UTCN
Computer Science Department
Software Design 2022

ASSIGNMENT A2

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1. Objective

The objective of this assignment is to allow students to become familiar with MVC architectural pattern, services, repository and unit tests.

2. Application Description

Use JAVA Spring/C# Web API to design and implement an application for the tracking the laboratory activity for the Software Design laboratory. The application should have two types of users (student and teacher) which must provide an email and a password to use the application.

The teacher can perform the following operations:

- Login
- CRUD on students. For each student we should track: email address, full name, group (ex. 30434) and hobby – free field.
- Can add/edit/delete Laboratory classes (Subjects of lab classes- eg. Software design, Maths) is out of scope). For each class we should track: Laboratory number (#1-#14), date, title, objectives (string) and a long description with the laboratory text.
- CRUD on assignments. Some of the laboratory will have assignments: for each assignment we must track the name, deadline, and a long description with the assignment text.
- Grade the submitted assignments individually.
- Calculate the final grade as an average of all marks. Also store if a student has passed or failed the exam by the following rules:
  Passed: - all assignments submitted; grades > 5, average > 6.
  Failed: - condition from passed is not satisfied

The student can perform the following operations:

- Login with the username and password.
- View a list of laboratory classes.
- View the assignments for a laboratory class.
- Create an assignment submission. Here, students should be able to insert a link to a git repository and a short comment (optional) for the teacher.

3. **Application Constraints**
   - The data will be stored in a relational database. Database model should respect 1st, 2nd and 3rd normal forms and proper relations between tables (1:1, 1:n, m:n)
   - Use the MVC architectural pattern to organize your application. For this assignment we will create only the backend part (Model, Controller, Services (Business layer) and Repositories).
   - API design should be RESTful (and not SOAP)
   - Use an ORM (Hibernate / Entity framework) to access the database
   - Use dependency injection to inject Services in Controllers and Repositories in Services
   - Install and use Swagger to call your APIs / Or provide a Postman collection
   - Connection string and magic strings should be stored in a separate config file
   - Use Generic Repository pattern to access Databases (use sample code provided).
   - Use one design pattern of your choice from the structural or behavioral Design Patterns list. (Singleton – excluded)

4. **Requirements**
   - Create the analysis and design document (see the template).
   - Implement and test the application.

5. **Deliverables**
   - GIT/TFS link with:
     1. Analysis and design document.
     2. Source files.
     3. SQL script for creating and populating the database with initial values.
6. **Deadline – 3 weeks**
7. **Resources:**

Web Api:
https://app.pluralsight.com/library/courses/implementing-restful-aspdotnet-web-api/table-of-contents
Spring Boot:
https://javabrains.thinkific.com/courses/take/springboot-quickstart/multimedia/2784009-adding-a-rest-controller

Grading:

5 points	Correct & complete database & entity model (User, Laboratory, Assignment) Flows functioning correctly
1 point	**Server side validations:** Update Entity that does not exist Update Entity to invalid state Delete student that does not exist Create / Update with incorrect value Authorizations / teacher / Student
1 point	**Design pattern:** Use one design pattern of your choice from structural or behavioral category. Singleton - excluded
2 point	**Class design, clean code:** Correct usage of response codes (200,400,500) No magic strings No copy-paste code
1 point	Default