
System Requirements Specification

Index

For

College Management
System

Version 1.0

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College Management APPLICATION

System Requirements Specification

You need to consume APIs exposed by Backend application in Angular to make application work as FULLSTACK

BACKEND-SPRING BOOT RESTFUL APPLICATION

1 PROJECT ABSTRACT

College Management Application is Spring boot RESTful application with MySQL, where it manages students, departments and teachers.

Following is the requirement specifications:

	College Management System Application	
Modules		
	1	Department
	2	Student
	3	Teacher
Department Module Functionalities		
	1	Create a Department
	2	Update the existing department details
	3	Get department info by department id
	4	Get all registered departments
	5	Search department Info by department name
	6	Delete an existing department
Student Module Functionalities		
	1	Create a student
	2	Update the existing student
	3	Get a student by Id
	4	Fetch all registered students
	5	Delete an existing student
	6	Search student Info by student name
Teacher Module Functionalities		
	1	Create a teacher

2	Update the existing teacher
3	Get a teacher by Id
4	Fetch all registered teachers
5	Delete an existing teacher
6	Search teacherInfo by teacher name

2 ASSUMPTIONS, DEPENDENCIES, RISKS / CONSTRAINTS

2.1 DEPARTMENT CONSTRAINTS:

- While updating a department, if departmentId does not exist then the operation should throw a custom exception.
- While fetching the department details by id, if departmentId does not exist then the operation should throw a custom exception.

2.2 STUDENT CONSTRAINTS:

- While creating the student, if departmentId does not exist then the operation should throw a custom exception.
- While updating a student, if studentId does not exist then the operation should throw a custom exception.
- While fetching the student details by id, if studentId does not exist then the operation should throw a custom exception.
- The student Details are connected through a field department name – applying integrity constraint

2.3 TEACHER CONSTRAINTS

- While fetching the teacher details by id, if teacherId does not exist then the operation should throw a custom exception.
- While creating the teacher, if teacherId does not exist then the operation should throw a custom exception.
- While updating a teacher, if teacherId does not exist then the operation should throw a custom exception.
- The teacher Details are connected through a field department name – applying integrity constraint

Common Constraints

- For all rest endpoints receiving @RequestBody, validation check must be done and must throw custom exception if data is invalid
- All the business validations must be implemented in dto classes only.
- All the database operations must be implemented on entity object only. Do not change, add, remove any existing methods in service layer
- In Repository interfaces, custom methods can be added as per requirements.
- All RestEndpoint methods and Exception Handlers must return data wrapped in **ResponseEntity**

3 BUSINESS VALIDATIONS

3.1 Department Entity

- Department name is not null, min 3 and max 100 characters.

3.2 Student Entity

- Student name is not null, min 3 and max 100 characters.
- Department id is not null.

3.3 Teacher Entity

- Teacher name is not null, min 3 and max 100 characters.
- Department id is not null.

4 REST ENDPOINTS

Rest End-points to be exposed in the controller along with method details for the same to be created

4.1 DEPARTMENT CONTROLLER

URL Exposed		Purpose
1. /departments		Create a Department
Http Method	POST	
Parameter 1	Department	
Return	Department	
2. /departments/{id}		Update the Department
Http Method	PUT	
Parameter 1	Long (id)	
Parameter 2	Department	
Return	Department	
3. /departments/{id}		Fetches the details of Department by Id
Http Method	GET	
Parameter 1	Long(id)	
Return	Department	
4. /departments/{id}		Delete the Department
Http Method	DELETE	
Parameter 1	Long (id)	
Return	Boolean	
5. /departments/		Fetch all registered Departments
Http Method	GET	
Parameter	-	
Return	List<Departments>	
6. /departments/search?name={name}		Fetches the department with the given name
Http Method	GET	
Parameter 1	String (name)	
Return	List<Departments>	

4.2 STUDENT CONTROLLER

URL Exposed		Purpose
1. /students/		Create a Student
Http Method	POST	
Parameter 1	Student	
Return	Student	
2. /students/{id}		Update the Student
Http Method	PUT	
Parameter 1	Long (id)	
Parameter 2	Student	
Return	Student	
3. /students/{id}		Fetches the details of Student by Id
Http Method	GET	
Parameter 1	Long(id)	
Return	Student	
4. /students/{id}		Delete the Student
Http Method	DELETE	
Parameter 1	Long (id)	
Return	Boolean	
5. /students/		Fetch all registered Students
Http Method	GET	
Parameter	-	
Return	List<Students>	
6. /students/search?name={name}		Fetches the students with the given name
Http Method	GET	
Parameter 1	String (name)	
Return	List<Students>	

4.3 TEACHER CONTROLLER

URL Exposed		Purpose
1. /teachers/		Create a Teacher
Http Method	POST	
Parameter 1	Teacher	
Return	Teacher	
2. /teachers/{id}		Update the Teacher
Http Method	PUT	
Parameter 1	Long (id)	
Parameter 2	Teacher	
Return	Teacher	

3. /teachers/{id}		Fetches the details of Teacher by Id
Http Method	GET	
Parameter 1	Long(id)	
Return	Teacher	
4. /teachers/{id}		Delete the Teacher
Http Method	DELETE	
Parameter 1	Long (id)	
Return	Boolean	
5. /teachers/		Fetch all registered Teachers
Http Method	GET	
Parameter	-	
Return	List<Teachers>	
6. /teachers/search?name={name}		Fetches the teachers with the given name
Http Method	GET	
Parameter 1	String (name)	
Return	List<Teachers>	

5 TEMPLATE CODE STRUCTURE

5.1 PACKAGE: COM.COLLEGEMANAGEMENT

Resources

CollegeManagementApplication (Class)	This is the Spring Boot starter class of the application.	Already Implemented
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5.2 PACKAGE: COM.COLLEGEMANAGEMENT.ENTITY

Resources

Class/Interface	Description	Status
Department (Class)	<ul style="list-style-type: none">• This class is partially implemented.• Annotate this class with proper annotation to declare it as an entity class with departmentId as primary key.• Map this class with a department table.• Generate the departmentId using the IDENTITY strategy.	Partially implemented.
Student (Class)	<ul style="list-style-type: none">• This class is partially implemented.• Annotate this class with proper annotation to declare it as an entity class with studentId as primary key.• Map this class with a student table.• Generate the studentId using the IDENTITY strategy.	Partially implemented.

Teacher (Class)	<ul style="list-style-type: none"> • This class is partially implemented. • Annotate this class with proper annotation to declare it as an entity class with teacherId as primary key. • Map this class with a teacher table. • Generate the teacherId using the IDENTITY strategy. 	Partially implemented.
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5.3 PACKAGE: COM.COLLEGE MANAGEMENT.DTO

Resources

Class/Interface	Description	Status
DepartmentDTO (class)	Use appropriate annotations from the Java Bean Validation API for validating attributes of this class. (Refer Business Validation section for validation rules).	Partially implemented.
StudentDTO (class)	Use appropriate annotations from the Java Bean Validation API for validating attributes of this class. (Refer Business Validation section for validation rules).	Partially implemented.
TeacherDTO (class)	Use appropriate annotations from the Java Bean Validation API for validating attributes of this class. (Refer Business Validation section for validation rules).	Partially implemented.

	(Refer Business Validation section for validation rules).	
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5.4 PACKAGE: COM.COLLEGE MANAGEMENT.REPOSITORY

Resources

Class/Interface	Description	Status
DepartmentRepository (interface)	<ol style="list-style-type: none"> 1. Repository interface exposing CRUD functionality for Department Entity. 2. You can go ahead and add any custom methods as per requirements. 	Partially implemented
StudentRepository (interface)	<ol style="list-style-type: none"> 1. Repository interface exposing CRUD functionality for Student Entity. 2. You can go ahead and add any custom methods as per requirements. 	Partially implemented
TeacherRepository (interface)	<ol style="list-style-type: none"> 1. Repository interface exposing CRUD functionality for Teacher Entity. 2. You can go ahead and add any custom methods as per requirements. 	Partially implemented

5.5 PACKAGE: COM.COLLEGEMANAGEMENT.SERVICE

Resources

Class/Interface	Description	Status
DepartmentService(class)	<ul style="list-style-type: none">• Need to provide implementation for Department related functionalities.• Add required repository dependency.• Do not modify, add or delete any method signature.	To be implemented.
StudentService (class)	<ul style="list-style-type: none">• Need to provide implementation for Student related functionalities• Add required repository dependency• Do not modify, add or delete any method signature.	To be implemented.
TeacherService (class)	<ul style="list-style-type: none">• Need to provide implementation for Teacher related functionalities• Add required repository dependency• Do not modify, add or delete any method signature	To be implemented.

5.6 PACKAGE: COM.COLLEGEMANAGEMENT.EXCEPTION

Resources

Class/Interface	Description	Status
GlobalExceptionHandler (class)	<ul style="list-style-type: none">● RestControllerAdvice Class for defining global exception handlers.● Contains Exception Handler for InvalidDataException class.● Use this as a reference for creating exception handler for other custom exception classes.	Partially implemented.
ResourceNotFound Exception (Class)	<ul style="list-style-type: none">● Custom Exception to be thrown when trying to fetch or delete the department info which does not exist.● Need to create Exception Handler for same wherever needed (local or global).	Already created.
DepartmentNotFound Exception (Class)	<ul style="list-style-type: none">● Custom Exception to be thrown when trying to fetch or delete a department info which does not exist.● Need to create Exception Handler for same wherever needed (local or global)	Already created.

StudentNotFoundException (Class)	<ul style="list-style-type: none"> • Custom Exception to be thrown when trying to fetch or delete a student info which does not exist. • Need to create Exception Handler for same wherever needed (local or global) 	Already created.
TeacherNotFoundException (Class)	<ul style="list-style-type: none"> • Custom Exception to be thrown when trying to fetch or delete a teacher info which does not exist. • Need to create Exception Handler for same wherever needed (local or global) 	Already created.
ErrorResponse (Class)	<ul style="list-style-type: none"> • Object of this class is supposed to be returned in case of exception through exception handlers 	Already created.

5.7 PACKAGE: COM.COLLEGE MANAGEMENT.CONTROLLER

Resources

Class/Interface	Description	Status
DepartmentController (Class)	<ul style="list-style-type: none">● Controller class to expose all rest-endpoints for Department related activities.● May also contain local exception handler methods.	To be implemented
StudentController (Class)	<ul style="list-style-type: none">● Controller class to expose all rest-endpoints for Student related activities.● May also contain local exception handler methods.	To be implemented
TeacherController (Class)	<ul style="list-style-type: none">● Controller class to expose all rest-endpoints for Teacher related activities.● May also contain local exception handler methods.	To be implemented

6 CONSIDERATIONS

- A. There is no roles in this application
- B. You can perform the following 3 possible actions

Department
Student
Teacher

FRONTEND-ANGULAR SPA

1 PROBLEM STATEMENT

College management is SPA (Single Page Application) for maintaining all information related to students, teachers and departments in college. It performs all CRUD operations along with searching functionality for all 3 modules.

The core modules of College management app are:

1. Home Page
2. Students Page
3. Teachers Page
4. Departments Page

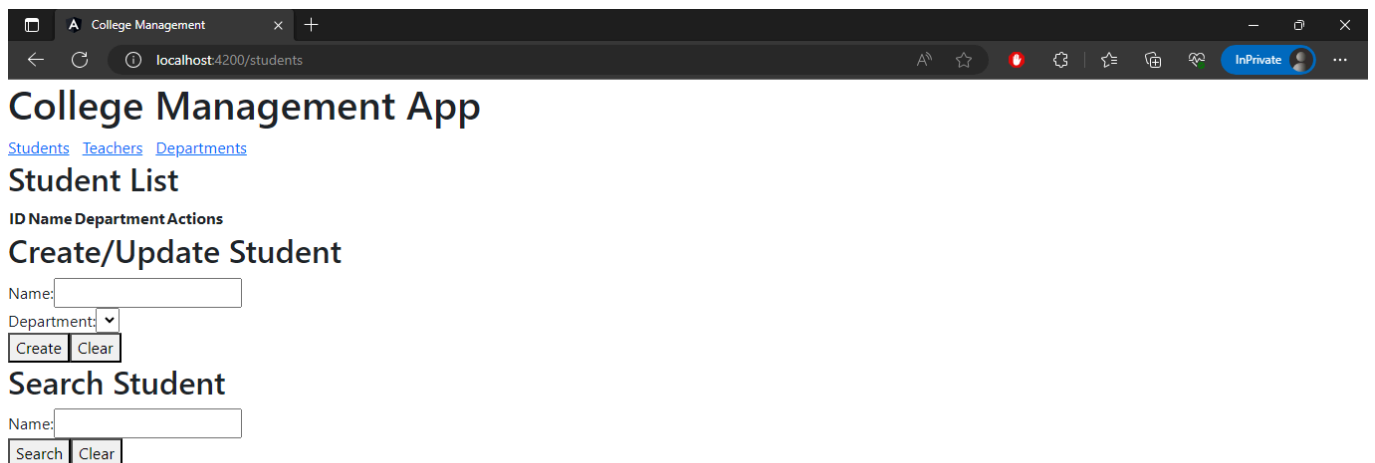
2 PROPOSED COLLEGE MANAGEMENT WIREFRAME

UI needs improvisation and modification as per given use case and to make test cases passed.

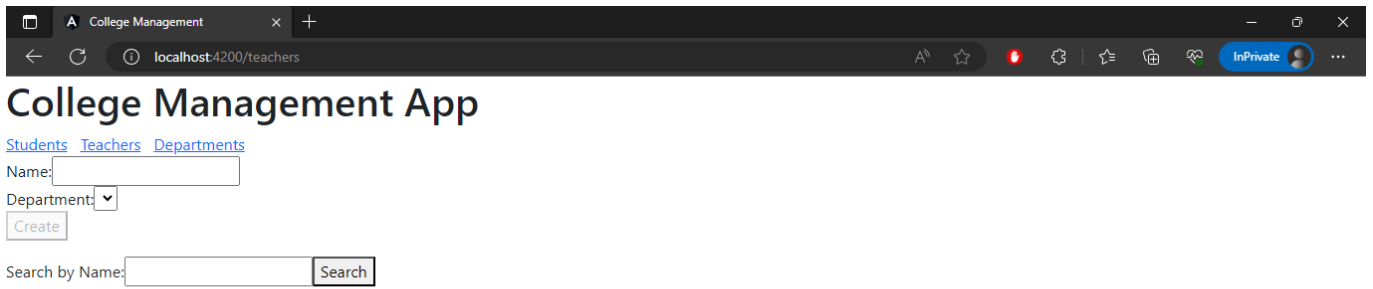
2.1 HOME PAGE



2.2 STUDENTS PAGE



2.3 TEACHERS PAGE



A screenshot of a web browser showing the 'Teachers' page of the 'College Management App'. The browser's address bar displays 'localhost:4200/teachers'. The page features a navigation bar with links to 'Students', 'Teachers', and 'Departments'. Below the navigation bar, there is a form with a 'Name:' label and a text input field, a 'Department:' label with a dropdown menu, and a 'Create' button. At the bottom of the form, there is a 'Search by Name:' label, a text input field, and a 'Search' button.

College Management App

[Students](#) [Teachers](#) [Departments](#)

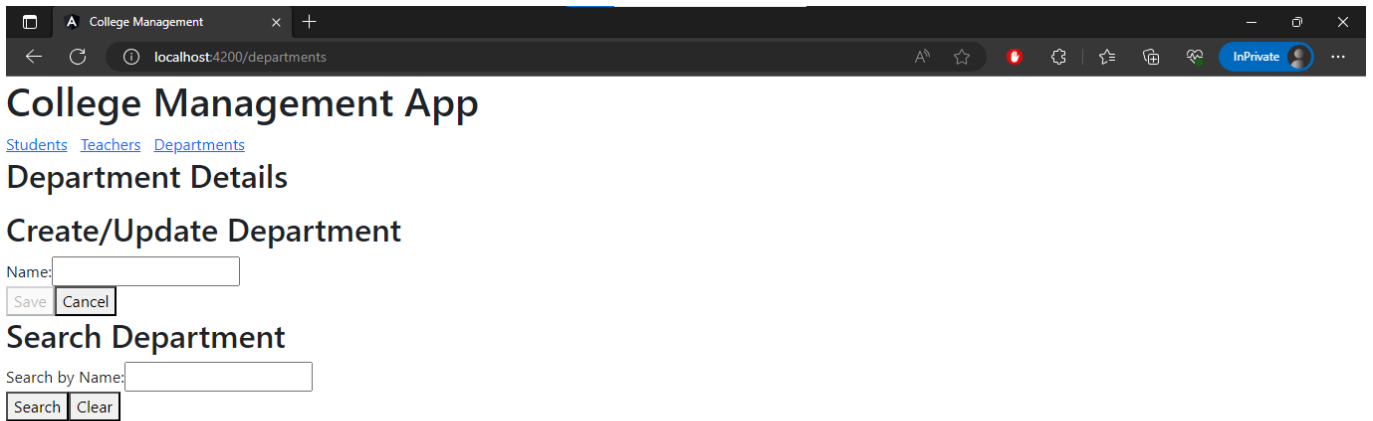
Name:

Department:

Create

Search by Name: Search

2.4 DEPARTMENTS PAGE



A screenshot of a web browser showing the 'Departments' page of the 'College Management App'. The browser's address bar displays 'localhost:4200/departments'. The page features a navigation bar with links to 'Students', 'Teachers', and 'Departments'. Below the navigation bar, there is a section titled 'Department Details' and a section titled 'Create/Update Department'. The 'Create/Update Department' section contains a form with a 'Name:' label and a text input field, and 'Save' and 'Cancel' buttons. Below this, there is a section titled 'Search Department' with a 'Search by Name:' label, a text input field, and 'Search' and 'Clear' buttons.

College Management App

[Students](#) [Teachers](#) [Departments](#)

Department Details

Create/Update Department

Name:

Save Cancel

Search Department

Search by Name:

Search Clear

3 BUSINESS-REQUIREMENT:

As an application developer, develop the College management App (Single Page App) with below guidelines:

User Story #	User Story Name	User Story
US_01	Home Page	<p>As a user I should be able to visit the welcome page as default page.</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none">1. User can click any links shown at homepage.
US_02	Students Page	<p>As a user I should be able to see Students page and perform all CRUD operations:</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none">1. As a user I should be able to furnish following details at the time of creating an ngo.<ol style="list-style-type: none">1.1 Name1.2 Department Name2. Create button should be disabled until all fields are validated.3. Cancel button should clear all fields.4. Search button should search all students on name basis and update the list accordingly.
US_03	Teachers Page	<p>As a user I should be able to see teachers page and perform all CRUD operations:</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none">1. As a user I should be able to furnish following details at the time of creating an teacher.<ol style="list-style-type: none">1.2 Name1.3 Department Name

		<ol style="list-style-type: none"> Create button should be disabled until all fields are validated. Search button should search all teachers on name basis and update the list accordingly.
US_04	Departments Page	<p>As a user I should be able to see department page and perform all CRUD operations:</p> <p>Acceptance criteria:</p> <ol style="list-style-type: none"> As a user I should be able to furnish following details at the time of creating an department. <ol style="list-style-type: none"> 1.2 Name <p>Save button should be disabled until all fields are validated.</p> Search button should search all departments on name basis and update the list accordingly.

4 CONSTRAINTS

- You should be able to press the "TAB" key and "SHIFT + TAB" to navigate from top field to bottom field and vice-versa.

NOTE:

There are **47 test cases** on the frontend and **77 test cases** on the backend.
 Ensure that your solution passes **all of the test cases** for a **100% successful submission**.

7 EXECUTION STEPS TO FOLLOW FOR BACKEND

1. All actions like build, compile, running application, running test cases will be through Command Terminal.
2. To open the command terminal the test takers need to go to the Application menu (Three horizontal lines at left top) -> Terminal -> New Terminal.
3. cd into your backend project folder
4. To build your project use command:
mvn clean package -Dmaven.test.skip
5. To launch your application, move into the target folder (**cd target**). Run the following command to run the application:
java -jar <your application jar file name>
6. This editor Auto Saves the code.
7. If you want to exit(logout) and continue the coding later anytime (using Save & Exit option on Assessment Landing Page) then you need to use **CTRL+Shift+B**-command compulsorily on code IDE. This will push or save the updated contents in the internal git/repository. Else the code will not be available in the next login.
8. These are time bound assessments the timer would stop if you logout and while logging in back using the same credentials the timer would resume from the same time it was stopped from the previous logout.
9. To test any Restful application, the last option on the left panel of IDE, you can find ThunderClient, which is the lightweight equivalent of POSTMAN.
10. To test any UI based application the second last option on the left panel of IDE, you can find Browser Preview, where you can launch the application.
11. Default credentials for MySQL:
 - a. Username: **root**
 - b. Password: **pass@word1**
12. To login to mysql instance: Open new terminal and use following command:
 - a. **sudo systemctl enable mysql**
 - b. **sudo systemctl start mysql**

NOTE: After typing any of the above commands you might encounter any warnings.

>> Please note that this warning is expected and can be disregarded. Proceed to the next step.

- c. **mysql -u root -p**
The last command will ask for password which is 'pass@word1'

13. Mandatory: Before final submission run the following command:

mvn test

14. You need to use **CTRL+Shift+B** - command compulsorily on code IDE, before final submission as well. This will push or save the updated contents in the internal git/repository, and will be used to evaluate the code quality.

8 EXECUTION STEPS TO FOLLOW FOR FRONTEND

1. All actions like build, compile, running application, running test cases will be through Command Terminal.
2. To open the command terminal the test takers, need to go to Application menu (Three horizontal lines at left top) -> Terminal ->New Terminal.
3. This is a web-based application, to run the application on a browser, use the internal browser in the environment.
4. You can follow series of command to setup Angular environment once you are in your project-name folder:
 - a. npm install -> Will install all dependencies -> takes 10 to 15 min
 - b. npm run start -> To compile and deploy the project in browser. You can press <Ctrl> key while clicking on localhost:4200 to open project in browser -> takes 2 to 3 min
 - c. npm run test -> to run all test cases. **It is mandatory to run this command before submission of workspace -> takes 5 to 6 min**
5. You need to use **CTRL+Shift+B** - command compulsorily on code IDE, before final submission as well. This will push or save the updated contents in the internal git/repository, and will be used to evaluate the code quality.