CS 281 Fall 2022-2023
Project Topics

Carefully study the following project descriptions and try to capture:

- Strong and weak entities,
- Relationships (binary, ternary and specialization (IS-A) relationships), role indicators for an entity in a relationship, mapping cardinalities (1-1, 1-M, M-M) and aggregations (i.e., a relationship as a whole serve as an entity in another relationship),
- Keys.

REMARK: In each of the below scenarios, we try to provide examples of most of the above E/R elements, so please study these scenarios very carefully!

You are free (and indeed ***expected to***) add more details (and, thus entities/relationships) to the scenarios below. While designing your database, also keep in mind that in the upcoming stages of the project, you have to specify interesting/sophisticated queries over this database.

- **Property Rental System**: In this project, you are asked to design a data management system for house/room rental system like Airbnb.

  Property owners are identified by a unique ID and has name, email address and GSM number as attributes. Each property is identified by a unique property ID and has name, city, district, description, capacity, property type (complete house or room for rental), nightly price information. Customers are identified by a unique customer ID and has name and email address as attributes. Each property belongs to exactly one owner, but an owner may have several properties. For each property availability information will be kept in the system. Owners can mark some dates as "not available" if they wish. Customers can make searches using city, district, and property type information from the system. Customers can make booking for a property for a period of time if the property is available during this period. System will calculate the total price. There can be discount codes defined for rentals in the system (% discount). If the customer enters a discount code, total price will be reduced accordingly. After booking is successfully finalized system should mark those dates as "not available" for the property. For each booking there will be unique booking ID, property ID, customer ID, from date, to date, total paid price information will be kept. Customers can evaluate their booking after their stay. Each evaluation has a unique ID, a rating (1-5) and an optional comment. These comments and rating will be displayed for each property anonymously during property search.

- **Online Video Sharing System:** In this project, you are asked to design a data management system for an online video sharing system like YouTube.

  In this system, each video has name, description, view count, like count and dislike count. Duration of the video is stored as an integer corresponding to seconds. Each video could have one or many tags associated with it, these tags are used during search. Each video should be associated with one video type. Video types are chosen from a list of presets, such as: education, entertainment, documentary… The system stores name, password, and email of each user. Each video should be uploaded by one user. When a user uploads a video, the date of the upload operation, as well as the IP address of the user is also stored. There are three types of users: Standard, Partner and Admin. Once a video is uploaded, one Admin user accepts it. Unless it is accepted, it cannot be seen by other Standard and Partner users except its uploader. Admin users can see all the videos. IBAN information is stored for Partner users, and they receive payment from registered companies. A payment has a unique transaction number and an amount. A Partner user can receive many payments from many companies. Company name, foundation year and IBAN information is stored for each company. Each company could have many advertisements (ad for short). A unique ad id is stored for each ad, as well as name, content, and a flag about whether it is skippable or not. Each video can show one ad, and different videos could show the same ad. Each ad belongs to one preset ad type, such as: sports, technology, and food. Each video has a preferred ad type associated with it; this is used when an Admin assigns an ad to an uploaded video.

- **Online Auction System:** In this project, you are asked to design a data management system for an online auction system like eBay.

  Every user has a first name, last name, password, date of birth and social security number. A user can be an admin, buyer, or seller. Each seller has an IBAN stored. Each buyer is associated with at least one payment information. A payment information can belong to only one buyer. For a payment information credit card number, expiration date, account holder's name and address are stored. An auction is created by a seller. An auction should be accepted by one admin before it can function. (System should store the information about which admin accepted which auction.) Each auction has a starting date, ending date, title, description, status, starting price, current price and a "buy it now" price. Status can be "Not Accepted", "Ongoing" or "Finished". Each auction should belong to a category. Each category has a name and can be related to many auctions. An auction can have many bids by buyers. Each bid is associated with one buyer, and the bidding price is stored along. A buyer can bid an auction many times. Current price of an auction will be calculated based on the maximum bidder of that auction. An auction finishes when a buyer uses the "buy it now" option, or when we reach its ending date. (In the project, to make it simpler, you can use a manual "end the auction" button.) The highest bidder wins the auction. The highest bidder will choose one of his or her payment information to pay the item. After the auction is finished a bill is created. Each bill has a unique transaction number as well as a net amount. (The company gets 8% commission from the selling price.) Each bill is related to only one seller, a seller can be associated to many bills.

- **Online Funding System:** In this project, you are asked to design a data management system for an online funding system like Kickstarter.

  There are three types of users: Investor, company owner, and admin. Each user has an e-mail address, password, name, and surname. Company owners can have multiple companies, but one company has only one owner. Companies have names, contact information, and a brief description of their intent. Company owners can add products to their company. One company may produce multiple products, but a product can be made only by one company. Each product has a name, a description, a type, a donation goal, and a targeted date for donations to end. The company owner can cancel the funding of a product. An investor can search for companies, products, or product types. Investors can select a product and send a donation. One investor can send multiple donations to one product and one product can get donated from multiple donors. A donation can be made until the target day. Therefore, even if the donation target date has passed, investors can still donate to that product. Company owners can add donation tiers to products. A tier has a minimum donation amount, title, and description of benefits. Investors can choose a tier or donate a special amount of money without choosing any tier. They can add multiple comments to products. Company owners can view and reply to those comments. Admins can also view comments and products and delete any of them if they think it violates the Terms of Service.