

Assignment 1 - 15% – groups of 2 students

The Task

Your task for this assignment is to complete a database design for the given case studies.

Model the system described in the case study and draw a Physical Data Model using MySQL Workbench. Your diagram must conform to the notation used in this subject (object notation = 'Workbench Simplified', relationships notation = 'Crows Foot', show data types). If you include sub-types, place them inside a Layer with a note explaining their relationship to the super-type.

Your model should be in at least 3rd normal form.

If you are uncertain about any aspect of the handout, seek clarification via CANVAS, in class, or at Office Hours. You may write down any assumptions you made when designing your model.

However, assuming without checking, may not be accepted, especially if it simplifies the assignment.

Assessment

This assignment is worth 15% of your marks in the subject. Your data model will be assessed on the correctness and completeness of your solution. 'Correctness' refers to whether your model adheres to the rules and syntax of data modelling. 'Completeness' refers to whether the model includes all of the required entities and relationships and can handle the data storage problem specified.

Submission

Submit your assignment as **a single PDF document** via CANVAS by midnight on the due date of **Tuesday 23rd November**.

To copy your ER diagrams into your document, use Workbench File/Export as a PNG file.

Please ensure that you place the **student's name and ID** of each group member in the header of every page of your assignment.

Academic Honesty

This assignment must be your own work. Plagiarism - the copying of another's work without proper acknowledgment - is not permitted. Nor is allowing another person to copy your work. Work submitted for assessment purposes must be the independent work of the student concerned.

Academic misconduct occurs when students portray someone else's work as their own. There are many ways in which academic misconduct can occur. Some of these are:

- **Sham Paraphrasing:** Material copied verbatim from text and source acknowledged in-line but represented as paraphrased.
- **Illicit Paraphrasing:** Material paraphrased from text without in-line acknowledgement of source.
- **Other Plagiarism:** Material copied from another student's assignment with the knowledge of the other student.
- **Verbatim Copying:** Material copied verbatim from text without in-line acknowledgement of the source.
- **Recycling:** Same assignment submitted more than once for different subjects.
- **Ghost Writing:** Assignment written by third party and represented as own work.
- **Purloining:** Assignment copied from another student's assignment or other person's papers without that person's knowledge.

CASE 1

A newspaper is setting up a website where people can write, read and comment on news stories. Your job is to design a database that can record the information needed for the website to work.

The website lists a number of stories, each classified within one of about 10 sections ('Local news', 'World news', 'Opinion', 'Sport', 'Technology' etc). Each content of each story consists of a piece of text (the manager would prefer there to be no limit on the size) as well as a headline and a short "lede" (a lede is a sentence of 10 to 20 words that summarizes the story). Each story is written by one or more of our authors, who submit the story to our database on a particular date. If a story is considered worthy, it is edited by one of our editors, assigned to a section, and then published on a particular date. Authors and editors are staff members. It is not possible to be both an author and an editor. About each staff member we store their name and when they join (and later leave) the newspaper.

We want to organize the website so that readers can click on a section, or an author's name, and see a list of all the relevant stories. On the main page we list each story's title (shown as a headline) and lede. Then if the reader clicks on the headline, we display the entire story.

Our readers, if they wish, can choose to register themselves in our database, recording a username and password (they do not need to record their real name). Readers who register can then comment on stories, and on other readers' comments. They can also click "Like" on a story – and if they change their mind later, they can "Unlike" it. When we display a story we show the number of Likes the story has received and list out the comments below it. With each comment we show the username of the person who commented, and the time they commented. We aim for brevity in comments, and restrict them to 1024 characters.

CASE 2

SnacksNow

You are designing a database to support “SnacksNow”, a new startup in the food delivery business. SnacksNow allows people to order snacks from local shops and have them delivered by a bike rider. SnacksNow will only operate in Dhaka and does not plan to have more than one million customers.

How SnacksNow works

The SnacksNow smartphone app presents the customer first with a list of shops. The customer chooses a shop. Then the app shows the snacks available from that shop. The customer chooses which snacks they want from that shop: for example, “3 chocolate bars and 1 bottle of water”. The phone sends this order information, along with the phone’s current GPS coordinates: this is the location to where the snacks will be delivered.

When a customer order is received, SnacksNow broadcasts a job offer to all riders who are within 1 km of the customer. Riders see the offer pop up on their app and can press “accept” or “no thanks”. If several riders press “Accept”, our algorithm chooses one rider and gives them the job. We need to track these rider offers and responses. If no rider accepts the offer within 5 minutes, another offer is broadcast, and so on, until a rider has taken the job.

The chosen rider now goes to the shop, picks up the snacks, and delivers them to the customer. We record when the order is delivered to the customer. (You do not need to worry about the payment mechanism.)

People

If people want to order snacks, they need to first register as a customer, giving us their first and last name and mobile phone number.

Snack shops must register their name and address, and tell us the name and price of each snack they want to sell.

If someone wants to be a delivery rider, they need to register, giving us their first and last name, mobile phone number, and date of birth. Whenever a rider is on duty, their app sends us the rider’s GPS coordinates about once per minute, allowing us to keep track of each rider’s location. We must store a history of all rider locations.

Location coordinates

All locations are recorded as a pair of numbers representing latitude and longitude. Latitudes are between -90 and 90 degrees (south pole to north pole) while longitudes are between -180 and 180 degrees (west or east of the prime meridian). We use a precision of 4 decimal places, which is about 11 meters at the equator (smaller in Dhaka). For example, NSU is at latitude 23.8151, longitude 90.4256.