

CS3733-D05 Final Exam

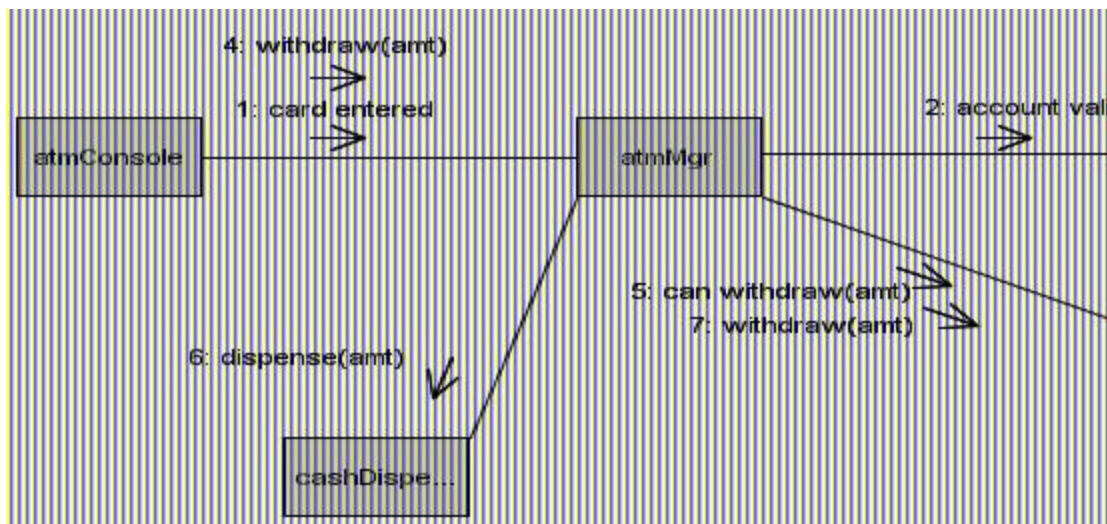
Name:

Remember that there is a code of academic honesty at WPI and you are expected to do your own work. Good luck.

1. (5) What is the purpose of the Entity class in creating an analysis model?
The entity class represents persistent objects.
2. (5) You have a subsystem that consists of multiple classes, making it hard to use. Additionally, the implementation of many of the classes is likely to change, but the interfaces are stable. You want to make it easy for the users of this subsystem to work with it. What design pattern might you apply to facilitate this?
Facade pattern.
3. (6) Name three parts (sections) that you might find in a design pattern description and state the purpose of each section.
Any three of: Name, Synopsis, Context, Forces, Solution, Consequences, Examples.
4. (6) What are the three sections of CRC cards and what do you put into each?
 - **Class: Class name**
 - **Responsibilities: those things the class is responsible for**
 - **Collaborators: those classes the class must collaborate with to perform its responsibilities.**
5. (5) Which UML diagram do you use to show the interaction of objects in a specific scenario?
Sequence diagram.
6. (3) Which one of the following is not a goal of a description of a development process according to Parnas and Clements?
 - a. What criteria must that work product satisfy?
 - b. What kind of persons should do the work?
 - c. **What documentation must be produced?**
 - d. What product we should work on next?
7. (7) In one or two sentences, say why it is important for the customer to write the acceptance tests.
Since the customer is the one who writes the requirements, the customer knows best what the system must do. Also, the customer is the one who will finally accept the system. Therefore, the customer should specify the acceptance tests. Also, the customer can use acceptance tests to further elaborate upon the user stories.
8. (3) According to the textbook, which one of the following is absolutely necessary to let you refactor your code fearlessly?
 - a. Thorough knowledge of the complete code base.
 - b. **A comprehensive set of unit tests**

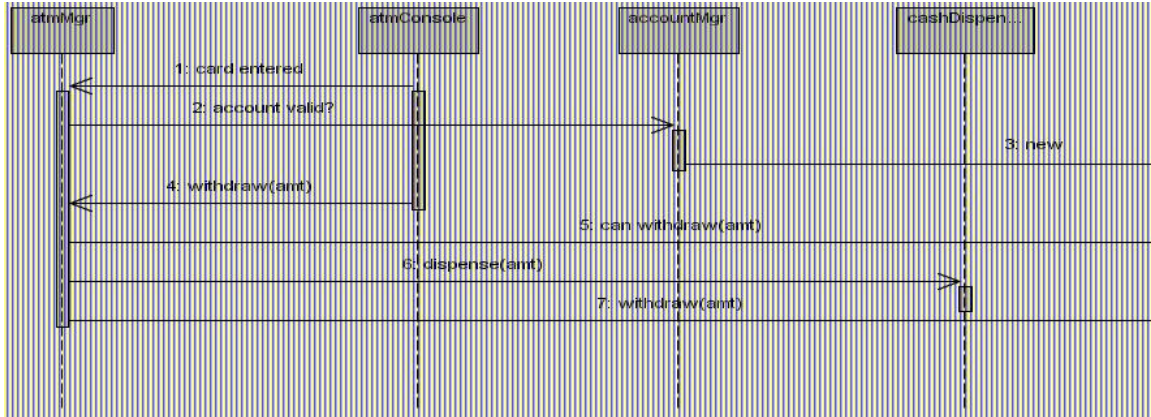
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- c. Thorough knowledge of the code you are working on
 - d. A comprehensive set of system acceptance tests
9. (5) What is the difference between system (acceptance) testing and integration testing?
- System testing is performed to ensure that the whole system meets the requirements specified in all of the user stories and / or use cases, as well as other non-functional requirements. Integration testing is done to ensure that the different components, or subsystems, actually work (at all) when they are combined in a build of the system. The integration tests are not as extensive as system tests, but are used to make sure that you can build a system that works.
10. (10) What is the Observer design pattern?
- The Observer design pattern lets one class know when a change is made to the state of another class. It lets this dependence be **dynamically** specified at run time.
11. (15) Turn the following diagram into an equivalent sequence diagram.



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Solution (activation rectangles are not needed):



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12. (20) Perform a textual analysis on the following text. What are all of the possible classes? What are the classes that you might keep in your design to implement a library management system and what are the operations (methods) that you would assign to each?

The member enters the library and selects one or more book, magazine, video, or audio item. The member takes the publications to the front desk and presents his or her library card to the librarian, along with the publications. The librarian validates that the member is a member in good standing and for each publication, the librarian scans the bar code, determining the due date. The librarian then stamps the book with the due date and gives the publications to the member who leaves. For each bar code scanned, the library system records the publication, member ID, and due date.

Class	Methods	Keep
Member	selectPublications (or checkout)	Actor
Library (or LibrarySystem)	validateMember checkoutPublication	Yes
Book		Yes (subclass)
Magazine		Yes (subclass)
Video		Yes (subclass)
Audio		Yes (subclass)
Publication	checkout getDueDate	Yes
FrontDesk		No
LibraryCard		Yes
Librarian		Actor
BarCode	readBarCode	Yes
DueDate		Yes
MemberID		Yes

The parts above that are in yellow are optional. You might keep the subclass or not. Many of the methods one might want to put in, or infer from the text are not really specified there so, if they add methods, it's not necessarily wrong. They should have all of the classes here. Take 1 pt. off for each class they are missing. However, if they don't have Magazine, Video, Audio, or Book, but have Publication, that's okay.