CS 370: Computer Science Practicum – Fall 2022

Davide Fossati
Department of Computer Science
Emory University
davide.fossati@emory.edu

CS 370: Computer Science Practicum is part of the mandatory set of core courses for all Computer Science majors at Emory University. Students typically take this course in their junior or senior year. One of the main goals of this course is to let students "scale up" their software development skills in order to create larger and more sophisticated systems whose implementation requires effective organization, teamwork, and collaboration. Participation in the Piedmont Project increased my awareness on the broader definition of sustainability. In particular, I learned that sustainability is not only about paying attention to the environment, but it includes several other aspects, such as social justice and economic development. In Computer Science, we often tend to optimize our systems for narrow metrics of efficiency, such as processing speed and memory usage. However, it would be beneficial to include additional metrics – such as social, economical, and environmental impact – in the design and implementation of our systems, especially the larger and more complex ones. This course is thus an ideal entry point for making our students reflect and apply the broader concepts of sustainability into their projects. To do so, I added three elements to my course plan: (1) a brief lecture and class discussion about sustainability in Computer Science at the beginning of the semester; (2) the requirement that students include elements of sustainability in their projects, and discuss them in their weekly project presentations; and (3) the explicit addition of sustainability in the grading criteria for the students' final projects.

Calendar

Week	Date	Topics	Deadlines and Exams
1	August 24	Syllabus and policies	
2	August 29	Introduction to Scrum. Sustainability in Computer Science	
	August 31	Scrum: roles, sprint cycle, artifacts	
3	September 5	Labor Day (no class today)	Team registration due by Friday
	September 7	Scrum: supporting practices	
4	September 12	Technologies and tools	Scrum exam on Wednesday Project proposal due by Friday
	September 14	Scrum exam	
5	September 19	Project proposal presentations	Presentation feedback due by Tuesday and Thursday
	September 21	Project proposal presentations	
6	September 26	Sprint 1	Sprint 1 artifacts and feedback due by Tuesday and Thursday
	September 28	Sprint 1	
7	October 3	Sprint 2	Sprint 2 artifacts and feedback due by Tuesday and Thursday
	October 5	Sprint 2	
8	October 10	Fall Break (no class today)	Sprint 3 artifacts and feedback due by Thursday
	October 12	Sprint 3 (all teams)	
9	October 17	Sprint 4	Sprint 4 artifacts and feedback due by Tuesday and Thursday
	October 19	Sprint 4	
10	October 24	Sprint 5	Sprint 5 artifacts and feedback due by Tuesday and Thursday
	October 26	Sprint 5	
11	October 31	Sprint 6	Sprint 6 artifacts and feedback due by Tuesday and Thursday
	November 2	Sprint 6	
12	November 7	Sprint 7	Sprint 7 artifacts and feedback due by Tuesday and Thursday
	November 9	Sprint 7	
13	November 14	Sprint 8	Sprint 8 artifacts and feedback due by Tuesday and Thursday
	November 16	Sprint 8	
14	November 21	Sprint 9 (all teams)	Sprint 9 artifacts and feedback due by Tuesday
	November 23	Thanksgiving Break (no class today)	
15	November 28	Sprint 10	Sprint 10 artifacts and feedback due by Tuesday and Thursday
	November 30	Sprint 10	
16	December 5	Project showcase	Final project due by Monday

Course Description and Learning Outcomes

This course introduces basic concepts and techniques of software engineering, and applies these in the context of a semester-long group programming project. Particular emphasis is given on effective teamwork, technical communication, application of the Scrum Agile software development process, and sustainable software development. Students are expected to proactively and independently research and learn modern tools, frameworks, and technologies suitable to the completion of a project of their choice. After this course, students will be able to effectively work in teams, discuss their work in public, and demonstrate the ability to develop complex software artifacts using state of the art software engineering processes and practices.

Class Meetings

Section 1: Monday and Wednesday, 1:00 pm – 2:15 pm Eastern Time, room MSC N304.
Section 2: Monday and Wednesday, 2:30 pm – 3:45 pm Eastern Time, room MSC N304.

Activities

The course consists of several learning activities:
- **Class.** After the first few introductory weeks, there is very little lecturing in this course. Most of the class time is dedicated to project progress presentations (sprint reviews). This is an interactive process that involves discussion and feedback with the entire class.
- **Readings.** The main reading required for this class is the book "The Elements of Scrum" (see details below). After that, students will be responsible for reading appropriate documentation for the technologies and tools they choose to use for their specific project.
- **Project.** The project is the main focus of this course. You and your team will engage in the full development of an original software artifact, all the way from idea (project proposal) to public release (project showcase). Your team will research and learn all the state-of-the-art technologies and tools necessary for the successful implementation of your project.
- **In-class assessment.** There will be only one theory exam in class early in the course. The rest of the assessment will be based on your project, and on the feedback you provide to other teams on their projects. See more details in the sections below.

Technology

Requirements. Each student should have consistent access to a personal desktop or laptop computer with either Linux, Mac, or Windows operating system; a webcam; and a stable and reliable Internet connection. Students are responsible to maintain their computing equipment in good working condition at all times. **Technical issues with personal computer equipment and Internet connection are not valid reasons for requesting deadline extensions or other accommodations.**

Canvas. We will use Canvas (https://canvas.emory.edu) as repository for class resources, including lecture notes and videos, and as a hub for class discussion and communication. **Students are expected to stay on top of everything that is posted on Canvas at all times**, including other students' questions, as well as answers and follow-ups to those questions. Students' questions about the course should be posted on Canvas, instead of emailing the teaching staff. This will ensure quicker answers, and will reduce duplicated questions.

QTest. We will use the QTest system for exams. Solutions and scores for your exams will be posted on QTest as well. Instructions on how to install and operate QTest will be posted on Canvas.

Textbook and resources

The textbook for this course is "The Elements of Scrum" by Chris Sims and Hillary Louise Johnson. We will use this textbook extensively in the first few weeks of class, and it will be an important reference for your teamwork during the rest of the semester. Additional resources will be posted on Canvas.
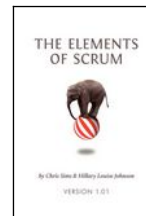
Teamwork

Teamwork and collaborative learning is a central component of this course. For your project, you will work in a team of 6-7 students. Moreover, you will contribute to other teams' success by providing them with feedback and suggestions after each weekly presentation. The exam and feedback to the other teams should be done individually.

All team members are expected to provide significant contributions to their team. "Free riders" may be removed from the team, and they will receive a score of zero for the entire project.

Assessment and Grading

Here is the grading structure of this course:

Item	Weight (%)
Scrum exam	5
Project proposal: Document and presentation	5
Sprint progress: Artifacts and demos (10 total)	25
Feedback to other teams	15
Individual contribution to your team	10
Final project: Robustness (the program works well, it does what it is supposed to do, it does not crash, etc.)	10
Final project: Sophistication (number of features, complexity of the features)	5
Final project: User interface / program looks (the user interface is attractive, consistent, and easy to use)	5
Final project: Deployment (the program is easy to install and/or access)	5
Final project: Documentation (user and technical)	5
Final project: Presentation	5
Final project: Sustainability	5
Total	**100**

At the end of the semester, a letter grade will be assigned according to the following table:

Letter grade	Minimum score
A	93.3
A-	90.0
B+	86.6
B	83.3
B-	80.0
C+	76.6
C	73.3
C-	70.0
D+	66.6
D	60.0
F	0

Any request to change the score of a graded item should be submitted within **one week** since the graded item is returned to the student. **No change request will be considered after this deadline, no matter the justification**. Hint: double check your graded items right away, which is also a great learning opportunity to catch up with topics you might have misunderstood.

Academic Integrity

Academic integrity is extremely important at Emory University. All students are expected to be familiar with and follow Emory's Honor Code, particularly Article 4: Academic Misconduct.
http://catalog.college.emory.edu/academic/policies-regulations/honor-code.html

The Math & Computer Science Department has also a specific policy regarding the submission of computer code.
https://www.cs.emory.edu/undergraduate/general-information/spca/

The policy above should be followed with an adaptation for collaboratively written code. In particular, all submissions should include a comment statement near the top of the program of the form:

```
THIS CODE IS OUR OWN WORK, IT WAS WRITTEN WITHOUT CONSULTING
A TUTOR OR CODE WRITTEN BY OTHER STUDENTS OUTSIDE OF OUR TEAM.
- YOUR NAMES
```

Appropriate citation of all external sources is required. This also includes the acknowledgment of any collaboration or assistance.

Also remember that deliberately **providing false information** for personal gain is a serious violation of academic integrity and will not be tolerated.

Violations of academic integrity will result in immediate referral to the Honor Council. Penalties will depend on the

severity of the transgression and each individual student's history of transgressions. Penalties range from a negative score on an assignment or test, failing the course, or even more severe university-wide actions such as suspension or expulsion from the university.

Help and Support

First of all, make sure you interact with the community using the Canvas system. Post your questions there, and also try to answer other students' questions if you can. For one-on-one help, you can consult the instructors and teaching assistants. Make sure you seek help early if needed, and try to keep up with the course material at all times. When you ask for help, make sure you don't cross the boundaries of cheating or excessive collaboration.

Emory University offers accommodations to students with disabilities. If you anticipate issues related to the format or requirements of this course, please meet with the instructor to discuss ways to ensure your full participation in the course. If you determine that disability related accommodations are necessary, please register with the Department of Accessibility Services (https://accessibility.emory.edu) as soon as possible.