Curriculum at a Glance

AP Computer Science Principles

Grade 9-12

In this course you will learn computer science by building mobile apps. In addition to programming and computer science principles, the course is project-based and heavily emphasizes writing, communication, collaboration, and creativity.

Unit Description	Content and/or Skills
Unit 1: Getting Started: Preview & Setup ● Mazes, Algorithms, and Programs ● Google Account and Portfolio Setup ● App Inventor Setup	● Introduction to block coding platform, Blockly Maze Activity ● Define control structures (Sequence, selection, and iteration) ● Set up Google Sites E-Portfolio for course reflections and activities ● Set up MIT App Inventor account
Unit 2: Introduction to Mobile Apps & Pair Programming ● Event-Driven Programming ● Hardware vs Software ● Binary Numbers ● Abstractions ● Blown to Bits Ch 2 o Data o Moore's Law o Networking	● I Have a Dream Tutorial and Project - Create a soundboard app ● The Internet and the Cloud (POGIL) ● Algorithm Basics (POGIL) ● Converting Decimal, Binary, and Hexadecimal Activity ● Designing Hardware Logic Gates Logicaly Activity (POGIL) ● Blown to Bits Ch 2 Technology tracking activity
Unit 3: Creating Graphics & Images Bit by Bit ● Refactoring ● Error Detection ● Representing Images with Bits ● Coding Graphics Features ● Coding Maps/GPS ● Databases (TinyDB)	● Paint Pot Tutorial - Create an app that allows users to draw on a picture ● Draw and decode different images represented by bits through the Run-Length Encoding technique ● Refactor the Paint Pot app to improve code with abstractions ● Error Detection Activity with cards (POGIL) ● Identify parity bits with CS Unplugged Parity Exercise ● Map Tour App - Create an app that uses App Inventor's GPS sensor to determine the user's location and use it as a destination ● Blown to Bits Ch 3 Electronic Documents Questions
. **Unit 4: Animation, Simulation, & Modeling** ● Modeling	● Lights Off Tutorial and Project - Create a socially useful app that uses animation, event-driven programs, and randomness to move an ImageSprite around a canvas

• Programming Simulations • Abstraction • Socially Useful Apps	• LogoApp - Test and Redesign the given Logo App to define procedures to simplify the app with loops and abstractions • Coin Flip App - Create an app that uses Randomness and simulates a model (coin flip experiment) • Develop, test, and reverse a hypothesis using the rabbits and wolves simulator to understand real-world models and abstractions (POGIL) • Use the 4-bit computer simulator to construct algorithms and translate machine language through various-leveled abstractions • Blown to Bits Ch 4 Privacy Questions
Create #1	• Create a socially useful interactive app that uses graphics and drawing • Keep track of significant errors and bugs that you encounter and how you solved or debugged them • Create a 1-minute video demonstrating the app
Explore #1	• Create a computational thinking artifact of a computing innovation of your choice • Research and write a report describing the computing innovation and its intended purpose, function, and its effect
Unit 5: Algorithms & Procedural Abstractions • Search Algorithms • Sort Algorithms • Encryption and Decryption • Debugging and Errors • Algorithms	• Logo Part 2 - Redesign your Logo app to utilize algorithms to draw complex shapes and define your own procedures • Explore the efficiency of binary and sequential search algorithms and write pseudocode for binary search (POGIL) • Watch a series of videos, practice sorting with a deck of cards, and complete interactive exercises to understand simple examples of sorting algorithms • Caesar Cipher App - build an app that implements Caesar Cipher encryption and decryption, as well as using local variables and functions • Find and fix 5 bugs in the Caesar Cipher App, identifying if it was a syntax or semantic error
Unit 6: Using and Analyzing Data and Information • **Lists** • **Big Data** • **Databases** • **Modeling**	• Quiz App - Create an app that allows you to navigate through a list using an index variable, select items from a list, check for the end of a list, and understand parallel lists. • Identify and explain Big Data and its effect on society • Clicker App - Create an app that can be used to poll individuals

• **Data Visualization**	and store responses on the web • Investigate large data sets and how to process them; then create your own data visualizations using charts and maps
Explore #2 - Uploaded to College Board by Due Date	• Create a computational thinking artifact of a computing innovation of your choice • Research and write a report describing the computing innovation and its intended purpose, function, and its effect
Unit 7: Communication Through the Internet • **Networks and Protocols** • **Clients/Servers** • **Internet Architecture** • **IP Addresses** • **Domain Names** • **Cryptography**	• Broadcasthub App - Create an app that uses texting or emailing components for group messaging • Explore abstraction layers and the architecture of the internet, as well as packet switching routing schemes and TCP/IP protocols (POGIL) • Utilize the DNS simulator app to explore how we communicate on the Internet with IP addresses • Encode and Decode various characters utilizing Cipher Calculators
Create #2	• Create a socially useful interactive app that uses graphics and drawing • Keep track of significant errors and bugs that you encounter and how you solved or debugged them • Create a 1-minute video demonstrating the app
Unit 8: AP CS Principles Exam Prep • **AP Exam Review** • **Ap Exam Upload**	• Upload the Explore and Create Performance Tasks to the College Board Digital Portfolio • Review AP CSP Pseudocode • Prepare for AP Exam
Unit 9: Beyond the AP CSP Exam • **Additional Apps (Optional)**	• Magic 8 Ball App • Persisting Photos App • Where is North: A Compass App • The Pong Game App • Multiple Choice Quiz App • No Texting While Driving App • Programming Careers