



Computer Science through Engineering Design in New York

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CSED-NY ACTIVITIES UNDER DEVELOPMENT — JUNE 15, 2024

FROM DAVID BURGHARDT, HOFSTRA UNIVERSITY

Conducting a Light and Sound Show

You and your team need to design and construct an interactive light and sound show. You will conduct music by moving your hand into and out of an open-faced rectangular prism (the Conductor's Magical Box), varying your hand's distance from a distance sensor and in the process, creating a light and sound show.

Designing a Crosswalk Light System

You and your team will design and construct a crosswalk traffic light system. When a pedestrian pushes the crosswalk button, a program is created to determine the time for the light to change to Walk from Don't Walk. Considerations include walking time across the road as well as driver reaction and braking times.

FROM MATT DAVIS, CARROLL COUNTY (MD) SCHOOLS

Intro to Hummingbird:

This activity provides instruction for the teacher on how to prepare a brand-new Hummingbird kit prior to using it. It also provides the steps required for teachers and students to assemble and connect the Hummingbird to a computer using the Hummingbird Snap! programming language. Once successfully connected, students will be ready to complete other robotic activities.

Creating Student Accounts:

Students will need a Snap! account to save their work to the cloud. Depending on the policies of your state and school district you may need to create accounts for each student. This activity will walk you through the process of creating students with a Snap! account if needed. Students are still able to save their work locally if they do not have a Snap! account.

FROM ELLEN HARP, BRIGHTON CSD

The "loop-de-loop" or roller coaster project:

Students are required to build a roller coaster model of known length, using insulation foam and duct tape. Students use sensors, code and the Hummingbird Bit to detect when a marble (modeling the roller coaster car) comes to the last flat section and then to the end of the track. Students vary the height of the initial hill and plot the time it takes to reach both points. This is an investigation of potential vs. kinetic energy as well as the calculation of velocity.

FROM TONYA LACKEY, KEENE CSD

Robot and Maze Activity

Student teams will design a robot that will independently navigate through a known maze. They will use up to two rotation servos and a distance sensor. Each team will have access to the "floor plan" (the maze which is constructed of cardboard or scrap 2x4 to create the walls of the maze) prior to programming their robot. The robot will start at a designated starting point and navigate to the exit. Students will learn about the Hummingbird micro:bit, rotation servos, and distance sensors. They will write pseudocode, learn to use block programming, and conditional statements. Mathematical and science concepts such as circumference, distance, speed are included.

FROM DAN THOMAS, SOUTHWESTERN CSD

Robot Arm: In this project, the students are designing, constructing and programming a robotic arm to move a manufactured product from one assembly line to another. The arm should lift, rotate and grip the object. It should then rotate and return to the home position

Candy Dispenser: In this project, the students are creating a "candy" dispenser to provide a serving on candy. The project will be made from household items, and use a rotation servo and either a button or distance sensor. The goal is to build the mechanism to dispense the candy.