

CPIT 252 Lab Exam

Instructions:

Please carefully read the instructions below. Failure to comply with any of the instructions below may result in the instructor being unable to accept or grade your exam:

- You will have from 4:00 pm on Wednesday May 18th until 4:00 pm on Thursday May 19th to complete the take home lab exam.
- The exam must be taken completely alone. Discussing the exam with anyone is forbidden.
- You may not check your exam answers with any person.
- You are not allowed to consult with any other person regarding the exam. Closely similar answers will be always scrutinized, and disciplinary actions will follow.
- All questions about the exam of any type can only be asked to the course instructor.
- Closely identical student answers will not be graded and both students will receive ZERO in the exam.
- You are not allowed to consult materials from the Internet with the exception to the course materials listed on the course website.
- You must submit your answers in ZIP file named as follows: studentId-firstName-LastName-QuestionNumber.zip. Additionally, please include your student Id and name in the README file for each question.

Questions

Question A1:

[3 grades]

A developer created an app that connects to a remote database. The database connection is poorly implemented in a way that it reconnects multiple times to the database upon each call to perform an operation.

Import the code at <https://gitlab.com/cpit252/labExamQuestionA1> and answer the following questions:

1. Fix the current implementation, so it returns a single connection to the database and the unit testing can pass.
2. The `Team` class has poor abstraction. Refactor the code to improve it.

Question A2:

[3 grades]

A developer has created a service that returns information for a given domain (e.g., `kau.edu.sa`). The service takes a host or a domain name and returns the city, country, and time zone for that domain. He found a library that takes an IP address, performs a lookup, and returns the related details for the IP address (city, country, and time zone). However, the developer wanted to interact with the library using the host name not the IP address. He needs to write an adapter to convert the interface of this library into another interface his code expects.

Import the code at <https://gitlab.com/cpit252/labExamQuestionA2> and answer the following question:

- Refactor the code using the adapter design pattern.

Note: You need to visit <https://ipinfo.io/> and sign up for a free account to obtain API keys. Add the API key as an environment variable called `key`.

Question A3:

Implement one of the following scenarios [ONLY ONE]:

[4 grades]

- A. A podcast studio can notify subscribers when it publishes a new podcast. Releasing a new podcast is what changes the state of the podcast studio, and it causes the subscribers to be notified via email, SMS, and twitter. Implement this scenario using the observer design pattern.
- B. A store is offering different types of discounts to its customers (regular discount, member only discount, clearance discount). Implement this scenario using the strategy design pattern.