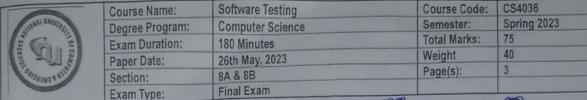
National University of Computer and Emerging Sciences, Lahore Campus



Student: Name:

0000000000

Roll No.__



Section:



Instruction/Notes:

Attempt all questions on the answer sheet 1 A4 size page (both sides) is allowed as cheat-sheet during the exam Take Assumptions where required and note them down along with your answers.

Question #1:[10+10+3+2]

You have been asked to test the web api of a project management tool. The tool uses the micro-service architecture pattern. Following three are among the many services. A few API endpoints are also mentioned for each service:

- Authentication Service
 - POST /api/login
 - Request Parameters
 - '{"username":"ABCD", "password":"abcd"}'
 - Responses

 - In case of invalid credentials: '{"status": "401", "message": "Either username or password is incorrect"}'
- Project Service
 - GET /api/projects
 - Request Parameters
 - '{"token":"xxxx-xxxxxxxxxxxxxxx, "filter":"open"}'
 - Filter field can be set to open, closed or archived.
 - Responses
 - In case of valid credentials:
 - '{"status": "200",
 - "projects": [
 - {"id": "zzzzzzzzzz","name":"board1","status":"open"}
 - {"id" "zazzzzzzz" "pame":"board2","status":"open"}
 - 13'
- Task Service
 - POST /api/tasks
 - Request Parameters
 - Responses
 - '{"status": "200", "id":"yyyyyyy","projectId":"zzzzzzzzzz,", "summary":"Some Text"."description":"Some text }'

Department of Computer Science

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You are required to automate the integration tests for above API endpoints by covering following scenarios:

- Scenario-1: Make an api call to /api/login endpoint with invalid credentials and expect that
 the application does not return a token. Then make calls to /api/projects and /api/tasks
 without a token and expect that both endpoints return 401 responses.
- Scenario-2: Make an api call to /api/login endpoint with valid credentials and expect that the application will return a token. Then make calls to /api/projects and expect that no project is created and therefore the project array is empty in the response
- Scenario-3: Make an api call to /api/login endpoint with valid credentials and expect that the application will return a token. Then make calls to /api/projects and expect that list of projects is returned. Then use id of one of the projects and call the /api/tasks endpoint to create a task and expect that the task is successfully created
- a) Suggest a folder structure and modules/class structure to create a modular integration testing framework that uses programing principles like KISS, DRY, single responsibility principle.
- b) Automate above three scenarios using your preferred language according to the above suggested modular approach
- c) Assuming that modules have been developed in the following order due to multiple practical reasons, suggest your strategy of using stubs/drivers to perform integration testing at each stage
 - i) Project
 - ii) Task
 - iii) Authentication
- d) Logically speaking, which of the above three scenarios does not need to be a part of the integration testing suite. Give reasons.

Question #2:[5+5+5]

Write load, stress and spike tests for following requirements while testing https://mywebsite.com/

- For concurrent users upto 5000/sec with ramp up time of 10 mins and duration 30 mins
 - 1) P80 of response time < 1s
 - 2) Error rate < 0.1%
- ii) For concurrent users upto 10000/sec with ramp up time of 10 mins and duration 30 mins
 - 1) P80 of response time < 3s
 - 2) Error rate < 0.5%
- iii) For concurrent users upto 20000/sec with ramp up time of 30 seconds and duration 5 mins
 - 1) P80 of response time < 30s
 - 2) Error rate < 10%



Ouestion #3:[2+10+8]

Your company "Jiggle" has a product "JDocs", where people can collaborate to manage their shared documents word/sheets. For collaboration the user can use the sharing feature of the JDocs. Currently JDocs offer following options when sharing

- You can share Files or Folders
- You can give following access rights |
 - read-only permissions
 - ead and write permissions
 - Owner permissions
- You can share with
 - Individuals
 - All members of an organisation
 - Anyone that has the link
- a) Which technique among the following two is most appropriate for this situation to optimise your number of test cases. Explain why?
 - i) Combinatorial testing
 - ii) Reduced decision tables
- b) Apply the above recommended technique to identify the appropriate test cases
- c) Write a BDD test using gherkin scenario outline to cover the above identified test cases

Question #4 [10+5]:

```
void AddressBook::Open()
  if(!fs.ExecuteOpen()) return;
  filename = fs;
  FileIn in(filename);
     Exclamation("Unable to open [* " + DeQtf(filename));
     return;
  array.Clear();
  while(!in.lsEof()) {
     Vector<Value> q;
     for(int i = 0; i < 4; i++)
       q.Add(in.GetLine());
     array.Add(q);
```

- a) Compute the cyclomatic complexity of the above open function in a class AddressBook and identify the paths that you will choose to achieve 100% basis path coverage. (Focus on the code structure without worrying about the logic.)
- b) If you are asked to use Test Driven Development (TDD) approach then will you use base path coverage as a test-basis? Briefly explain