Computer Science Explorations: Curriculum Map

Curriculum: Micro¿Bit.Introduction.to.Computer.Science by Microsoft, https://makecode.microbit.org/courses/csintro

Course Length: 1 semester Grades: 7-8 Prerequisites: Computer Essentials

Units and Topics	Creative Projects	Duration
Unit 1: Making Introduction to micro:bit, introduction to MakeCode and design environment, design thinking process and steps, understanding a need or purpose, defining a problem, ideating/brainstorming solutions, prototyping, testing	Micro:pet	1 week
Unit 2: Algorithms Components of a computer (processor, memory, inputs, outputs), functions, conditionals (if-then), event handlers (on-start, forever, on-button-pressed), LED output blocks (show leds)	Fidget cube	1 week
Unit 3: Variables Number variable, string variable, Boolean variable, sprite variable, array, setting and changing variables, showing variables, coding a scorekeeper	A project that counts something (e.g. digital wallet, baseball pitch/strike counter, shake counter, pedometer, calculator)	1 week
Unit 4: Conditionals Conditionals (if-then-else), random variables, coding a rock-paper-scissors game.	An electronic component for a board game	1 week
Unit 5: Iteration Iteration, loops (repeat, while, for-loop), moving a sprite in a square, debug mode (pausing), moving a light across the display in a pattern, coding an alarm with a “while” loop	A project using loops (e.g. animation, alarm, or motorized creature)	1 week
Unit 6: Mini-Project Students create an original project based on concepts learned so far in the course. The project should have a physical component and demonstrate the use of at least one of the following concepts: input/processing/output, variables, conditional statements, iteration/loops	Independent mini-project using concepts from units 1-5	1 week
Unit 7: Coordinates Coordinates on micro:bit, similarities and differences between math coordinates and micro:bit coordinates, toggle command, pause command, display animated face, display random patterns, set brightness	Screensaver or game	1 week
Unit 8: Booleans Setting Boolean variables, generating random Boolean values, creating a double coin-flipper	A project using at least 2 Booleans (e.g. sunscreen monitor, board game with arrows)	1 week
Unit 9: Bits, Bytes, and Binary Bit, byte, base-2 number, kilobyte, megabyte, gigabyte, terabyte, converting from base-2 to base-10, converting from base-10 to base-2, coding a binary calculator	Binary cash register	1 week
Unit 10: Radio Radio-send commands, on-radio-received events, play tone, Morse code	A project using the radio (e.g. remote alarm system, remote interactive art, remote piano, radio tennis)	1 week
Unit 11: Arrays Array, array length, array sort, array index, array type, range, array blocks (array-of, get-value-at, length-of-array), bubble sort, selection sort, insertion sort, coding a headband charades application, coding a starry night constellations display, traversing an array	Micro-bit musical instrument	1 week
Unit 12: Accelerometer Velocity, acceleration, accelerometer, x-y-z coordinates in 3D space, accelerometer blocks (on-shake, rotation, set-accelerometer range), coding a stand-up-for-health monitor that reminds people to stand up and move after they have been sitting for a certain amount of time	A project which uses the accelerometer	1 week
Unit 13: Final Project Students create an original project based on concepts learned in the course.	Final project	2-3 weeks