# 22S-CST8288 Case Study – Part 1
# (15% of grade)

## Overview

- A console-based prototype for an application to book tutoring sessions for students
- You will not have enough time to fully develop the system, the intention is to give you the opportunity to apply concepts introduced in this course.
- *Part 1* focuses on UML diagram and implementation for most of the domain objects for the prototype.

## Project Description

- You are provided with a system description and an *Entity-Relation Diagram* (ERD)
    - The implementation of classes related to the corresponding database will be in Part 2.
- Your tasks are to:
    - provide UML diagrams which correspond to the application's:
        - Use case diagram
        - Class diagram
        - Sequence diagram for the "book a session" feature
    - show your knowledge of design patterns by implementing:
        - **Singleton**
        - **Builder**
        - **Strategy**
    - implement the business/domain objects (complete with JUnit test classes)
        - for the entities in the ER diagram.
            - There are 5 entities, pick any 3
        - You can omit the "join tables"

# Description

You have conducted an interview with the "domain expert" for creating an application which permits students to book a tutoring session with a tutor. The final application is in the form of a multi-tier Web application. But for this prototype, only the business/domain objects are required. Here is a summary of the key domain abstractions ("entities") discovered through your interview.

- **Student**
  - can have 1 or more Courses
- **Tutor**
  - A Tutor is also a Student
  - but there are Students who are not Tutors
  - can have 1 or more Courses for which they offer tutoring
    - These are Courses which they have previously taken
- **Course**
  - A Course is the primary subject or context of the tutoring Sessions
- **Session**
  - A Session represents a Time and Date when a Tutor will meet with a Student to discuss a Course
  -
- **Experience**
  - Every Tutor has some experience as a Tutor

Note:

- This system description summarizes the initial session to gather requirements and is not complete. You will likely need to gather more detailed requirements through more discussions with "domain experts" and/or by conduct your own research (e.g. Internet) on similar products.
- Based on the system description above, an initial ERD was drafted. So it is only as complete as the description.

## Deliverables required for the Part 1

- Documentation
  - UML Class Diagrams for 3 out of the 5 domain objects/entities in the system description (your choice)
  - For the "book a session" feature:
    - UML Use Case Diagram complete with text description
    - UML Sequence Diagram
  - A list of design patterns implemented including:
    - which classes are used to implement each design pattern
    - choosing class names which reflect the design pattern and their role in it would be useful
  - Note: diagrams must be submitted in .jpg or .pdf format
- Code
  - **DTO's** for each of the 3 domain objects/entities you picked from the 5 in the system description above.
  - all 3 objects/entities to be part of a Java package named: tutoring.DTO
  - Also you need to code each of the following design patterns:
    - **Builder**, **Strategy**, **Singleton**
  - **Note:** the Strategy pattern will involve 2 of the tables from the ERD. So for this portion of the assignment, you will probably end up using 4 tables.
  - And place them in a Java package named tutoring.BusinessObjects
  - must follow Java coding conventions
  - must have Javadoc comments
  - must have JUnit tests for all public member of **DTO's**
  - JUnit tests must be placed in package named: tutoring.test
  - must have comments in the JUnit tests
  - (for full marks) code submitted must be in the form of **NetBeans** project and
    - exported as a .zip
    - name your file Lastname.Firstname.CaseStudy1.zip
    - name your project Lastname.Firstname.CaseStudy1

## Appendix – Additional Resources

- UML Class Diagram
  - Derek Banas. (Nov 9, 2012). UML Class Diagrams. https://www.youtube.com/watch?v=3cmzqZzwNDM)
  - Donald Bell. (2004). UML basics: The class diagram. http://www.ibm.com/developerworks/rational/library/content/RationalEdge/sep04/bell/#N100A5
- UML Sequence Diagram
  - Derek Banas. (Nov 12, 2012). UML 2 Sequence Diagrams https://www.youtube.com/watch?v=cxG-qWthxt4

- Donald Bell. (2004). UML basics: The sequence diagram http://www.ibm.com/developerworks/rational/library/3101.html
- UML Use Case Diagram
  - Derek Banas. (Nov 5, 2012). UML 2 Tutorial https://www.youtube.com/watch?v=OkC7HKtiZC0
  - Scott W. Ambler. (2014). UML 2 Use Case Diagrams: An Agile Introduction http://www.agilemodeling.com/artifacts/useCaseDiagram.htm