School of Computing, Faculty of Engineering

SECJ2203: Software Engineering

Problem Solving 2 (OOD)

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Prepared for:

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Problem Solving 2: Object-Oriented Detailed Design

INSTRUCTIONS:

Ensure you write your team's name, each team member's full name and matric number on the first page of your team submission. Team members who are absent during the assessment should not be included. Only the team leader should submit the file by uploading via e-learning or as required by the course lecturer.

Teams who are caught copying other teams' work will be penalised by getting an 'F' grade for the concerned problem solving. This includes committing plagiarism by copying resources from the Internet without any citation or direct copy with citation, which should be quoted where applicable. Teams that allow their work to be copied will be penalised too.

Read the questions carefully and discuss them with your team members. Answer all questions within the given time. Your answers could be typed or written or as required by the lecturer.

Question:

Given the case study below, answer the following questions.

Medical Appointment System **(MAS**) is a system used by doctors at clinics or hospitals to **manage surgery appointments and consultation appointments** for a particular patient. The system involves **patient registration, appointment management, appointment reminders** and **confirmation to patients**, and **various reporting**.

Patients should be registered before making an appointment. The registration is done by an administrative staff where the patient should be available personally in the clinic or hospital to register via MAS. The patient's details include the patient's name, address, phone number, date of birth, IC or passport number, place of employment, emergency contact information, health insurance information, and medical history. After the registration is confirmed, the patient will be given patientID to be used for inquiries and appointments.

Manage appointments can be done by the staff who are doctors or nurses. Doctors' records include their specialisation while nurses have shifts. They should login to the system, then they can retrieve all the information which is related to the patient using the patientID. Then, they can choose either a surgery appointment or consultation appointment based on the patient's situation. For each appointment, the doctor has to choose the date, time and room number based on availability. After the doctor has confirmed the appointment details, a detailed confirmation message will be sent to the

patient. One day before the appointment date, the system sends a reminder message to the patient including the appointment details.

MAS supports generating various types of medical reports and administrative reports. The medical reports include medical history, consultation, operative report, discharge summary, radiology report, pathology report, laboratory reports. While the administrative reports include statistics of patients treated at each clinic or hospital, the number of patients who have been admitted and discharged for surgeries, the medication prescribed and their costs.

a) Draw a **design class diagram** for MAS that includes the dependency relationships. Identify required attributes including their types and at least two methods/operations with signatures for each class. (26 marks)

b) Based on the design class diagram in (a), identify suitable subsystems for MAS. Draw a **package diagram** to represent the subsystems that you have identified. Organise the classes (without attributes and operations) into respective subsystems and show the dependencies among the subsystems. A multi-layer package is not required. (9 marks)

c) Based on the use case description for Manage Appointment in Figure 1, draw a **sequence diagram** for the scenario manage appointment. The diagram should include the three stereotypes <<boundary>>, <<controller>>, <<entity>> and <<dataAccess>>. (10 marks)

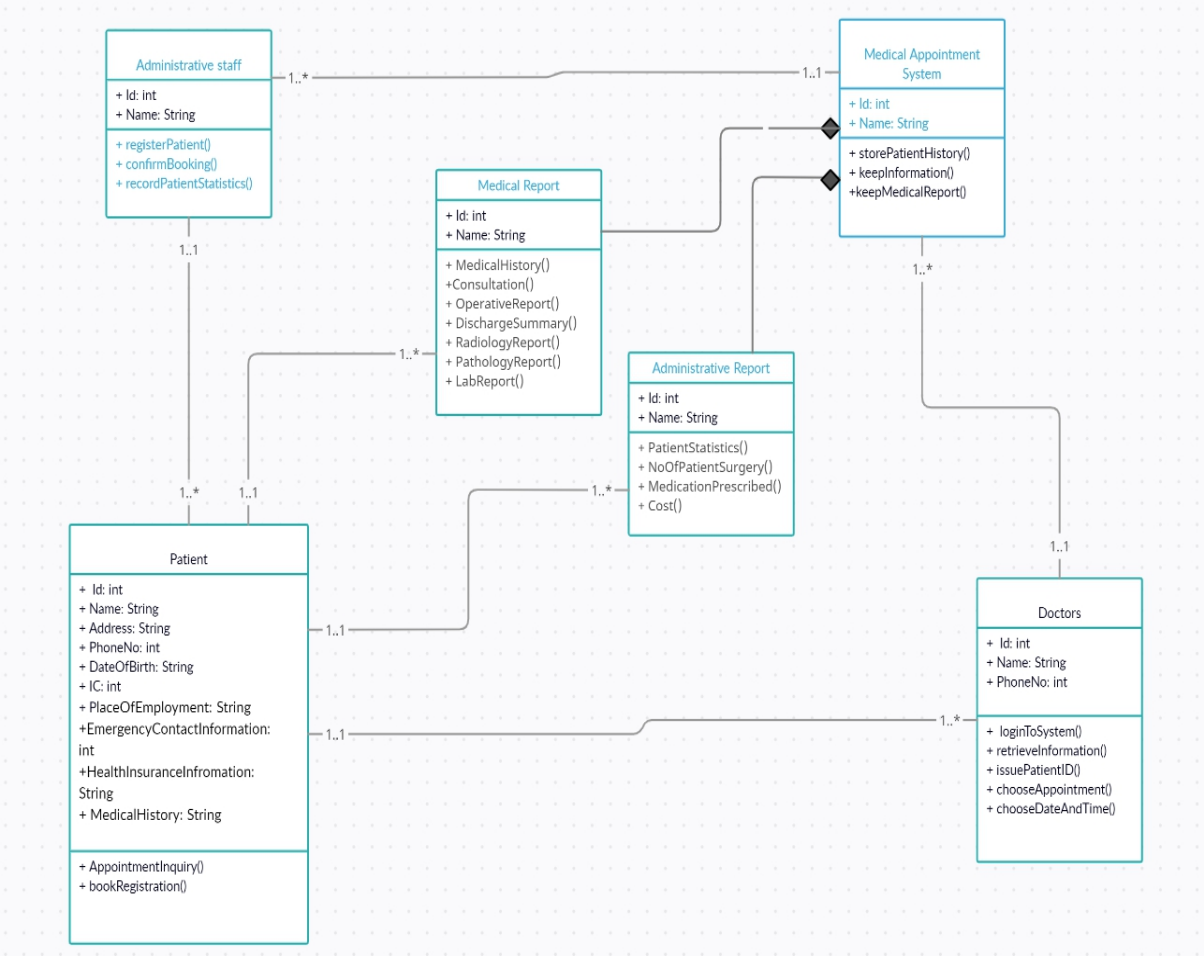
Use Case:	Manage Appointment
ID:	UC0031
Actors:	Nurse and doctor
Preconditions:	1. The Doctor has logged in successfully. 2. The Doctor selects “Appointment Menu”. 3. The Patient has been registered.

Flow of events:	1. The system displays content of “Appointment Menu”. 2. The Doctor selects “add appointment”. 3. The Doctor enters patientID. 4. The System displays the patient details. 5. The Doctor selects “surgery appointment” or “consultation appointment”. 6. **If** the Doctor selects “surgery appointment” then 6.1 The system displays available time and date. 6.2 The Doctor selects the date, time and room number based on availability. 6.3 The Doctor clicks save. 6.4 The system displays surgery details. 6.5 The surgery appointment details are confirmed and updated to the database. 7. **Else** 7.1 The system displays available time and date. 7.2 The Doctor selects the date and time based on availability. 7.3 The Doctor clicks save. 7.4 The system displays consultation details. 7.5 The consultation appointment details are confirmed and updated to the database.
Postconditions:	The regular appointment details, surgery and consultation appointment are set and updated.

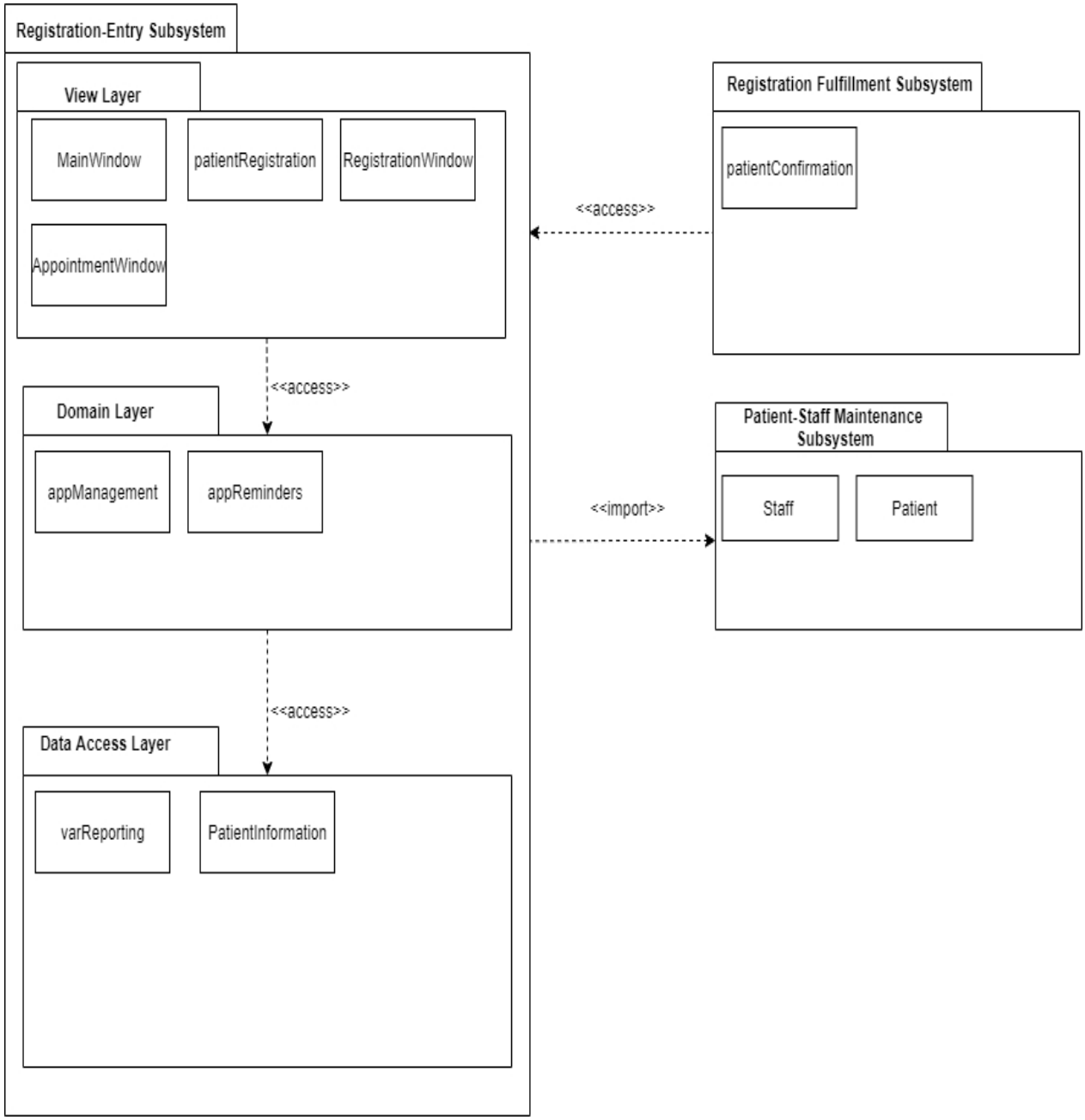
Total: 35 marks (3%)

Answers:

a) Design class diagram:



b) Package diagram



c) Sequence diagram