Rose-Hulman Institute of Technology

University of Wisconsin–Madison | Department of Computer Sciences
Human-Computer Interaction Laboratory

Milestone 4

Trey Cahill Katie Greenwald Samad Jawaid Kevin Risden

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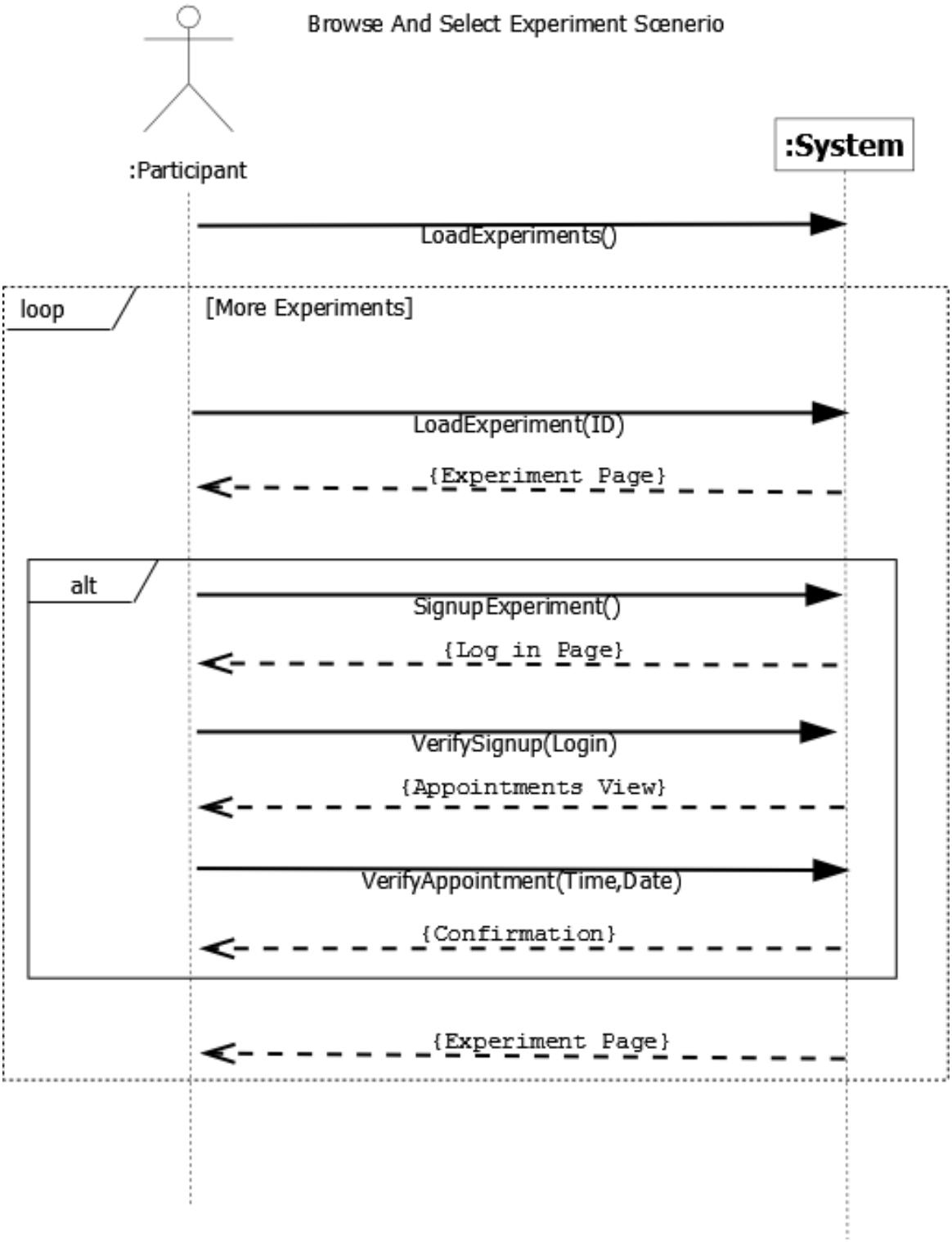
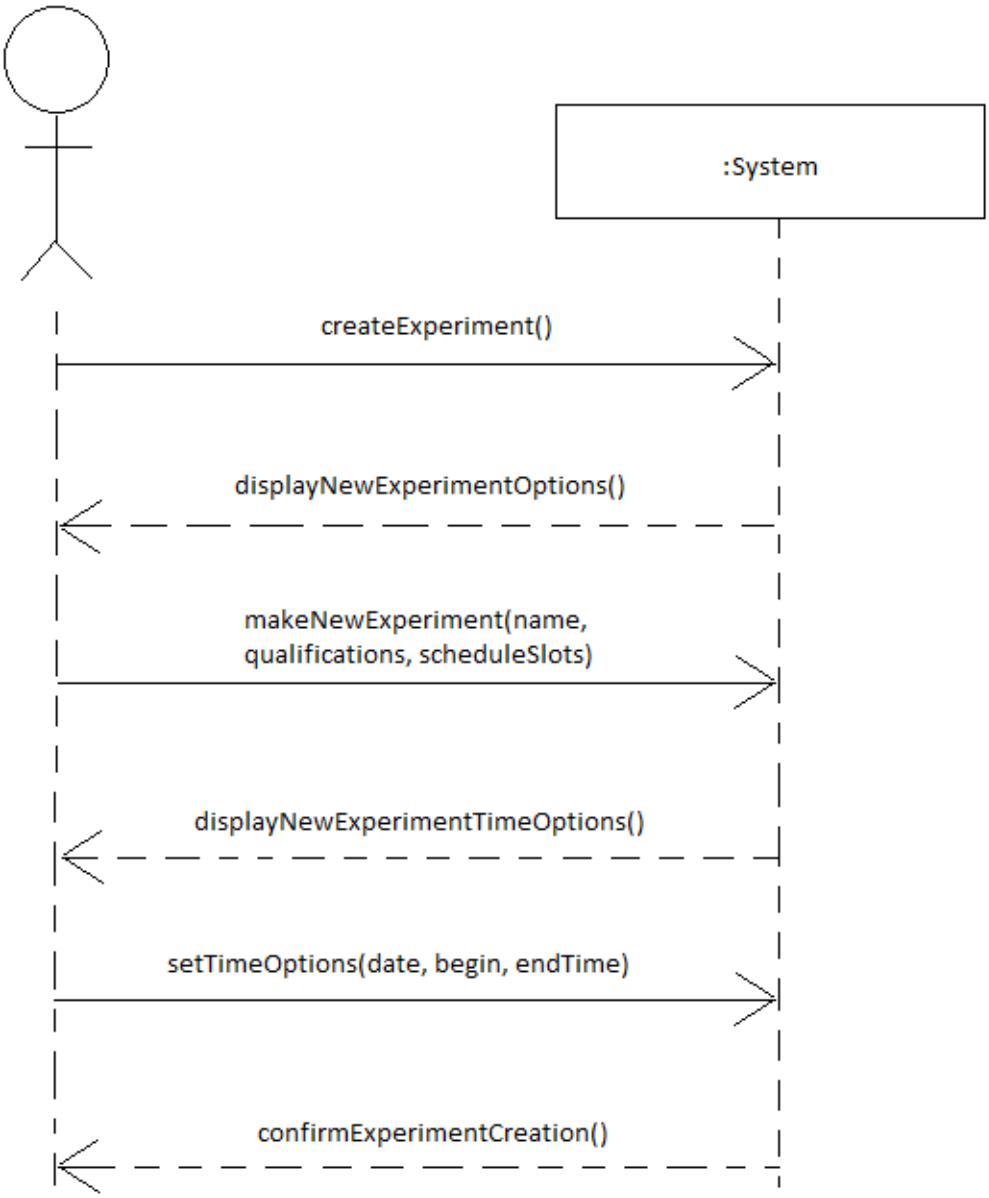
Contents

1 System Sequence Diagrams

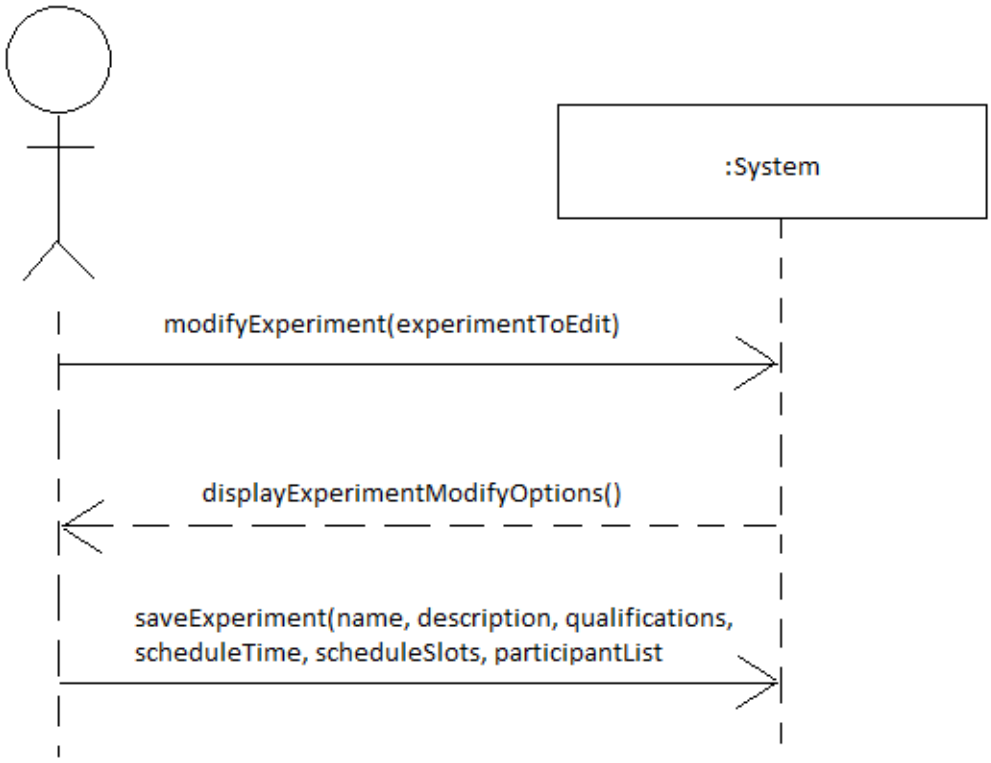
1.1 Browse and Select Experiment



1.2 Create Experiment



1.3 Modify Experiment



2 Operations Contracts

This section provides operation contracts for vital operations.

2.1 CreateExperiment

Operation:	CreateExperiment()
Cross References:	Uses Cases: Add Experiment
Preconditions	User is an Administrator and/or a Researcher and has authenticated
Postconditions:	Experiment object will have been created, or an error message will have been displayed

2.2 ModifyExperiment

Operation:	ModifyExperiment(ID)
Cross References:	Uses Cases: Modify Experiment
Preconditions	User is an Administrator and/or a Researcher and has authenticated
Postconditions:	The experiment object will have its fields modified, will have been deleted, or an error message will ha

2.3 LoadExperiments

Operation:	LoadExperiments()
Cross References:	Uses Cases: Select Experiment
Preconditions	The participant has loaded the web page.
Postconditions:	Experiments collection was created (instance creation)

2.4 LoadExperiment

Operation:	LoadExperiment(ID)
Cross References:	Uses Cases: Select Experiment
Preconditions	The participant as clicked on an experiment.
Postconditions:	Experiment was created (instance creation)
	Experiment attributes was loaded into the web page

2.5 Sign Up Experiment

Operation:	SignupExperiment()
Cross References:	Uses Cases: Sign up for Experiment
Preconditions	The participant has clicked on an experiment to sign up for
Postconditions:	LogIn was created (instance creation)
	LogIn.logged became loggedIn (attribute modification)

2.6 Verify Sign up

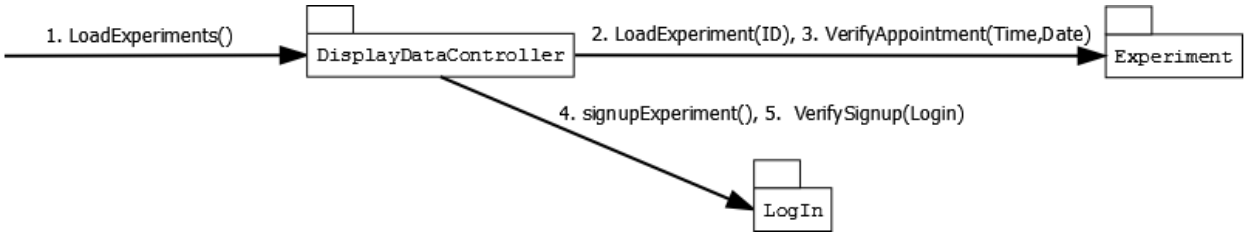
Operation:	VerifySignup(Login)
Cross References:	Uses Cases: Sign up for Experiment
Preconditions	The participant has logged into or created an account
Postconditions:	this.hasConflict is set to false (attribute modification)

2.7 Verify Appointment

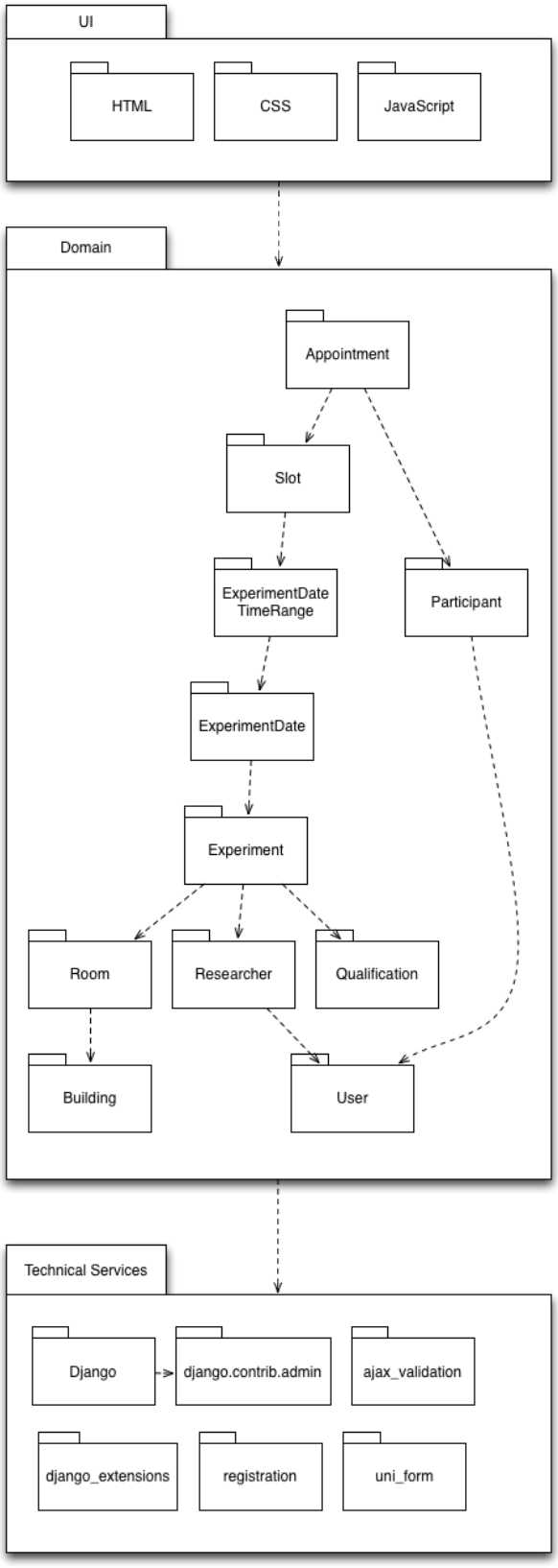
Operation:	VerifyAppointment(Time,Date)
Cross References:	Uses Cases: Sign up for Experiment
Preconditions	The participant has selected a time and date slot.
Postconditions:	experiment.slots has been modified (attribute modification)
	Database is updated

3 Interaction Diagrams

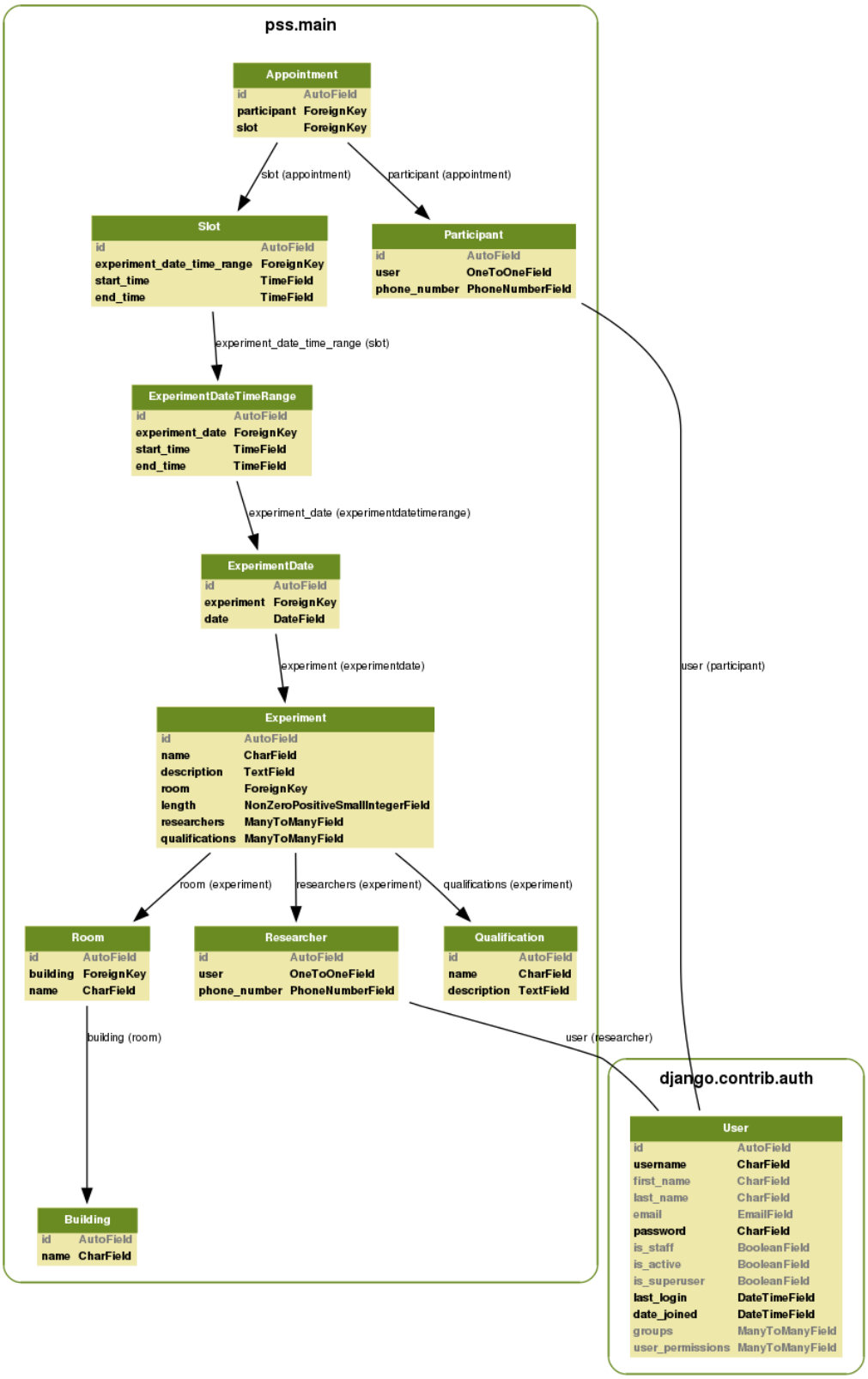
3.1 Sign Up For Experiment



4 Package Diagram



5 Class Diagram



6 GRASP Principles

6.1 Creator

6.2 Info Expert

6.3 Controller

6.4 High Cohesion

High cohesion is achived in many parts of our code, but an example of where cohesion is extremely strong is in the Administration code. All of our Administration procedures, fields, responsiblities, and all similar objects are located in the administration package, specifically in the django.contrib.admin package as seen in the package diagram in section 4 of this document. By having administration as its own package, it leaves other administration tasks out of other unrelated classes in our system.

6.5 Low Coupling

By seperating out objects and responiblities into our their own packages, we achive a fairly low coupling. Each seperate package contains a resonibility and is conntected only to the classes to which must be connected. Our class diagram in section 5, shows how our classes interact with each other and also shows that each class is used only by a class that needs its information. For example, Qualification is only connected to Experiment; if could possibly be connected to participant, but because you will not be able to completely verify the particiapants qualifications until they show up for the experiment, there is no need to make the connection between Participant and Qualifications.

6.6 Pure Fabrication

Pure Fabrication becomes uses in our system by creating ExperimentDateTimeRange and ExperimentDate. Neither of these two classes are in the domain model, but since they make the code easier to work with and seperate out responsiblity, increasing cohesion, they become very useful as classes. Should we not have these two classes Slot or Experiment would have to contain this information, which would decrease cohesion and generally add to the complexity of the Slot or Experiment or both.

6.7 Indirection

The GRASP principle indirection directly relates to our system for how we need to represent experiment dates and the experiment datetime ranges. An experiment must keep track of the dates and time slots for each day that it is offered. We decided that having two intermediate classes, ExperimentDate and ExperimentDateTimeRange, would reduce coupling and ensure easier maintainability of the system. The ExperimentDate class keeps track of the slots that the ExperimentDateTimeRange can generate. This enables the user to enter a time range and the system will then calculate the specific time slots. The Experiment class just has to have the ExperimentDates. This makes the coupling of time slots to experiments cleaner. An alternative would be for the experiment to have a massive list of all the dates and slots that it is offered. This would make it difficult to add or remove slots later and not know which slots are current filled participants.

6.8 Polymorphism

Currently, the Participant Scheduling System requires both researchers and participants. In order to accomplish this, a User class was introduced to provide a standard base class and then the Researcher class was derived from this. This provides our solution with the polymorphism GRASP principle. The other option was to create two separate classes for researcher and user, but then there would be duplicated code. Furthermore, if there needs to be another type of user then it will be simpler to just extend the current User class.

6.9 Protected Variation

In our system, protected variation builds off our decision for polymorphism. The User class enables the protected variation GRASP principle since it protects us from changes in the type of users who need to use the system. If the client comes back with a request for another type of user besides participant and researcher, the system is setup to handle this by just extending the User class. This provides the most elegant solution to the problem since the other option would have been to create the different user classes separately and would make it difficult to extend later.

7 References

8 Appendix