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Software Engineering I (CS 561)

Exam 2

Part I – True / False, circle T for true or F for false. Statements are intended to have one answer. Evaluate truth based upon the material covered in this class (20 points, 2 points per question).

1. T F A modal dialog must be closed or dismissed before interacting with another part of a user interface.

2. T F Abstraction-Occurrence, General Hierarchy, and Adapter are all design patterns.

3. T F Composition is a strong form of aggregation in which objects that are part of the composition are destroyed when the aggregate is destroyed.

4. T F Aggregations may be represented as associations.

5. T F Associations may sometimes be represented as aggregations.

6. T F The Delegation design pattern utilizes methods from pre-existing classes within new classes.

7. T F Heuristic evaluations are part of usability inspections.

8. T F Usability guidelines include using consistent fonts, colors, and font size throughout a user interface.

9. T F An immutable object is one whose state never changes after creation, such as a Java string.

10. T F The Factory design pattern is one that allows for a reusable framework to create multiple application dependent objects that are typically of the same type for a specific application.

Part II – Short and long answer questions (80 points).

1. Describe the context, problem, and solution for the Read-Only Interface design pattern (5 points).
2. Create a UML diagram for a Student interface and a class MutableStudent that has a name, ssn, and date of birth and implements Person. Assign proper methods to the class and interface assuming an implementation of the Read-Only Interface design pattern. Draw UML diagrams for additional classes Registrar and StudentRegistrationViewer that are associated with MutableStudent and Student, respectively. Use appropriate multiplicities with your associations (15 points).
3. List and describe five usability principles/guidelines (10 points).
4. Create a UML diagram for the following situation starting with a Building class. Assume that a Building contains one or more Rooms, represented by a class, and Rooms contain zero or more pieces of Equipment (also represented by a class). There are many types of equipment including ComputerEquipment and Furniture. Note that when a Building is destroyed, its rooms are destroyed. When a room is destroyed the equipment is not (10 points).
5. Describe the differences between associations, aggregations, and compositions (6 points).
6. List and describe the four aspects of usability (8 points).
7. Assume you are using Java and have a LinkedList class implemented with methods addFirst(…), addLast(…), addAfter(…), removeFirst(), removeLast(), delete(…), and isEmpty(). You would like to create a Stack class based upon the LinkedList class. Draw a UML diagrams for both the LinkedList and Stack classes indicating with linkage in UML how a Stack class with methods push(…), pop(), and isEmpty() could make use of the LinkedList class. Describe what design pattern this problem represents, and provide code for the push(…), pop(), and isEmpty() methods from the Stack class assuming you are making use of methods from the LinkedList class (15 points).
8. List and describe the three types of domain models (6 points).
9. Assume you are designing a crew check-in system for an airline. Federal law limits the number of hours aircrews may work, especially pilots. Determine a central use case for this system (5 points).