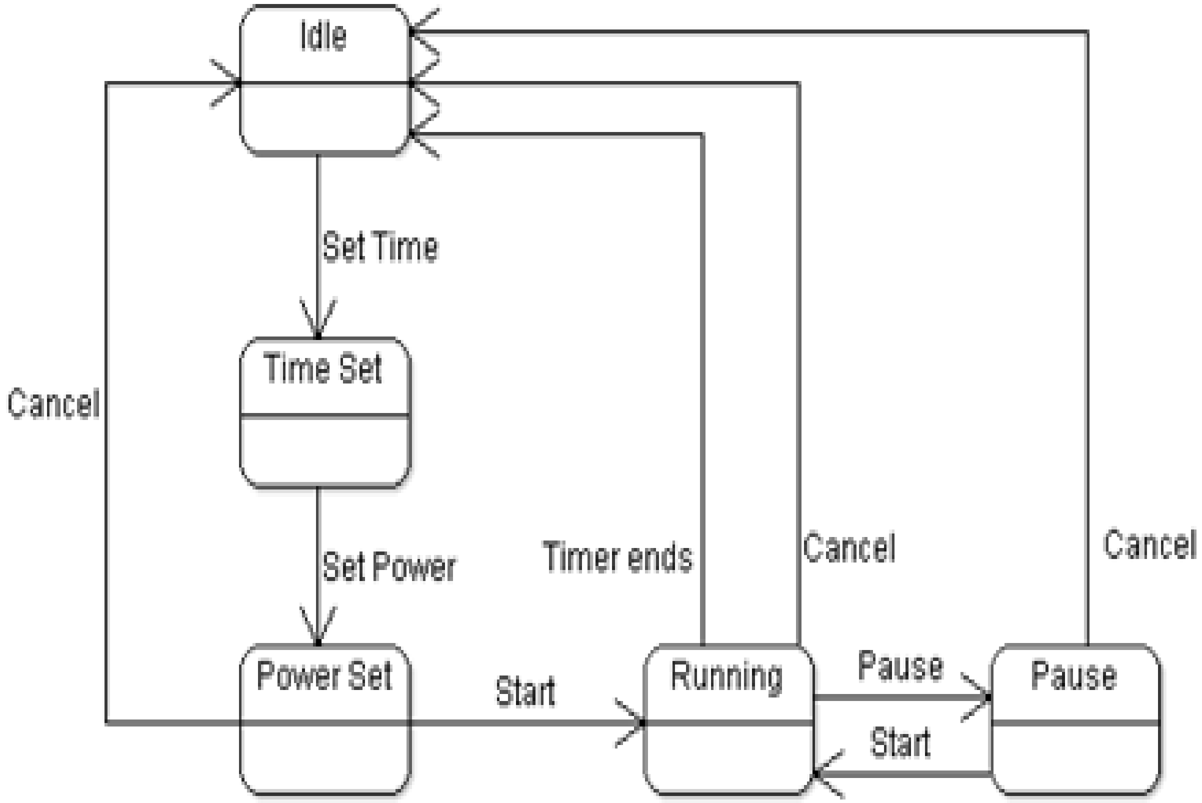
Lecture #16– Exam #2 Review

- Quiz-answer review
- Questions

Exam #2 Review

1. Create a state diagram for an object class the controls a microwave oven. The oven has the following buttons: set time, set power, start, pause, and cancel. Set time must be selected first and then set power must be chosen before start. Pause can be selected after start to temporarily stop the oven. Start must be pressed to resume the oven if it is in the pause state. The expiration of the timer turns off the oven and returns it to the idle state. Cancel may be selected at any time to stop the oven and return it to the idle state. Assume the initial state is “Idle” and the initial trigger event is “set time”. Be sure to use proper notation and labeling, especially for transitions.

Exam #2 Review



Exam #2 Review

- What is the value of doing unit testing?

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- Unit testing identifies bugs early as it can be much more complex and therefore expensive later, forces you to read the code more which can directly impact code design by identifying issues, helps automate tests which helps maintainability and extensibility

Exam #2 Review

- Describe an integration testing approach.

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- Top down, bottom up, or sandwich based on the use of test drivers and/or test stubs

Exam #2 Review

- Highlight the items that describe high order testing approaches.
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  - System testing
  - Stress testing
  - Performance testing
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Exam #2 Review

- Highlight the items that are **not** approaches to debugging? (2 pts)
  - Backtracking
  - Brute force
  - Cause elimination
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- unittest supports:
- test automation,
- sharing of setup and shutdown code for tests
- aggregation of tests into collections
- independence of the tests from the reporting framework
- etc.
- The unittest module provides classes that make it easy to support these qualities for a set of tests.

Exam #2 Review

- Match the following types of testing to their definitions – place **one** letter for each definition (2 pts):
  - System Testing
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  - Recovery Testing
- c
- Put modules together, try to get them working-Integration Testing
- b
- Testing against user needs-Acceptance Testing
- a
- Black-box testing of entire deliverable against specs-System Testing

Exam #2 Review

- What is the purpose of regression testing **and** how is it performed? (4 pts)

Exam #2 Review

- What is the purpose of regression testing **and** how is it performed?
- Regression testing helps to ensure that changes (due to testing or for other reasons) do not introduce unintended behavior or additional errors.
- Whenever software is corrected, some aspect of the software configuration (the program, its documentation, or the data that support it) is changed.
- Regression testing may be conducted manually, by re-executing a subset of all test cases or using automated capture/playback tools.

Exam #2 Review

- In your own words describe what a design pattern is.

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- A design pattern is a proven solution to a design problem within a given context and requirements or constraints known as system forces.

Exam #2 Review

- Highlight any statements that are NOT benefits of conducting reviews of design and code artifacts beyond finding errors?
  - Other developers become familiar with the material.
  - Promotes uniformity of design and coding practices on the project.
  - Allows supervisors to determine who are the better designers and programmers
  - Clears up any miscommunication and misunderstanding.
  - Provides a welcome break from programming.
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- Producer/Author – person who has developed the work product to be reviewed
- Leader/Moderator – determines that the material is read for a review, copies and distributes the material to reviewers, runs the review meeting.
- Reviewers/Inspectors – pre-read the material to prepare for the review meeting, and provide review comments
- Reader (may be the author) – reads through the artifact
- Recorder/Scribe – takes notes during the review

Exam #2 Review

- What is the purpose of applying the façade pattern?

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-
- The façade pattern helps when you need to simplify the view that programmers have of a complex package. This makes it much easier for the programmer to deal with the package and reduces the number of classes they need to interact with.

Exam #2 Review

- What is the purpose of applying the factory method pattern?

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- Factory Method is to creating objects as Template Method is to implementing an algorithm. A superclass specifies all standard and generic behavior (using pure virtual "placeholders" for creation steps), and then delegates the creation details to subclasses that are supplied by the client.
- Factory Method makes a design more customizable and only a little more complicated. Other design patterns require new classes, whereas Factory Method only requires a new operation.

Exam #2 Review

- What is the purpose of applying the strategy pattern?

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- Define a family of algorithms, encapsulate each one, and make them interchangeable. Strategy lets the algorithm vary independently from the clients that use it.
- Capture the abstraction in an interface, bury implementation details in derived classes.

Exam #2 Review

- What is the purpose of applying the Adapter pattern?

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- Convert the interface of a class into another interface clients expect. Adapter lets classes work together that couldn't otherwise because of incompatible interfaces.
- Wrap an existing class with a new interface.
- Impedance match an old component to a new system

Exam #2 Review

- What is the purpose of applying the Decorator/Wrapper pattern?

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- Attach additional responsibilities to an object dynamically. Decorators provide a flexible alternative to subclassing for extending functionality.
- Client-specified embellishment of a core object by recursively wrapping it.
- Wrapping a gift, putting it in a box, and wrapping the box.

Exam #2 Review

- What general problem does the observer pattern address?

Exam #2 Review

Using the information contained in the class diagram below, construct a simple **sequence diagram** to depict the interactions corresponding to a *Course Registration* process. Making sure to use proper notation, account for all elements of a sequence diagram and label them appropriately. Assume: a) authentication has already taken place; b) Actor needs only **one** interaction with the system to request registration; c) The Registration class does **not** exist at the beginning of the sequence; d) Once Registration is created it is the one calling add methods. If need be also describe any/your additional assumptions.

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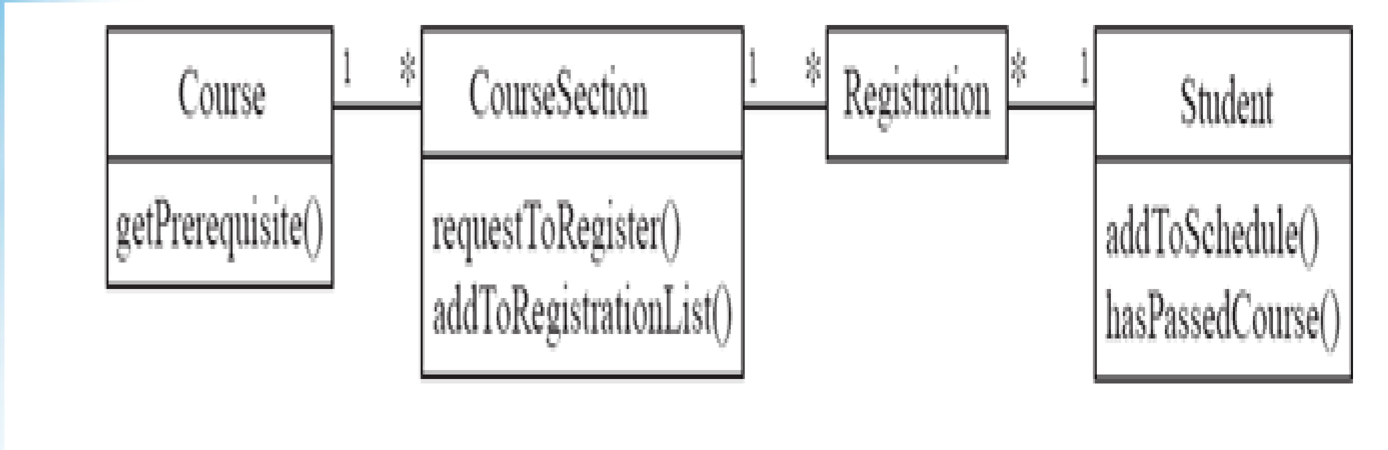

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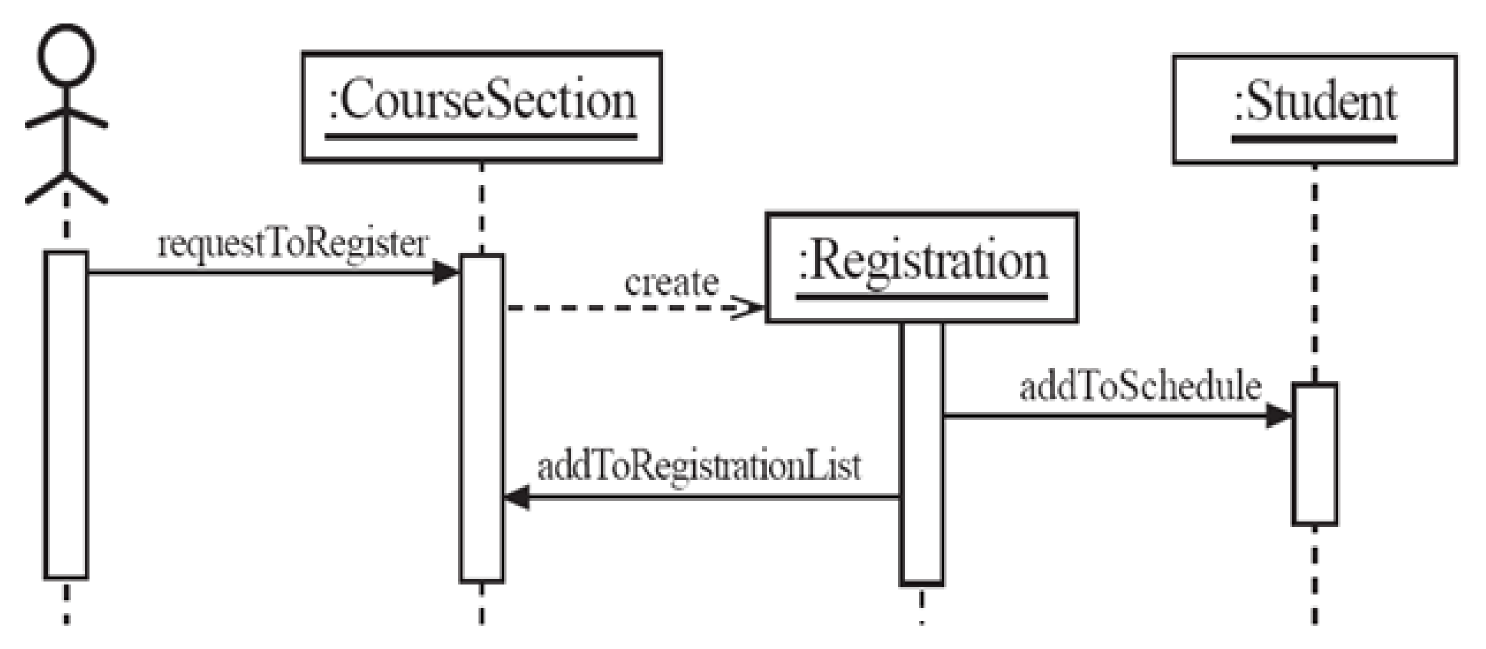

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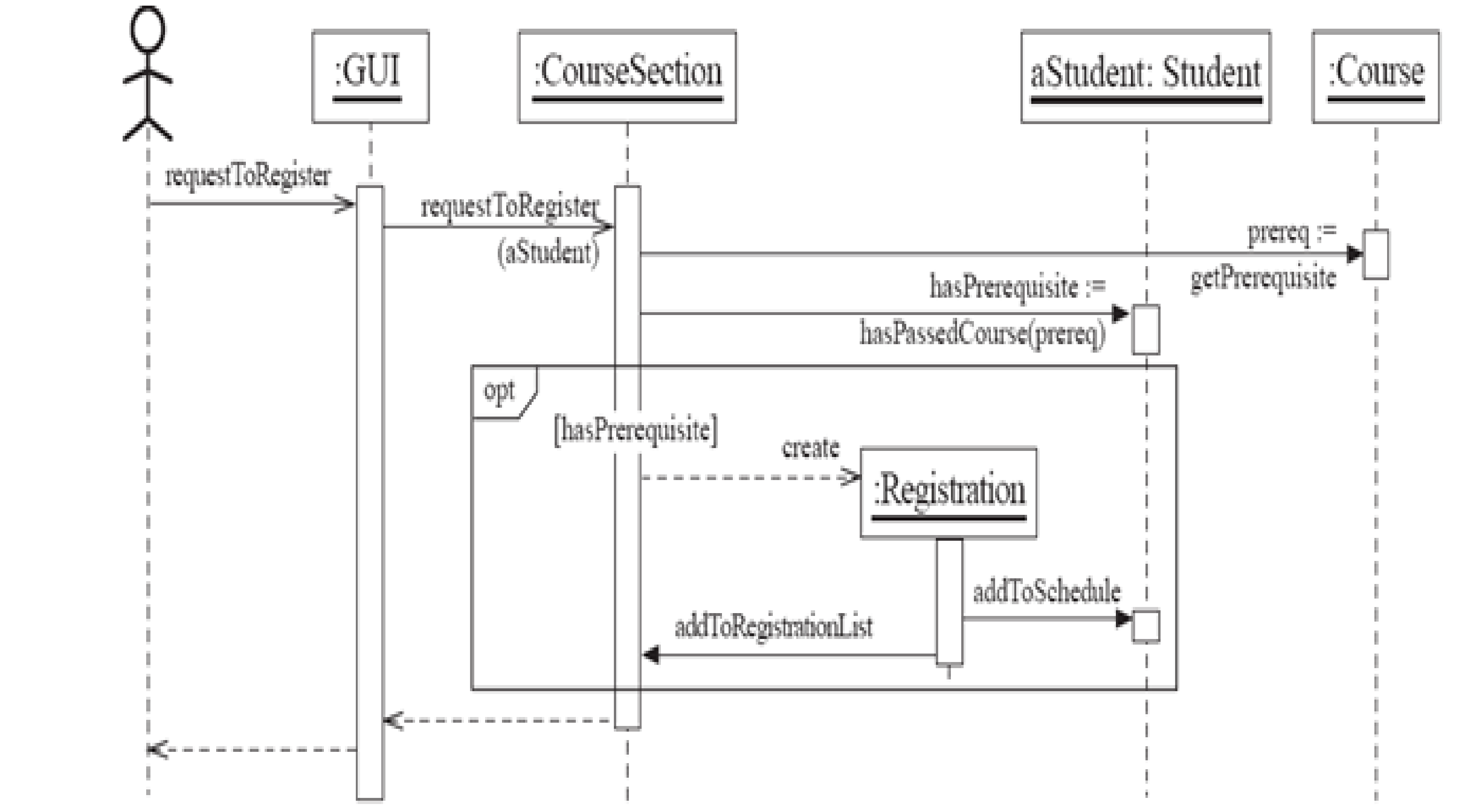

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- In the context of this course, what is an equivalence class and what is the **main** motivation for using them (1-2 sentences)?

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- An equivalence class is a group of possible inputs that will be treated similarly by all algorithms.
- We use equivalence classes because:
- It is inappropriate to test by *brute force*, using *every possible* input value because:
- - Takes a huge amount of time
- - Is impractical
- - Is pointless

Exam #2 Review

- Jane has written a stove simulation where a user must enter one of three string heat intensity values “high”, “medium” and “low”. Once the user enters the heat intensity, the simulation displays how long it took to boil a 2 quart pot of water.
  - Identify the four equivalence classes to be tested

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  - Identify the four equivalence classes to be tested
-
- [“high”] [“medium”] [“low”] [all other strings]
-
- usually give a ½ pt by quoting “any answer is a string” …

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- If the input to the system had been numeric rather than strings, what other “special” inputs would you have tried in order to uncover issues?

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- -1, 0, a very large positive number and very large negative number