

Fall 2015: ITI 202: Object-Oriented Programming

http://comminfo.rutgers.edu/~chirags/teaching/2015_fall/ITI202/

Class meetings: Monday & Wednesday, 4:30-5:50pm, [CI-119](#).

Instructor: [Dr. Chirag Shah](#)

Email: chirags@rutgers.edu

Phone: (848) 932-8807

Office: Room 302 in [SC&I](#)

Office hours: Monday and Wednesday 3-4:30pm, or by appointment

Teaching assistant: Dongho Choi

Email: dongho.j.choi@gmail.com

Phone: (848) 932-8763

Office: Room 303 (InfoSeeking Lab) in [SC&I](#)

Office hours: Tuesday and Thursday 3-5pm, or by appointment

Course Description

This course introduces students to the principles of object-oriented analysis, design and programming. The focus is on developing creative thinking for analyzing a problem domain and designing a solution, and on using the Java programming language to implement it. Analysis, design and construction of programs will be discussed and the basic skills of writing, testing and debugging will be emphasized.

Prerequisites

[ITI 201: Introduction to Computer Concepts](#)

Course Materials

The primary book for this course will be Java Concepts by Cay S. Horstmann: 5th or 6th edition. We will use Eclipse IDE as the main software tool to write and run Java programs. See [resources](#) page for more details.

Learning Objectives

By the end of the course, students should be able to:

- Apply critical thinking to analyze the requirements of a simple application and build a model of the problem;
- Use the Unified Modeling Language (UML) and object-oriented design principles to develop a conceptual solution;
- Use the Java programming language to implement the designed solution;
- Use visual programming tools to sketch and build simple user interfaces;
- Apply testing and debugging to ensure the correctness and efficiency of the application.

Instructional Methods

Programming is as much an art as it is a science. Part of the practice of programming in any language is to internalize how a programming language works and to acquire enough experience with that language to avoid common pitfalls. To that end the class will be taught as a mixture of lecture, discussion and lab, in an effort to provide an accelerated path to experience. Students will program in class in teams together. Occasionally, teams will swap code, in order to understand the utility of writing clear code and the challenge of working with code written by others. The first several weeks of class will be spent learning the syntax of Java and the use of basic tools used to create and correct programs. After this, parts of the Java libraries will be introduced as well as a focus on parts of Java that organize larger blocks of code such as abstraction and interfaces. Depending on how quickly this material is covered and the problems encountered along the way, we will also discuss generics, GUI programming, profiling, craftsmanship, techniques common to large programming projects, and other topics that are of interest to the class.

Topics

- Introduction to object-oriented programming; contrast to procedural programming
- Algorithms and flow-charts
- Writing, compiling, running, and debugging Java programs
- Data types
- Decision-making
- Arithmetic, logical, and Boolean operators
- Iterations and loops
- Arrays
- Method calls
- Designing and deriving classes
- Interfaces and code reuse
- Polymorphism
- Inheritance
- Input-output and file handling
- Exception (error) handling
- Graphical User Interface (GUI) and Applets

Full syllabus is available through [Sakai](#).

Assignments (Labs), Quizzes, and Project

There will be an assignment at the end of almost every class, which will be due later in the day. A total of 5 quizzes will be administered during the semester. Each quiz will be given in the beginning of a class as listed on the [schedule](#). Each student will choose a personal project for the mid-term examination. This project will be converted into a group project and advanced further for the final project submission.

Course Assessment

Grading is based on assignments (lab exercises), quizzes, etc. as well as class participation. Course grades are assigned according to the following:

- A (91-100%): Outstanding and excellent work of the highest standard, mastery of the topic, evidence of clear thinking, good writing, work submitted on time, well organized and polished.
- B+ (85-90%): Very good work, substantially better than the minimum standard, very good knowledge of the topic; error free.
- B (80-84%): Good work, better than the minimum standard, good knowledge of the topic.
- C+ (74-79%): Minimum standard work, adequate knowledge of the topic.
- C (70-73%): Work barely meeting the minimum standard, barely adequate knowledge of the topic; errors.
- D (65-69%): Writing not up to standard, disorganized, many errors.
- F (< 65%): Unacceptable, inadequate work.
- T Temporary.

The final grade will be weighted based on the following: Labs: 50%, Quizzes: 20%, Mid-term project: 10%, Final project: 15%, Class participation: 5% (see below for the rubric)

Course Policies

Announcements: Students are responsible for all announcements made in class, whether or not they are present when the announcements are made.

Late submissions: Deadlines are your responsibility. Late submissions may be accepted with a penalty. In the case of unforeseen emergencies (e.g. with a doctor's note), or with a prior permission from the instructor (obtained before the due date), late submissions will be graded normally. Late submissions will not receive any verbal or written feedback.

Communication: For emails, Rutgers accounts preferred. Always include your name (esp. if emailing from non-Rutgers account) and always include the course number (ITI 202) in subject line. If you don't, your email most likely will not be read. This course uses [Sakai](#), primarily for submitting assignments and posting grades. Speaking of communication, please turn off or silent your cellphones and anything that can spontaneously make noise before entering the class.

Attendance: Students are expected to attend all classes. If you expect to miss one or two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to me. Note that class participation accounts for 5% of the final grade (see the grading policy above). You are responsible for obtaining any material that might have been distributed in class the day when you were absent.

Academic Integrity

Academic integrity means, among other things:

- Develop and write all of your own assignments.

- Show in detail where the materials you use in your papers come from. Create citations whether you are paraphrasing authors or quoting them directly. Be sure always to show source and page number within the assignment and include a bibliography in the back.
- Do not look over at the exams of others or use electronic equipment such as cell phones or MP3 players during exams.
- Do not fabricate information or citations in your work.
- Do not facilitate academic dishonesty for another student by allowing your own work to be submitted by others.

If you are doubtful about any issue related to plagiarism or scholastic dishonesty, please discuss it with the instructor. At the instructor's discretion, work presented in this course is subject to verification of originality, using www.turnitin.com.

The consequences of scholastic dishonesty are very serious. Rutgers' academic integrity policy is at [this site](#). An overview of this policy may be found [here](#). Multimedia presentations about academic integrity may be found [here](#) and [here](#).

How to Succeed in this Course

- Successful students will attend class regularly. If you know you must miss a class, please contact the instructor in advance, either by phone or email. You can obtain assignments or notes from a fellow classmate or from the instructor. In the case of a prolonged absence from class, you should schedule an appointment with the instructor so we can discuss the course material and concepts that you missed.
- Successful students will pay close attention to the course goals and objectives, because they will help you master the course material. If you have any questions about any of the objectives, please ask the instructor. Questions are encouraged during class for clarification. Remember that you're probably not the only one in the class with the same question. If you have questions about material from previous classes, please email me prior to the next class session, and I'll address your question at the beginning of the class session, prior to any quizzes.
- Successful students will talk to their classmates about the course material. You will find that they can help you understand many complex issues.
- Successful students will come prepared to the class with assigned readings for that class. This will help you comprehend the material for that class better. Regular assignments will also be given at the end of each class. Doing these assignments and turning them on time (typically before the next class), will help you obtain higher-order learning goals for this course.

Professionalism

- 1 Access the class material promptly and on time.
- 2 Respect yourself, classmates, and the instructor.
- 3 Participate in class discussions.
- 4 Display preparedness for class through completing reading assignments.
- 5 Present content knowledgeably with supported reasoning.

Class Attendance/Participation Rubric

Criteria	Unsatisfactory-Beginning	Developing	Accomplished	Exemplary	Total
Attendance	0-16 points	17-19 points	20-22 points	23-25 points	/25
	3 or more unexcused absences	2 unexcused absences	1 unexcused absence	Attended all class sessions or received approval for all necessary absences	
Frequency	0-16 points	17-19 points	20-22 points	23-25 points	/25
	Student does not initiate contribution & needs instructor to solicit input.	Student initiates contribution at least in half of the class sessions	Student initiates contribution once in each recitation.	Student initiates contributions more than once in each class session.	
Quality	0-16 points	17-19 points	20-22 points	23-25 points	/25
	Comments are uninformative, lacking in appropriate terminology. Heavy reliance on opinion & personal taste, e.g., "I love it", "I hate it", "It's bad" etc.	Comments are sometimes constructive, with occasional signs of insight. Student does not use appropriate terminology; comments not always relevant to the discussion.	Comments mostly insightful & constructive; mostly uses appropriate terminology. Occasionally comments are too general or not relevant to the discussion.	Comments always insightful & constructive; uses appropriate terminology. Comments balanced between general impressions, opinions & specific, thoughtful criticisms or contributions.	
Listening	0-16 points	17-19 points	20-22 points	23-25 points	/25
	Does not listen to others; regularly talks while others speak or does not pay attention while others speak; detracts from discussion; sleeps, etc.	Student is often inattentive and needs reminder of focus of class. Occasionally makes disruptive comments while others are speaking.	Student is mostly attentive when others present ideas, materials, as indicated by comments that reflect & build on others' remarks.	Student listens attentively when others present materials, perspectives, as indicated by comments that build on others' remarks, i.e., student hears what others say & contributes to the dialogue.	
				TOTAL	/100

Schedule

#	Day	Topics and Activities	Before the class	After the class
1.	Wed, Sept. 2	<ul style="list-style-type: none"> • Introduction to the course • Administrivia • Objects and object-oriented programming • Quiz-0 • "Hello,world!" program 	<ul style="list-style-type: none"> • Setup your computer to run Java. See the resources page.	<ul style="list-style-type: none"> • Get access to the Horstmann book. • Verify and prepare your computer for Java. • Lab-1
2.	Tue, Sept. 8	<ul style="list-style-type: none"> • Algorithms and flow-charts • Writing, compiling, running, and debugging a program 	<ul style="list-style-type: none"> • Prepare your work environment on your machine (install and setup Eclipse) 	<ul style="list-style-type: none"> • Lab-2
3.	Wed, Sept. 9	<ul style="list-style-type: none"> • Basic data types • Decision-making • Procedural vs. object-oriented programming 	<ul style="list-style-type: none"> • Setup and get familiarized with Eclipse. 	<ul style="list-style-type: none"> • Lab-3
4.	Mon, Sept. 14	<ul style="list-style-type: none"> • Boolean operators • Loops 	<ul style="list-style-type: none"> • Read chapter-1, and sections 2.1-2.3. 	<ul style="list-style-type: none"> • Lab-4
5.	Wed, Sept. 16	<ul style="list-style-type: none"> • Arrays • Method calls • Revisiting objects and classes 	<ul style="list-style-type: none"> • Read sections 5.1, 5.4, 6.1-6.3. 	<ul style="list-style-type: none"> • Lab-5 • Review the material so far
6.	Mon, Sept. 21	<ul style="list-style-type: none"> • Quiz-1 • More on arrays • Designing functions 	<ul style="list-style-type: none"> • Read section 7.1. • Be prepared for the quiz. 	<ul style="list-style-type: none"> • Lab-6
7.	Wed, Sept. 23	<ul style="list-style-type: none"> • Review • Multi-dimensional arrays 	<ul style="list-style-type: none"> • Read sections 7.4-7.6.6 (other than ArrayLists) 	<ul style="list-style-type: none"> • Lab-7
8.	Mon, Sept. 28	<ul style="list-style-type: none"> • Designing classes-1 	<ul style="list-style-type: none"> • Read sections 8.1, 8.6, 8.7, 8.8. 	<ul style="list-style-type: none"> • Lab-8
9.	Wed, Sept. 30	<ul style="list-style-type: none"> • Designing classes-2 	<ul style="list-style-type: none"> • Read sections 8.2, 8.9. 	<ul style="list-style-type: none"> • Lab-9 • Review the material so far
10.	Mon, Oct. 5	<ul style="list-style-type: none"> • Quiz-2 • Input-output 	<ul style="list-style-type: none"> • Be prepared for the quiz. 	<ul style="list-style-type: none"> • Lab-10
11.	Wed, Oct. 7	<ul style="list-style-type: none"> • Review • Input-output with files 	<ul style="list-style-type: none"> • Read section 4.6. 	<ul style="list-style-type: none"> • Lab-11
12.	Mon, Oct. 12	<ul style="list-style-type: none"> • Handling command-line arguments • Exception handling • Debugging 	<ul style="list-style-type: none"> • Read sections 11.1 and 11.2. 	<ul style="list-style-type: none"> • Lab-12 • Try debugging with Eclipse

13.	Wed, Oct. 14	<ul style="list-style-type: none"> • Interfaces and code reuse 	<ul style="list-style-type: none"> • Read sections 11.3-11.5. 	<ul style="list-style-type: none"> • Lab-13 • Review the material so far
--	Mon, Oct. 19	<ul style="list-style-type: none"> • No class - instructor away for a conference 		
--	Wed, Oct. 21	<ul style="list-style-type: none"> • No class - instructor away for a conference 		<ul style="list-style-type: none"> • Mid-term project submission
14.	Mon, Oct. 26	<ul style="list-style-type: none"> • Quiz-3 • Polymorphism • Mid-term course evaluation 	<ul style="list-style-type: none"> • Read section 9.1. • Be prepared for the quiz. 	<ul style="list-style-type: none"> • Lab-14
15.	Wed, Oct. 28	<ul style="list-style-type: none"> • Review • Inheritance 	<ul style="list-style-type: none"> • Read section 9.3. 	<ul style="list-style-type: none"> • Lab-15
16.	Mon, Nov. 2	<ul style="list-style-type: none"> • Revisiting interfaces, polymorphism, and inheritance 	<ul style="list-style-type: none"> • Read section 10.1-10.3. 	<ul style="list-style-type: none"> • Lab-16 • Review the material so far
17.	Wed, Nov. 4	<ul style="list-style-type: none"> • Quiz-4 • Graphics • Discussion about the project 	<ul style="list-style-type: none"> • Be prepared for the quiz. 	<ul style="list-style-type: none"> • Lab-17
--	Mon, Nov. 9	<ul style="list-style-type: none"> • No class - instructor away for a conference 		
--	Wed, Nov. 11	<ul style="list-style-type: none"> • No class - instructor away for a conference 		
18.	Mon, Nov. 16	<ul style="list-style-type: none"> • Review • More graphics 	<ul style="list-style-type: none"> • Read section 9.7. 	<ul style="list-style-type: none"> • Lab-18
19.	Wed, Nov. 18	<ul style="list-style-type: none"> • Interactions with graphics 	<ul style="list-style-type: none"> • Read sections 9.8, 9.9. 	<ul style="list-style-type: none"> • Lab-19
20.	Mon, Nov. 23	<ul style="list-style-type: none"> • Case study-1 		<ul style="list-style-type: none"> • Lab-20
--	Wed, Nov. 25	<ul style="list-style-type: none"> • No class - Friday schedule 		
21.	Mon, Nov. 30	<ul style="list-style-type: none"> • Case study-2 		<ul style="list-style-type: none"> • Lab-21
22.	Wed, Dec. 2	<ul style="list-style-type: none"> • Introduction to data structures 	<ul style="list-style-type: none"> • Read sections 12.1, 12.2, 12.4.3, 12.4.4. 	<ul style="list-style-type: none"> • Lab-22
23.	Mon,	<ul style="list-style-type: none"> • Quiz-5 	<ul style="list-style-type: none"> • Be prepared for the 	<ul style="list-style-type: none"> • Quiz-5 submission

	Dec. 7	• Course review	quiz.	
24.	Wed, Dec. 9	• Quiz-6 • World of Sion project presentations	• Read section 15.1. • Be prepared for the quiz.	• Quiz-6 submission • Work on the project
---	Fri, Dec. 11	• Final project submission		

Project

For the class project, each student will participate in creating the World of Sion, first individually, and then collaboratively. The project will thus be divided in two phases: individual working phase for mid-term, and group working phase for the final. Here's how it will work:

- Each student will be randomly given a couple of classes of characters to build. Characters in the World of Sion include king, queen, soldiers, farmers, blacksmiths, venders, and builders. There will also be need to create supplies, such as metal, wood, grain, water, and clothes.
- These characters and other materials will have to be mapped to classes. Each class should have certain properties and functions (what they can do and/or what you can do with them).
- Fully designed and implemented classes as well as corresponding documentation will be used for mid-term project submission (10% of overall grade, deadline: **October 21**). Grading criteria:
 - Class design: 10 points
 - Appropriate properties (at least 5): 10 points
 - Appropriate functions (at least 10): 30 points
 - Working code with the use of a main class for demo purpose: 20 points
 - In-line documentation: 10 points
 - External documentation: 20 points
- One may receive suggestions/modifications to his/her classes. These changes should be made by **October 28**.
- After the mid-term, groups of four students will be formulated by students with different classes. They will combine their classes, instantiate objects, and create appropriate main class/function to make the World of Sion as interactive and realistic as possible. Each person in the group will document individual contribution clearly.
- Group's project will be used as the final project submission (15% of overall grade, deadline: **December 11**). Grading criteria:
 - Integrated design for the World of Sion (how well all the classes fit together): 10 points
 - Working and bug-free code with the use of a main class (think about exceptions handling): 15 points

- Use of appropriate object-oriented and Java technologies (interface, polymorphism, inheritance, etc.): 10 points
- Interactivity (through command-line or GUI): 10 points
- Features (more than just get and set functionalities): 15 points
- In-line documentation (comments on classes, functions, and other places where appropriate): 10 points
- External documentation (Word Doc or PDF with UML, 4-6 pages, as well as JavaDoc): 20 points
- Project presentation: 10 points