Homework Assignment 5 (100 Points)
CSE 464
CIDSE, Arizona State University
Due: By Sunday Nov 16th by 11:59 pm

Objective: To enhance the knowledge about code review, Object Oriented Design Considerations and Modularity, Principles of Object-Oriented Application Testing.

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1. [30 Pts] Consider the hw5.java program given. This program is not a well-written program, specially considering the code quality with smelly code symptoms including object-oriented concept violations.

a) Identify at least three major smelly code symptoms in this code. Clearly explain your reason to consider them as smelly code symptoms.
b) Explain how to fix each issue identified above
c) Develop the hw5modified.java program that fixes the three smelly code symptoms identified above

2. **[20 Points]** Consider the Hospital Management System (HMS) software structure given with this question (Only the skeleton code is given to learn the structure of the system)
HMS has one module that handles patient registration, billing, appointment scheduling, lab reporting, pharmacy inventory, and notifications.

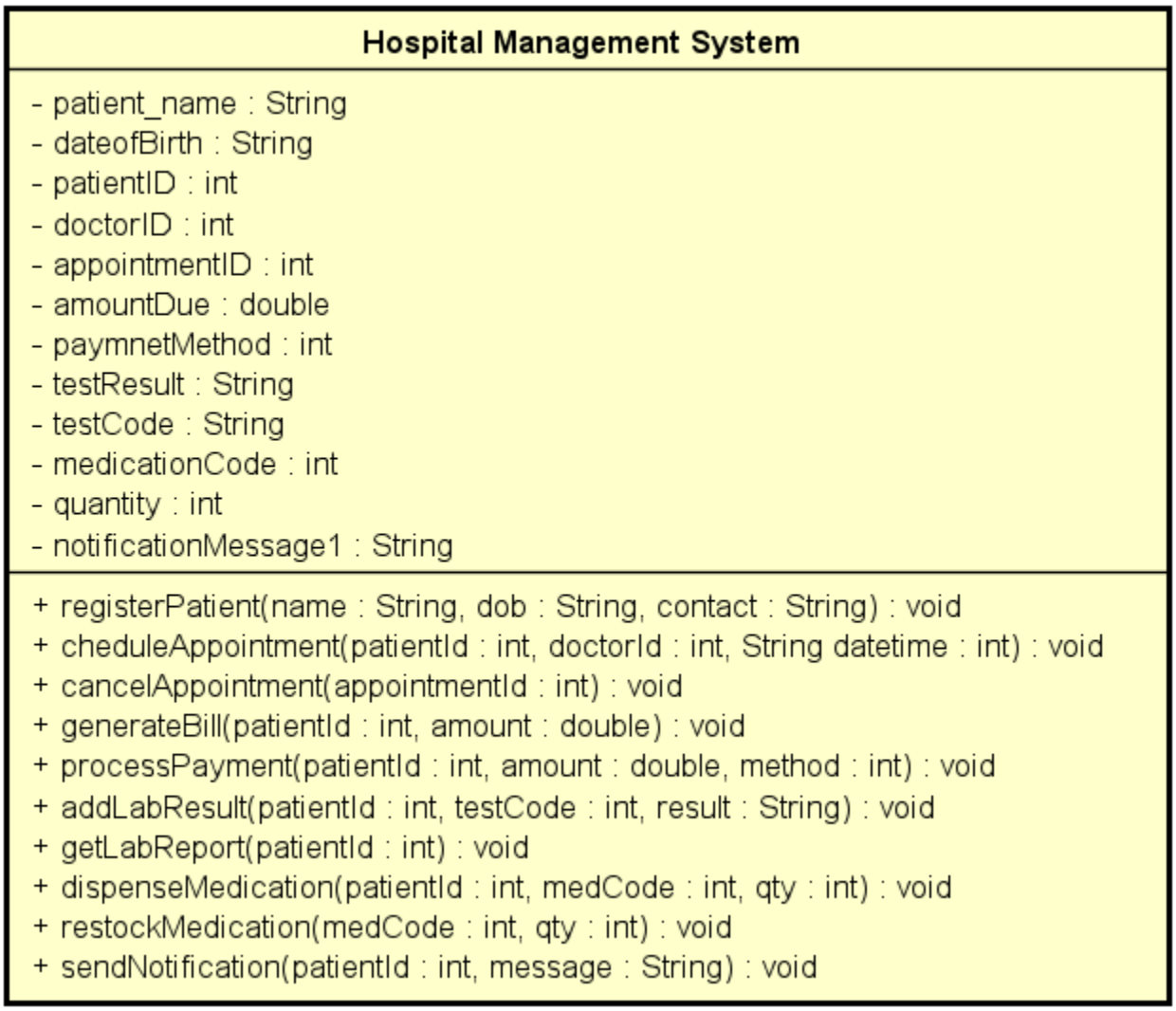
a) Identify cohesion, testability and code quality issues in this design
b) How do you refactor this design that will improve cohesion, testability and code quality. Clearly explain how your refactoring improves cohesion, testability and code quality
c) Develop the class diagram for the refactored design

Note: Before you attempt this question, study and review module 10 material including Module design case study posted

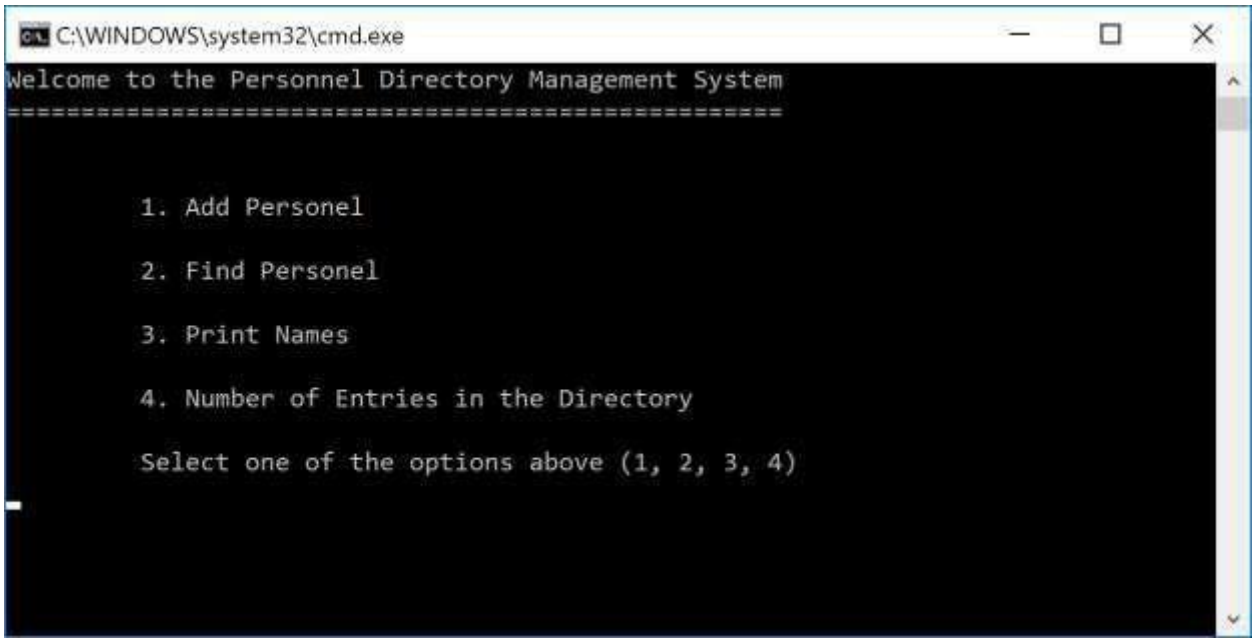
System Features:

```
Patient registration
 // create patient record, assign patient ID
registerPatient(String name, String dob, String contact)

Appointments
 // check doctor availability, book slot
public void scheduleAppointment(String patientId, String doctorId, String datetime)
 // cancel and notify
public void cancelAppointment(String appointmentId)

 Billing
 // compute bill, apply insurance rules
public void generateBill(String patientId, double amount)
 // charge card / cash handling / update ledger
```

```
public void processPayment(String patientId, double amount, String method)

 Lab results
// store result, flag critical values
public void addLabResult(String patientId, String testCode, String result)
// compile and print report
public void getLabReport(String patientId)

  Pharmacy / inventory
// check stock, reduce inventory, create dispense record
public void dispenseMedication(String patientId, String medCode, int qty)

// increase inventory
public void restockMedication(String medCode, int qty)

 Notifications
// send SMS / email
public void sendNotification(String patientId, String message)
```



3.[50 Pts Object Oriented Design and Modularity] Consider the PersonnelDirectory system implementation given. This implementation has several object-oriented concept violations and coupling issues



a) Draw the class diagram for the current implementation of the Personnel Information System (use correct UML notations) .

b) Identify object-oriented concept violations that includes abstraction, encapsulation, information hiding. Also, identify any modularity issues including content coupling, common coupling, control coupling and stamp coupling situations in the code. (Clearly indicate the code segments that show above coupling situation) .

c) Explain how you would fix object-oriented concept violations and modularity issues Then, refactor the code to remove above object-oriented concept violations, common coupling, control coupling, and content coupling. Objective of the refactoring is to remove above violations but not to remove any intended functionality of the system

Final Submission Instructions

Use HW5 submission template given.