

FIT3077 – Software Engineering: Architecture and Design

Assignment 1 Marking Guide

Application description – the details in this description are fictitious

You are asked to develop an app to support the work of Professor Priyamvada Gopal, an expert in global health and epidemiology to help prevent the spread of COVID-19. The app will be used to aid in the monitoring and transmission of the 2019-nCoV and test the efficacy of new vaccines in global trials.

The app will contain a questionnaire that health practitioners will complete after each immunisation, recording the following details about the patient: name, surname, age, town, country of residence, notes on prior health conditions, and the date when the vaccine was delivered. All these details must be entered, and the app will automatically record the details of the health practitioner that entered the record.

Health practitioners will also use the app to record if a patient is a carrier of 2019-nCoV. Before recording a carrier, doctors must obtain the blood test report and x-ray report, which are also stored in the app. After recording the data of a carrier patient, doctors can choose to send the patient to isolation ward or home quarantine, and record this decision in the app.

The following information must be recorded for carriers of the virus: name, surname, age, town, country of residence, date of the test, date of the diagnoses, date of onset (i.e., when the first symptoms appeared), notes on prior health conditions, notes on where the person has travelled in the past 2 weeks, notes on people they have been in contact with in the past 2 weeks, and the state of the patient (critical, recovered, etc.). All these details must be entered, and the app will automatically record the details of the health practitioner that entered the record.

The app will visualise summary statistics from the information above, such as the number of vaccines delivered for each country, number of infected cases in each country, and number of recovered cases.

The app must support authentication of the health practitioners with a login screen. Prior to using the app, health practitioners must register with their name, surname, position title, organisation name, address and password.

Task 1

5 marks

Given the system description above, **create a high level and expanded use case** for recording a patient who is a carrier of 2019-nCoV. In your expanded use case, you must cross-reference any other required use cases.

- Typical course of events matches behaviour described in specification. **2 marks**
- Alternative courses match behaviour described in specification. **1 mark**
- Appropriate level of detail and abstraction. **1 mark**
- Scope of use case is not too broad or narrow. Required sections are present. **1 mark**

Task 2

5 marks

Using UML notation, **create a class diagram** that models the application described above. You should include attributes and operations in your class diagram where necessary. **Discuss the design principle(s)** you have considered in your design. You must discuss at least one design principle (max 200 words).

- Design can easily support all use cases in the specification. Classes are well-chosen. Important domain concepts are modelled. Elements that are outside the scope of the specification are not modelled. All elements that are shown are within the scope of the specification. **2 marks**
- All relevant associations are shown. Inheritance is used appropriately. Aggregation/composition are used correctly (if at all). All obvious associations and dependencies between classes are shown. Navigability arrows on associations and dependencies make sense (if shown). **2 marks**
- At least one design principle is discussed. **1 mark**

Task 3

5 marks

Using the class diagram and the use case, **create an interaction diagram** to show how objects (of classes in your class diagram) interact to implement the use case. You may use either a sequence diagram or a communication diagram.

- Behaviour matches specification. The interaction diagram describes a plausible implementation of the use case. Shows all interactions needed to implement the use case. Does not show interactions that are not required to implement the use case. **2 marks**
- Messages are named and correspond to plausible operations of classes. Class syntax is correct. Correct use of colon operator to distinguish classes from instances. Correct syntax for Actor (if used). Correct syntax for fragments, e.g. alt, loop (if used). **2 marks**
- Classes/methods shown in interaction diagram are consistent with those shown in class diagram. Messages passed in interaction diagram are consistent with associations/dependencies in class diagram. **1 mark**

Task 4

5 marks

The app has a method to return a country's total number of infected cases, but the algorithm to compute this must be able to be selected at runtime (e.g., calculated by date of diagnoses or by date of onset). It also must be possible to add new algorithms to compute the total number of infected cases with only minor modifications to the "country" class. **Redraw your class diagram highlighting the changes** you would need to make to add a new algorithm. **Discuss the design principle(s)** that help you achieve this kind of flexibility in your design.

Note: If you don't have a country class, then you must demonstrate that a new algorithm can be added with minor modifications to the other parts of the system.

- It is possible to add new algorithms to compute the **total** number of infected cases without major modifications to the system. **2 marks**
- The method to return a country's total number of infected cases can be selected at runtime. **1 mark**
- Design principles have been applied and discussed correctly. **2 marks**