

DATABASE SECURITY LAB

Develop a course management web application with a database backend. The web application should allow four types of users : database administrators, faculty, Teaching Assistants (TAs) and students.

The functions and privileges of each type of users are as follows:

- Database administrators are responsible for creating courses and accounts for other type of users. They also have to grant required privileges to the different classes of users to access data from the database.
- The faculty adds students to the courses assigned to them. The faculty also assigns one or more TAs to each course. At any point the faculty can also remove a TA from a course.
- The TA can add, edit or delete student marks for the course they are assigned to. Based on the marks they receive, the students receive a grade for the course.
- Students can only view the grade they have been allotted for the courses.

Please note the following points while developing the said web application:

- Each user should have a separate account in the database in addition to the web application. All constraints related to access control should be implemented at the database level as well.
- Use SQL triggers where necessary to avoid unwanted or unauthorized modification of the database.
- Choose access control mechanisms and assignments carefully to avoid unauthorized data access as well as inference attacks.
- Choose suitable password management policies for database accounts.
- As SQL injection is one of the major attacks against web applications with SQL backends, your web application should have sufficient defenses against injection attacks built into it.