

Computer Programming in Java - Fall 2020/Spring 2021

DRAFT Syllabus

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Room Remote / BANC

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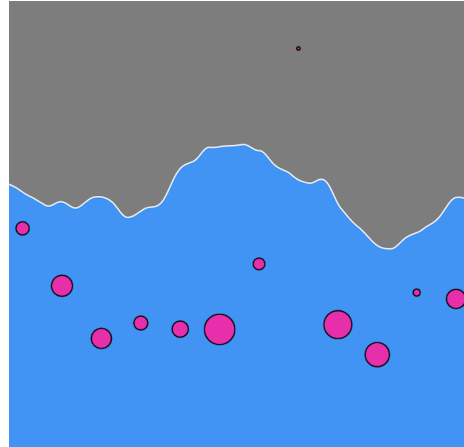
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Course Description

This course is designed to introduce computer programming in the Java language. Learning to use a computer language is a necessary skill for all students regardless of discipline. In this course we will teach the fundamentals of computer programming from the stand point of simulation, automation, and problem solving of real-world systems and natural processes. At the same time, the design and implementation of computer programs is taught from the context of fundamental aspects of computer science, including the development and analysis of algorithms, the development and use of fundamental data structures, the study of standard algorithms and typical applications, and the use of logic and formal methods.

In addition, the year-long course will cover many of the topics necessary for preparation to the AP Computer Science A examination in Spring of the following year. This is an introductory course in computer programming using Java. As such, no specific programming prerequisites are needed to take this course. However, additional preparation may be needed to fully prepare a student for the AP CSA exam with no prior knowledge of computer programming.

Desired Outcomes

Students should be able to at the end of the year-long course:

- Design and implement solutions to problems by writing, running, and debugging computer programs.
- Code fluently in an object-oriented paradigm using the programming language Java.
- Use and implement commonly used algorithms and data structures.
- Read and understand a large program consisting of several classes and interacting objects. (an example of such a program is the AP Computer Science Case Study.)
- Recognize the ethical and social implications of computer use.

21st Century Learning Expectations

Students will develop basic computing skills regardless of their discipline of study:

- Engaging in inquiry based, self-driven, authentic learning
- Utilizing higher order thinking skills that include the evaluation and synthesis of information and ideas
- Collaborating and communicating with others while also self-reflecting on personal growth
- Applying appropriate technology and media literacy skills
- Making connections to life and the larger world community

Essential Questions for the student taking the AP CSA exam

- How are Java classes designed to take advantage of reusing existing classes?
- How are arrays of objects and their methods handled in an ArrayList?
- When is it useful to use a wrapper class and the Comparable interface?
- When is it efficient to use a recursive method vs. an iterative method
- Design considerations for managing large amounts of data

Course Materials

Software:

- Bush Portal
- Processing
- Visual Studio Code
- Github
- [Jupyter Notebook](#)
- Google Drive
- Google Classroom

Texts/Online Resources:

- Runestone CSAwesome Curriculum
- BuildingJavaPrograms: A Back to Basics Approach by Stuart Reges and Marty Stepp
- The Coding Train

Supplies

- Laptop capable of running local applications
- Robust wireless connection when learning Remotely

Classroom Expectations

- Bring all [course materials](#) to class everyday.
- Arrive to class on time and be ready to begin immediately.
- Absences:
 - If you have a planned absence from school (such as commons duty, sport's game, or doctor's appointment), you should inform me before the absence.
 - For any absence (planned or unplanned), you are responsible for checking the portal and asking a classmate about missed information ideally prior to the next class meeting.
- This class will have you in charge of managing a lot of your own work. You need to be an independent worker!
- Take care of other business outside of the classroom and expect to be working for the full period. You will be working on your laptop regularly and with your classmates. Class time is not a time to check e-mail, peruse social media, etc. Don't cheat yourself of valuable class time to ask questions and work with your peers.
- Working together is a great way to learn computer programming. However, if you find that working with peers is less like collaboration and more like appropriation, please talk to me so that we can make a plan so that you can do your best work.

Coursework and Grading

Projects and weekly exercises: The majority of class time will be spent completing problem sets to practice and reinforce a computing mindset. We will apply the computing skills we gain to multiple Projects to analyze, document and publish the results. A small set of simple programming tasks with accompanying online exercises will be due approximately once a week. It is your responsibility to use class time to successfully complete and submit code solutions. Then, as time allows, you should challenge yourself to add optional features. You have two additional class periods after the problem set is submitted with comments to make corrections and earn full credit. I will be available during conference hours and at other times by prior appointment to offer any help. Below is the problem set rubric:

3: Mastering	2: Approaching	1: Emerging	0: Nothing to assess
You solved the problem perfectly.	You're on the right track, but made a tiny error or introduced a small bug.	You tried something, but started off on the wrong track or ended up with an invalid answer.	You didn't start the assignment, or you did so little as to be of no benefit to understanding.

Readings/Assignments: In general, your assigned homework will be online readings followed by developing and submitting code extracts. When reading contemporary science articles, you will be required to prepare a response to one or two related prompts which we will discuss the following class period.

Grading

Term grades will be determined by the following:

Readings/Assignments	40%
Projects	40%
Student Portfolio	20%

Class Hours (TBD)

Monday	1:40 – 3:10pm	Instruction Day
Wednesday	9:30 – 10:10am	Review/Workshop Day
Thursday	11:10 – 12:40pm	Instruction Day

Office Hours (TBD)

I encourage you to see me outside of class. I will be available in Wisner BANC for conference at the following times. I am happy to make arrangements to meet at other times if needed.

Monday thru Thursday	1:20 – 1:40 PM
Monday and Wednesday	3:10 – 3:30 PM

Syllabus (DRAFT ONLY)

Units, Labs, Tests	Estimated Start Date	Estimated Timing
Unit 1 (includes pre-test and pre-survey)	End of August	11 days/495 Minutes - Ten 45 min class periods + One 45 min review session (including AP Classroom assessments)
Unit 2	Middle of September	15 days/675 Minutes - Fourteen 45 min class periods + One 45 min review session
Unit 3	Middle of October	13 days/585 Minutes - Twelve 45 min class periods + One 45 min review session
Magpie Chatbot Lab		4 days/180 Minutes - Four 45 min class periods
Unit 4	End of October	11 days/495 Minutes - Ten 45 min class periods + One 45 min review session
Consumer Review Lab		6 days/270 Minutes - Six 45 min class periods
Unit 5	Beginning of December	13 days/585 Minutes - Twelve 45 min class periods + One 45 min review session

Celebrity Lab Activity 1-3	END OF FALL TERM	4 days/180 Minutes - Four 45 min class periods
Midterm Exam	Mid January	3 days/135 Minutes - Two 45 min reviews, One 45 min exam
Unit 6	Mid January	9 days/405 Minutes - Eight 45 min class periods + One 45 min review session with FRQ practice
Unit 7	End of January	11 days/495 Minutes - Ten 45 min class periods + One 45 min review session with FRQ practice
Data Lab		4 days/180 Minutes - Four 45 min class periods
Unit 8 (includes part of Picture Lab)	End of February	6 days/270 Minutes - Four 45 min class periods + Two 45 min review session with FRQ practice
Picture and Steganography Lab		6 days/270 Minutes - Six 45 min class periods
Unit 9	Mid March	15 days/675 Minutes - Fourteen 45 min class periods + One 45 min review session
Celebrity Lab Activity 4 & 5		4 days/180 Minutes - Four 45 min class periods
Unit 10	Beginning of April	5 days/225 Minutes - Four 45 min class periods + One 45 min review session
Exam Prep and FRQ Practice	Middle of April	5 days/225 Minutes - Five 45 min class periods (Optional for students not taking APCSA exam)
Unit 11 Post Test and Post Survey	Beginning of May	1 day/45 Minutes - One 45 min exam (Optional for students not taking APCSA exam)
AP CS A Exam	Friday, May 8, 2020	Three hour long exam (Optional for students not taking APCSA exam)
Post Exam Modules	Middle of June END OF SPRING TERM	

Attribution

The curriculum for this course is adapted from Lowell High School - Art Simon and Boston Latin School - Long Nguyen