



IT314

SOFTWARE ENGINEERING

Group 16

Online Examination System

Unit Testing

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1. Introduction:

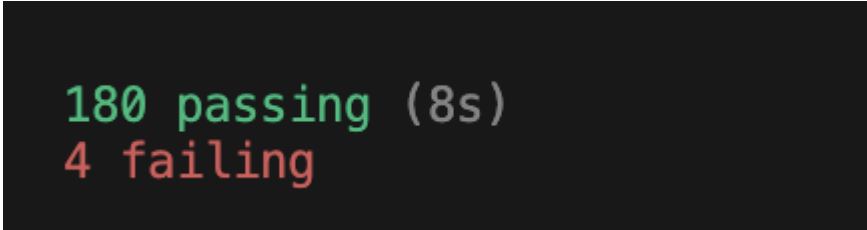
Unit Testing is the method to test isolated code to test the expected behaviour. We have created our project in MERN Stack, hence we use **mocha** (javascript framework) for unit testing. We have performed unit testing on controller functions.

2. What We have done:

We configured the mocha in our project environment and then we added test cases for each function in our controllers. In total we have added 184 test cases. We tried to cover the maximum number of statements.

3. Results:

Out of 184 test cases, 180 test cases passed and 4 test cases failed. All the tests are given in the code.



```
180 passing (8s)
4 failing
```

Below are all the files and functions/controllers for which we created tests.

Authentication

Admin_Login

admin_login API Function

- ✓ should return a 401 error if admin is not found
- ✓ should return a 401 error if the password does not match
- ✓ should return a 500 error if an exception occurs

Create_admin

create_admin API Function

- ✓ should return a 200 response with a success message for valid inputs (58ms)
- ✓ should return a 400 error if required fields are missing
- ✓ should return a 400 error for invalid email format
- ✓ should return a 400 error for invalid mobile number format
- ✓ should return a 500 error if there is a server error (56ms)

Create_examiner

create_examiner API Function

- ✓ should return a 400 error if required fields are missing
- ✓ should return a 400 error for invalid email format
- ✓ should return a 400 error for invalid mobile number format
- ✓ should return a 400 error for invalid date of birth format
- ✓ should return a 400 error for invalid date of birth values
- ✓ should return a 500 error if there is a server error (57ms)

Create_session

create_session API Function

- ✓ should return a 401 error if user is not found
- ✓ should return a 401 error if password does not match
- ✓ should return a 500 error if an exception occurs

Create_student

create_student API Function

- ✓ should return a 400 error if required fields are missing
- ✓ should return a 400 error for invalid email format
- ✓ should return a 400 error for invalid mobile number format
- ✓ should return a 400 error for invalid date of birth format

Forgot_password

forgot_password API Function

- ✓ should return a 400 error if email is not provided
- ✓ should return a 400 error for invalid email format
- ✓ should return a 401 error if no user is found with the provided email
- ✓ should return 200 if OTP is already sent
- ✓ should return 500 error for server issues

Resend_otp

resend_otp API Function

- ✓ should return a 400 error if email is missing
- ✓ should return a 400 error if email format is invalid
- ✓ should return a 401 error if no account is found with the provided email
- ✓ should return a 500 error if there is a server issue

Reset_password

reset_password API Function

- ✓ should return a 400 error if old or new password is missing
- ✓ should return a 409 error if the user does not exist
- ✓ should return a 400 error if the new password is less than 8 characters
- ✓ should return a 400 error if the old password is incorrect
- ✓ should return a 500 error if there is a server error

Verify_otp

verify_otp API Function

- ✓ should return a 400 error if email, otp, or password is missing
- ✓ should return a 400 error if password is too short
- ✓ should return a 400 error if OTP record does not exist for the provided email
- ✓ should return a 409 error if OTP has expired
- ✓ should return a 401 error if OTP is incorrect
- ✓ should successfully change the password if OTP is valid (56ms)
- ✓ should return 500 error for server issues

exam

Add_question_in_exam

add_question_in_exam API Function

- ✓ should return a 404 if no examiner is found
- ✓ should return a 404 if the exam is not found
- ✓ should return a 401 if the user does not own the exam
- ✓ should return a 401 if the exam has already started or ended
- ✓ should return a 404 if the question is not found
- ✓ should add a question to the exam successfully
- ✓ should not add the same question if it already exists in the exam
- ✓ should return a 500 error if there is a server issue

Create_exam

create_exam API Function

- ✓ should return a 404 if the examiner is not found
- ✓ should return a 400 error if a question is missing required fields
- ✓ should create and save a new exam successfully
- ✓ should return a 500 error if there is a server issue

Delete_exam

delete_exam API Function

- ✓ should return a 404 if no examiner is found
- ✓ should return a 404 if the exam is not found
- ✓ should return a 401 if the user does not have access to delete the exam
- ✓ should return a 401 if the exam start time has passed
- ✓ should delete the exam successfully
- ✓ should return a 500 error if there is a server issue

Delete_question_from_exam

delete_question_from_exam API Function

- ✓ should return a 404 if no examiner is found
- ✓ should return a 404 if the exam is not found
- ✓ should return a 401 if the user does not own the exam
- ✓ should return a 404 if the question is not found
- ✓ should remove the question from the exam successfully
- ✓ should not modify the exam if the question is not in the questions array
- ✓ should return a 500 error if there is a server issue

Fetch_exam_examiner

fetch_exam_examiner API Function

- ✓ should return a 404 if the exam is not found
- ✓ should return a 404 if the examiner is not the creator of the exam
- ✓ should return a 500 error if there is a server issue while fetching the exam
- ✓ should fetch the exam and its questions successfully
- ✓ should return a 500 error if there is a server issue while fetching questions

Fetch_exam_student

fetch_exam_student API Function

- ✓ should return a 500 error if there is a server issue while fetching the exam

Update_exam

update_exam API Function

- ✓ should return 404 if the examiner is not found
- ✓ should return 404 if the exam is not found
- 1) should return 400 if required fields are missing
- 2) should return 400 if questions array is empty
- 3) should return 400 if startTime is in the past
- ✓ should update an exam successfully
- ✓ should return 500 if there is a server error

Examiner

All_examiners

```
all_examiners API Function
✓ should handle server errors gracefully
```

Delete_examiner

```
delete_examiner API Function
✓ should delete an examiner and associated user successfully
✓ should handle user not found
✓ should handle examiner not found
✓ should handle server errors gracefully
```

Get_examiner

```
get_examiner API Function
✓ should handle unauthorized access for non-admin users
✓ should handle server errors gracefully
```

Update_profile

```
update_profile API Function
✓ should update the user profile successfully
✓ should return 400 if required fields are missing
✓ should return 400 if mobile number is invalid
✓ should return 400 if date of birth format is invalid
✓ should return 400 if email format is invalid
✓ should return 404 if user not found
✓ should handle server errors gracefully
```


Examresult

Exam_attempted_student

```
exam_attempted_student API function
  ✓ should return 400 if examId is not provided
  ✓ should return 404 if exam not found
  ✓ should handle server errors gracefully
```

Exams_result

```
exams_result API Function
  ✓ should handle missing username in request
  ✓ should handle server errors gracefully
```

Show_exam

```
show_exam API Function
  ✓ should handle missing username in request
  ✓ should handle missing examId in request
  ✓ should handle server errors gracefully
```

Past_upcoming_exam

Get_past_exams_5_student

```
get_past_exams_5_student API Function
✓ should return 404 if no username is found
✓ should return 404 if no student found for the username
✓ should return 500 if there is a server error
✓ should return 200 and past exams if successful
```

Get_past_exams

```
get_past_exams API Function
✓ should retrieve past exams successfully
✓ should return 500 if there is a server error
✓ should return an empty list if no past exams are found
✓ should handle invalid date formats gracefully
✓ should handle missing status field gracefully
✓ should handle exams with future dates
✓ should handle missing status field gracefully
```

Get_upcoming_exams_5_student

```
get_upcoming_exams_5_student API Function
✓ should return 404 if no username is found
✓ should return 404 if no student is found for the given username
✓ should return 500 if there is a server error
```

Get_upcoming_exams

```
get_upcoming_exams API Function
✓ should return 500 if there is a server error
✓ should return 200 and an empty array if no upcoming exams are found
✓ should return 200 and a list of upcoming exams if exams are found
✓ should handle invalid date format gracefully
```

Questions

Add_question_bookmark_student

```
add_question_bookmark_student API Function
✓ should return 404 if no questionId is provided
✓ should return 404 if no username is found in the request
✓ should return 404 if student is not found in the database
✓ should return 200 and successfully bookmark the question
✓ should return 500 if there is an error during the process
```

All_questions_examiner

```
all_questions_examiner API Function
✓ should return 404 if no username is provided in the request
✓ should return 404 if examiner is not found in the database
✓ should return 500 if there is an error during the process
```

All_questions_subject_wise_student

```
all_questions_subject_wise_student API Function
✓ should return 404 if no username found in request
✓ should return 404 if student is not found in the database
✓ should return 200 and the grouped questions if everything is valid
✓ should return 500 if there is an error during the process
```

Create_question

```
create_question API Function
✓ should return 404 if no username found in request
✓ should return 400 if options are not provided or have less than 2
✓ should return 404 if examiner is not found in the database
✓ should return 200 and the created question if everything is valid
✓ should return 500 if there is an error during the process
```

Delete_question_bookmark_student

```
delete_question_bookmark_student API Function
✓ should return 404 if no questionId is provided
✓ should return 404 if no username is found in the request
✓ should return 404 if student is not found in the database
✓ should return 404 if the question is not found or already removed
✓ should return 200 and successfully unbookmark the question
✓ should return 500 if there is an error during the process
```

Delete_question

delete_question API Function

- ✓ should return 404 if no username found in request
- ✓ should return 404 if examiner is not found in the database
- ✓ should return 404 if the question is not found or the examiner is not the creator
- ✓ should return 404 if the question creator is not the same as the user requesting deletion
- ✓ should return 500 if there is an error during the process

Update_question

update_question API Function

- ✓ should return 404 if no username found in request
- ✓ should return 404 if no examiner found in the database
- 4) should return 400 if options are not provided or have less than 2
- ✓ should return 404 if the question is not found or does not belong to the examiner
- ✓ should return 200 and the updated question if everything is valid
- ✓ should return 500 if there is an error during the process

Student

All_students

```
all_students API Function
  ✓ should return 500 if there is an error during the database query
```

Delete_student

```
delete_student API Function
  ✓ should return 200 and success message when student and user are deleted successfully
  ✓ should return 404 if username is not found in the request parameters
  ✓ should return 500 if there is an error during the deletion process
```

Get_student

```
get_student API Function
  ✓ should return 400 if the user is unauthorized (role is Examiner)
  ✓ should return 400 if the user is trying to access another user's profile
  ✓ should return 500 if there is an error in fetching the student profile
```

Student_performance

```
student_performance API Function
  ✓ should return 404 if no username found in request
  ✓ should return 500 if there is an error during the process
```

Student_submit_answer

```
student_submit_answer API Function
  ✓ should return 404 if no username found in request
  ✓ should return 404 if student is not found in the database
  ✓ should return 404 if question is not found in the database
  ✓ should return 404 if exam is not found in the database
  ✓ should return 404 if exam is not for the correct batch/branch
  ✓ should return 401 if exam is not started or already ended
  ✓ should return 401 if exam is already submitted
  ✓ should return 500 if there is an error during the process
```

Submit_exam_student

submit_exam_student API Function

- ✓ should return 404 if username is not found
- ✓ should return 404 if student is not found
- ✓ should return 404 if exam is not found
- ✓ should return 401 if the exam is not within the allowed time range
- ✓ should return 401 if the exam is already submitted
- ✓ should return 500 if there is an internal error in saving student data

Update_student

update_student API Function

- ✓ should return 200 and updated student data on successful update
- ✓ should return 400 if required fields are missing
- ✓ should return 400 if the email format is invalid
- ✓ should return 400 if the mobile number format is invalid
- ✓ should return 400 if the date of birth format is invalid
- ✓ should return 400 if the user is unauthorized (not Admin or incorrect username)
- ✓ should return 500 if there is an error in updating the student data