# CSCE 2501
# Fundamentals of Database Systems

**Project - Satellite TV**

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# Introduction

In this project, you will be building a database application to gather information about TV-Broadcasting Satellites across Asia, Europe, Atlantic and America. This include the carrier rockets used to put the satellites in orbit, their position, the information about the channels they broadcast and the corresponding networks. This will help build a tool for users to identify which satellites are in range for their location and what channels they can pick up from them.

The main site we will be using to provide such information is Lyngsat.com, Although the site provides a very exhaustive list about the information above, it has limited functionalities for filtering or doing some higher level aggregations on the different satellites and their broadcasted channels and networks. Hence, your application will be used to provide more flexibility on that front.

Your task will to build a database system backend and an application that provide the features described next.

# Milestone I: Data Requirements

The database system you design should be based on the information provided on each satellite, the TV networks it hosts, along with their channel information as well as non-network channels as well. (e.g. Satellite, Network, Channel)

Your database design should store all the information about the satellite, including but **not limited to**: its name, launch date, launching rocket, position, region, etc. Each of these satellites host a number of channels, for each of them you need to store their names, beam, frequency, symbol rate (SR), forward error correction (FEC), video encoding, language, encryption, which package / provider it belongs to (if any). Make sure if the same channels is hosted on multiple satellites, it is modelled as such and not as multiple different channels. You also need to store whether the channel is part of a TV network / provider package (e.g. Bein, MBC, etc.), storing available information about the existing TV network in the database as well.

The system should also allow users to register on your system using their email addresses, and pick a username, gender, birthdate, location, region. After registering, the users can create a list of their favorite channels to trace their information

# Milestone I: Database Design & Implementation

Tools: MySQL

Deadline: 10th March, 2024

Description:
In this milestone, you are required to design the database ERD, create your database and schema in MySQL server for the data requirements presented on the previous slides.

Deliverables: (20 points)

- Entity-Relationship Diagram of your system
- Relational Model for your system
- A transcript for the SQL statements used to create your database and schema

# Milestone II: Database Population

In this milestone, you are required to write a web crawler to crawl the pages from Lyngsat website for all the data available across all regions, parse the HTML you crawl and extract the relevant fields for populating the non-user tables in your schema.

At the end of this milestone, you should have all your non-user tables populated with the extracted data. For the user tables, use sample test sales to populate the relevant tables.

# Milestone II: Web Crawling and Data Population

Tools: Scrappy, pycharm, BeautifulSoup, selenium, python (or any other crawler library / language)

Deadline: 31st March, 2024

Description:
In this milestone, you are required to implement your crawler, extract the data from Lyngsat website and populate your database

Deliverables: (50 points)

- Crawling script
- Populated MySQL database dump
- CSV files for the values in each table

# Milestone III: Application Layer

In the final milestone, you are required to design a client application that is capable of connecting to the database hosted on remote MySQL server. The application should have the following functionalities:

- Register a user
- Create a new list of favorite channels
- Show all the channels viewable from a certain location (longitude) - (For simplicity, assume the satellites coverage is +/- 10 degrees around the satellite longitude).
- Show the user which of his/her favorite list is covered based on the user location along with the satellites and frequencies where s/he can get the channels on, and whether they are free or encrypted.
- Show the top 5 TV Networks / Provides by number of channels, and the average number of satellites they each channel is available on.
- Show the top 5 rockets in terms of the number of satellites they put in orbit.
- Show the top 5 growing satellites using the number of channels they host compared to their launch date
- Show the top 5 channels for each language by the number of satellites they are hosted on.
- Show the list of channels, filtered by region, satellite, HD/SD and/or language

# Milestone III: Application Layer

Tools: Any language / platform to implement your application (Web-based, GUI, command-line are all acceptable)

Deadline: 14th April, 2024

Description:
In this milestone, you are required to implement an application to perform various transactions / queries on your backend database system. The database has to be hosted on an actual server (you can use any of the free DB hosting services available (e.g. www.db4free.net)) and make sure your application is communicating with this service not the localhost

Deliverables: (30 points + 5 bonus points for GUI/Web-based apps)

- Application Implementation / Source Code + Executable
- Latest Dump of your database
- Demo