   c. Do the restaurants provide take-outs and caterings?
   d. Do the restaurants accept cash only, credit cards only or both?
   e. Do the restaurants provide online reservations, online ordering for take-outs?
   f. How do the restaurants handle customers with special dietary restrictions?

# Business Statement Criteria

3. Track operating cost and identify cost that are rising or above to similar business in the industry.

    a. Store locations:
        i. Own (mortgage?)
        ii. Rent (increasing every year? When lease expires?)
        iii. Does the restaurant pay parking spaces for the customers if it does not have parking spaces?
    b. How does the company pay for inventories (food and supplies)?
    c. Are there ingredients weather or political conflict dependent?
    d. Does the company have to pay high salaries to attract certain type of workers?

# Business Statement Criteria

4. Provide data and information to track important date-to-date operations related to customers.

    a. Certain days are better for business (more customers)
        i. Are the business weekdays oriented?
            o Serving professional workers in business districts?
        ii. Are the business weekends oriented?
            o In the mall, shopping plaza
    b. Is the restaurant business seasonal?
    c. How well does the business do on holidays?

# Business Statement Criteria

5. Provide relevant business operation information to help managers improve business competitiveness.

    a. Hours Open (Comparing to local competitors)

    b. Peak Hours (When do most people come to dine at the restaurants?)

    c. Any specials offered (What deals can the company offer customers?)

    d. Prices (How do they compare to other restaurants in the vicinity?)

    e. Set the restaurant apart from other places (Offer a different atmosphere than regular restaurants?)

    f. Disadvantages

        i. No parking

        ii. Located in the bad neighborhood

    g. Identify a few ideas to make the business more competitive

# Business Statement Documentation

- Business statement must be a five pages long **essay** in Word paragraphs.
    - Do not just answer the above questions
    - Do not just provide a list of bullet items
- Format for the business statement is 12 points Arial fonts with double spacing
- Page margins are one inch wide
- Add the business statement to the bottom of your database_project_document.docx
    - Start new page after Restaurant Services Definition
- Submit database_project_document.docx to Brightspace for grading
- Due 10/10/2021

# Data Modeling

1. Create a list of entities and their attributes from your business statement for five items listed in next slide
2. List the relationships between entities from the business rules in your business statement for five items listed in next slide
3. Create (draw) the entity-relationship diagrams (both ERD and EERD) for your data models using:
   a. Lists of entities from (1) and
   b. Lists of entity relationships from (2)
   ➢ Create the ERD first and then refine/enhance the ERD to create the EERD
4. Review lecture notes and labs
   o Examples: Donut Shops, Housing Developments
5. Do not just model the restaurant's menu!

# Data Modeling

- Analyze your business statement and identity the following items:
    1. Food items (meals/dishes) the restaurants serve
        - 3 to 5 food **types**
    2. Facilities and equipment
    3. Employee work hours and salaries
    4. Tracking day-to-day cash flow
        - Income and spending
        - Revenue and expenses
    5. Competitiveness
        - Renovation cost and extra earned income
        - Promotion cost and extra earned income

# Data Modeling

- Start a new page after the business statement and capture your works in the database_project_document.docx

- Four items are required for this assignment:

  1. Data modeling entity lists
  2. Entity relationships lists
  3. 1 ERD
  4. 1 EERD

- Submit database_project_document.docx to Brightspace for grading

- Due 10/24/2021

# Logical Database Design

1. Transform your restaurant conceptual data model (EERD) to relational data model

2. Normalize the relations to third normal forms

   a. Show referential integrity constraints between relations

   b. Show functional dependencies between attributes on each relation

- Capture your logical database design in database_project_document.docx

   o Start new page after the business data model

- Submit database_project_document.docx to Brightspace for grading

- Due 11/07/2021

# Database Implementation

- Create tables for your database using Oracle SQL Developer and Oracle DatabaseXE

- For each table
  - Identify data type for each attribute
  - Identify columns that must be unique (primary keys)
  - Identify primary key – foreign key pair
  - Identify columns that can and cannot be null
  - Determine default values
  - Identify constraints on columns

- Save table creation scripts to a file called *create_tables.sql*

# Database Implementation

- Populate database with five instances for each relation
  - i.e., insert five rows of hypothetical data into each table
- Save data insertion scripts to a file called *insert_data.sql*
- Take screenshots of each table in SQL Developer with inserted data
- Capture screenshots in database_project_document.docx
  - Start new page after the logical database design
- Submit the following files to Brightspace for grading
  a) database_project_document.docx
  b) create_tables.sql
  c) insert_data.sql
- Due 11/21/2021

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# Business Data Analysis

- Once the database implemented, it is important to verify the database is working properly based on the business statement's requirements

- Due to time constraint, we are exercising only a minimum set of test cases to verify the database is working properly

  A. Query your database to generate data for the following five business data analysis charts using Oracle SQL Developer

     1) Food and drink popularity
     2) Employee salary distribution
     3) Sale of meals vs drinks
     4) revenue per month
     5) Expense per month

  B. Import the five sets of queried data into Excel and plot graphs or tables to support your project report

# Database Project Report

- Report should be ten pages long in Word, including a cover page

- Report must be in essay format with 12 points Arial font and double line spacing

- Page margins are one inch wide

- Capture your project report in database_project_document.docx
  - Start new page after the database implementation

# Database Project Report

- The report must
    a. State the problems are you trying to solve
        o Building a database to help business improve
            ➢ operations (automation)
            ➢ profits
    b. Discuss your business statement
    c. Discuss your business data model (EERD diagrams from the project)
    d. Discuss your database logical data model (3rd normal relations from project)
    e. Discuss your five business data analysis charts (graphs and tables)
    f. Provide recommendations for what to do next
- Due 11/28/2021