Iowa State Cybersecurity Education Innovation Summit

April 8, 2022

Welcome & Introduction

Chuck Bales | PI & Program Moderator

Doug Jacobson | Professor & Director,

Jonathan Wickert | Senior Vice President and Provost at Iowa State University

Lynne Clark | Deputy Chief, Center for Education, NSA Chief

John Sands | PI CSSIA

Project Overview

- The purpose of this proposal is to disseminate content from the **Regions Investing in the Next Generation** (RING) Project and promote the implementation of new cybersecurity courses and Programs of Study

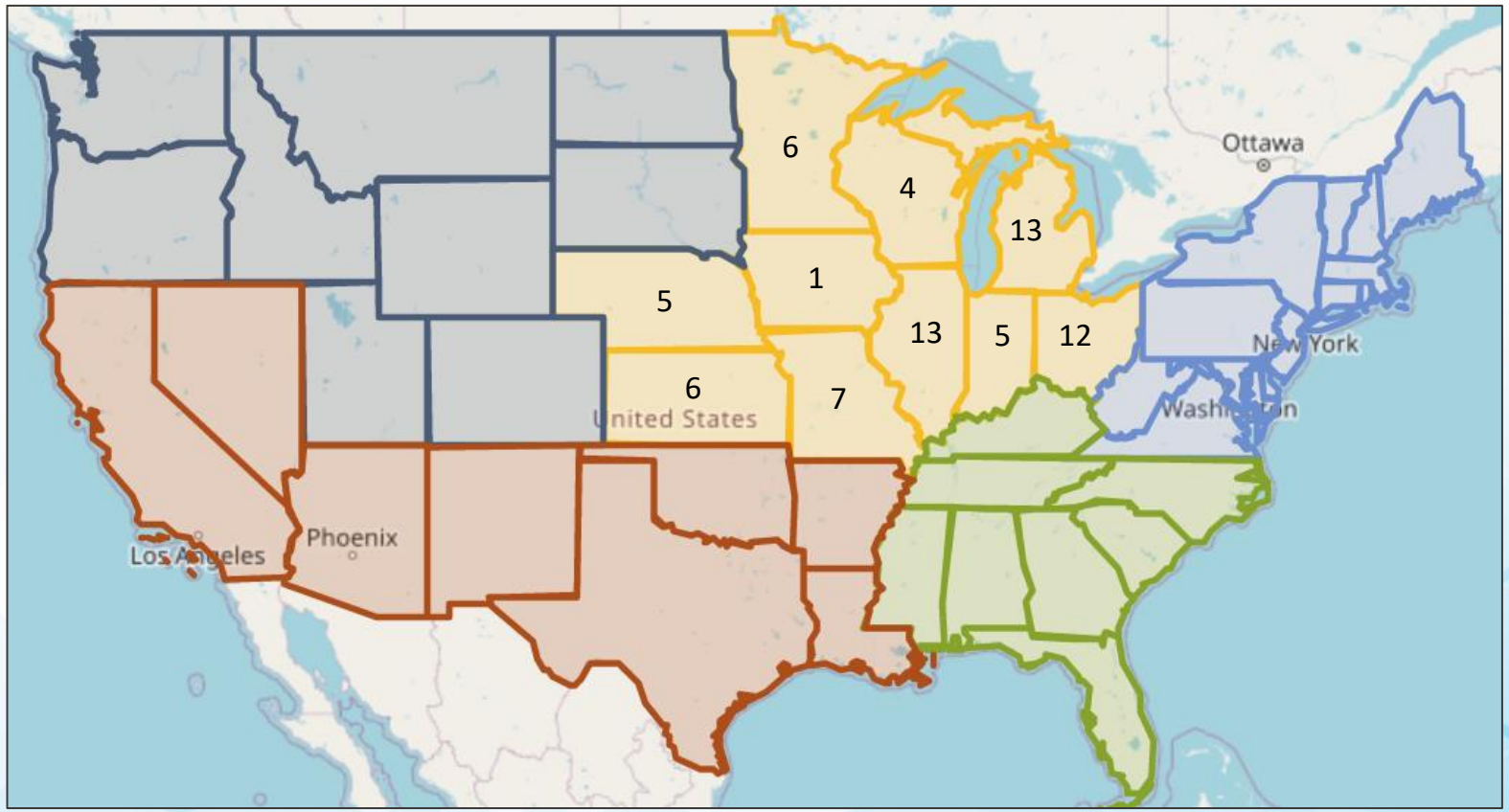
- The **Midwest CAE-C Hub** will lead this effort and identify and then work with a CAE coordinator in each state

- One **CAE institution** in each geographic region will act as initiative lead

NCAE-C Regional Hub Collaboration with State Departments of Education

CAE Midwest Regional Hub

1. Illinois
2. Indiana
3. **Wisconsin**
4. Minnesota
5. Ohio
6. Michigan
7. Iowa
8. Missouri
9. Kansas
10. Nebraska



Goals and Objectives

- Grow cybersecurity education starting in K12 and create interest/skills in cyber across the United States

- Wisconsin was selected as the first state

GOAL 1: Form statewide High School special interest communities in the Midwest region for aligning and promotion of Cybersecurity Programs of Study

GOAL 2: Establish a regional distribution network

GOAL 3: Publish a final report documenting project data, success and impact

Audience

- K12 Educators
- College / University Cybersecurity Educators
- CAE Institutions
- Critical State Cybersecurity Leaders
- State Education Agencies and Representatives
- Subject Matter Experts

Cybersecurity Education in the State

State Cybersecurity Pathway of Study Discussion

Doug Jacobson | Iowa Cyber Hub

Jeremy Hoffmann | CAE

Joe Collins | DoE

Samantha Dahlby | NewBoCo

Cybersecurity Curriculum

RING Curriculum | Jesse Hairston, University of Alabama in Huntsville

Interactive Learning | John Sands, CSSIA

Cisco Networking Academy | John Sands, CSSIA

Cyber.org | John Sands, CSSIA

Faculty Development Opportunities

CSSIA National Faculty Development Academy| Chuck Bales

CSSIA, IoT, and CMMC | Kristine Christensen

Certification Training & HS Faculty Development| John Sands, CSSIA

CSSIA

National Support Center for Systems Security and Information Assurance

The **Center for Systems Security and Information Assurance** (CSSIA) is a National Science Foundation (NSF) Advanced Technological Education (ATE) National Resource Center

Since 2003, CSSIA has provided students and faculty with real-world learning experiences in information assurance and network security through several program improvement supportive initiatives

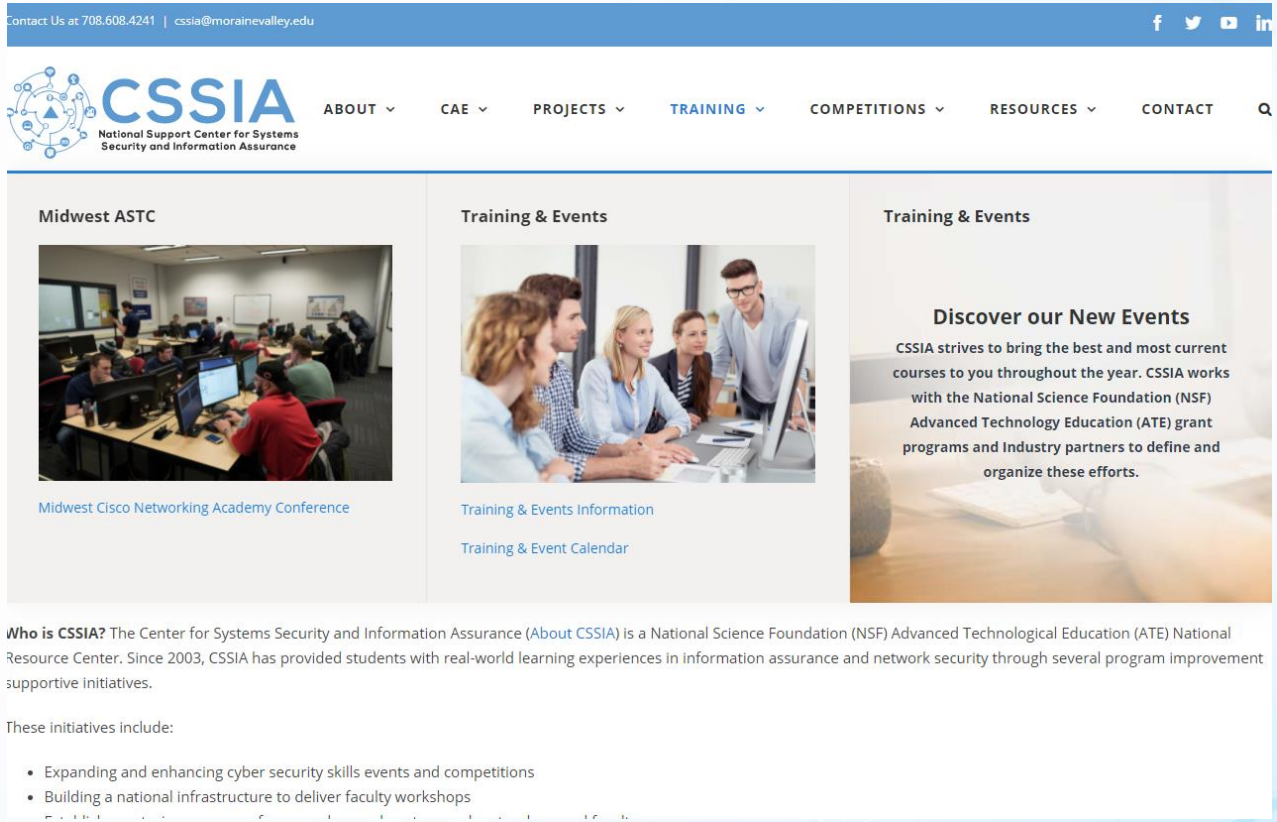
These initiatives include:

- Expanding and enhancing cybersecurity skills events and competitions
- Building a national infrastructure to deliver faculty workshops
- Establish mentoring programs for secondary and post-secondary teachers and faculty
- Developing national infrastructure models for skills and learning based on the creation of scalable and affordable remote virtual lab environments

K12 Faculty Development & Resources

Faculty Development Opportunities available via [CSSIA Website]

- Projects / Reports
- Training Calendar & Registration
- Competitions
- Additional Resources



Visit [https://www.cssia.org/]

Upcoming Workshops

- Grant-funded and free
- Listed on the CSSIA Website (under Training)
- Training Calendar

For advanced notification of upcoming CSSIA training and events, or to be added to the distribution list, contact Mike Gonzalez at gonzalezm272@morainevalley.edu or 708.608.4464

2021 TRAINING OPPORTUNITIES FOR THE
CAE IN CYBERSECURITY COMMUNITY

For registration and more information on these workshops, contact: **kostkas@morainevalley.edu**

AVAILABLE WORKSHOPS

IOT EDUCATORS ACADEMY: BASIC ELECTRONICS FOR IOT
Meets October 29th and 30th

This workshop is intended to introduce instructors to basic electronics concepts related to IoT (Internet of Things) devices through a series of hands-on projects built around electrical concepts, components, and theories.

Register Here: tinyurl.com/wxu6nydm

SSCP – SYSTEMS SECURITY CERTIFIED PRACTITIONER
Meets October 29th, November 5th, 12th, and 19th

SSCP certification demonstrates you have the advanced technical skills and knowledge to implement, monitor and administer IT infrastructure using security best practices, policies and procedures established by the cybersecurity experts at (ISC)².

Register Here: tinyurl.com/medzkmd3

IOT EDUCATORS ACADEMY: IOT FUNDAMENTALS
Meets November 5th, 6th, 13th, and 20th

This workshop is intended to introduce instructors to basic electronics concepts related to IoT (Internet of Things) devices through a series of hands-on projects built around electrical concepts, components, and theories.

Register Here: tinyurl.com/4wbzn2jk

CERTIFIED ETHICAL HACKER (CEH)
Meets December 3rd, 4th, 10th, and 11th

This is an advanced workshop that covers many of the common attacks used by hackers to exploit systems, such as SQL injection, spear phishing and buffer overflows. This workshop will immerse you into the Hacker Mindset so that you will be able to defend against future attacks.

Register Here: tinyurl.com/3pyjwhe9

RED HAT ACADEMY
Meets December 17th

This one-day Red Hat workshop will cover the Red Hat Certified System Administrator (RHCSA) exam (EX200) and the course materials that prepare the student for the exam. The curriculum consists of RH124 modules and RH134 modules which will be reviewed along with the accompanying labs.

Register Here: tinyurl.com/7yvetfe

CISCO CYBERSECURITY ESSENTIALS
Meets December 27th, 28th, and 29th

This workshop presents the fundamental concepts of cybersecurity and information assurance. The workshop includes online content, student assessment, lab activities and an online grading system. The workshop is intended to be used in both k12 and community college programs.

Register Here: tinyurl.com/9nnthye8

ISACA CISA: CERTIFIED INFORMATION SYSTEMS AUDITOR
Meets January 4th, 5th, 6th, and 7th

Validate your expertise and get the leverage you need to move up in your career. With ISACA's Certified Information Systems Auditor (CISA) certification, you can do just that. CISA is world-renowned as the standard of achievement for those who audit, control, monitor and assess an organization's information technology and business systems.

Register Here: tinyurl.com/48nuepd8

CSSIA UCCS

Cyber Competitions

Cyber Competitions

There are plenty of opportunities for you to test your cyber security knowledge in capture-the-flag competitions. Teams will build and defend their mock production business infrastructure from professional "hackers" who are given the challenge to take each team's production systems offline and breach their security.

Collegiate Cyber Defense Competitions (CCDC) are structured contests that allow students of higher education institutions to gain significant experience towards operational competency in managing the challenges inherent to protecting and configuring an enterprise network infrastructure and business information system. CCDC events provide opportunity for students to integrate and apply IT skills in an environment intended to simulate a commercial enterprise network.

LEARN MORE ABOUT MWCCDC

U.S. Cyber Challenge (USCC) is a program of the Center for Internet Security, a 501(c)3 organization, and has the mission to significantly reduce the shortage in the cyber workforce by serving as the premier program to identify, attract, recruit and place the next generation of cybersecurity professionals. USCC's goal is to find 10,000 of America's best and brightest to fill the ranks of cybersecurity professionals where their skills can be of the greatest value to the nation.

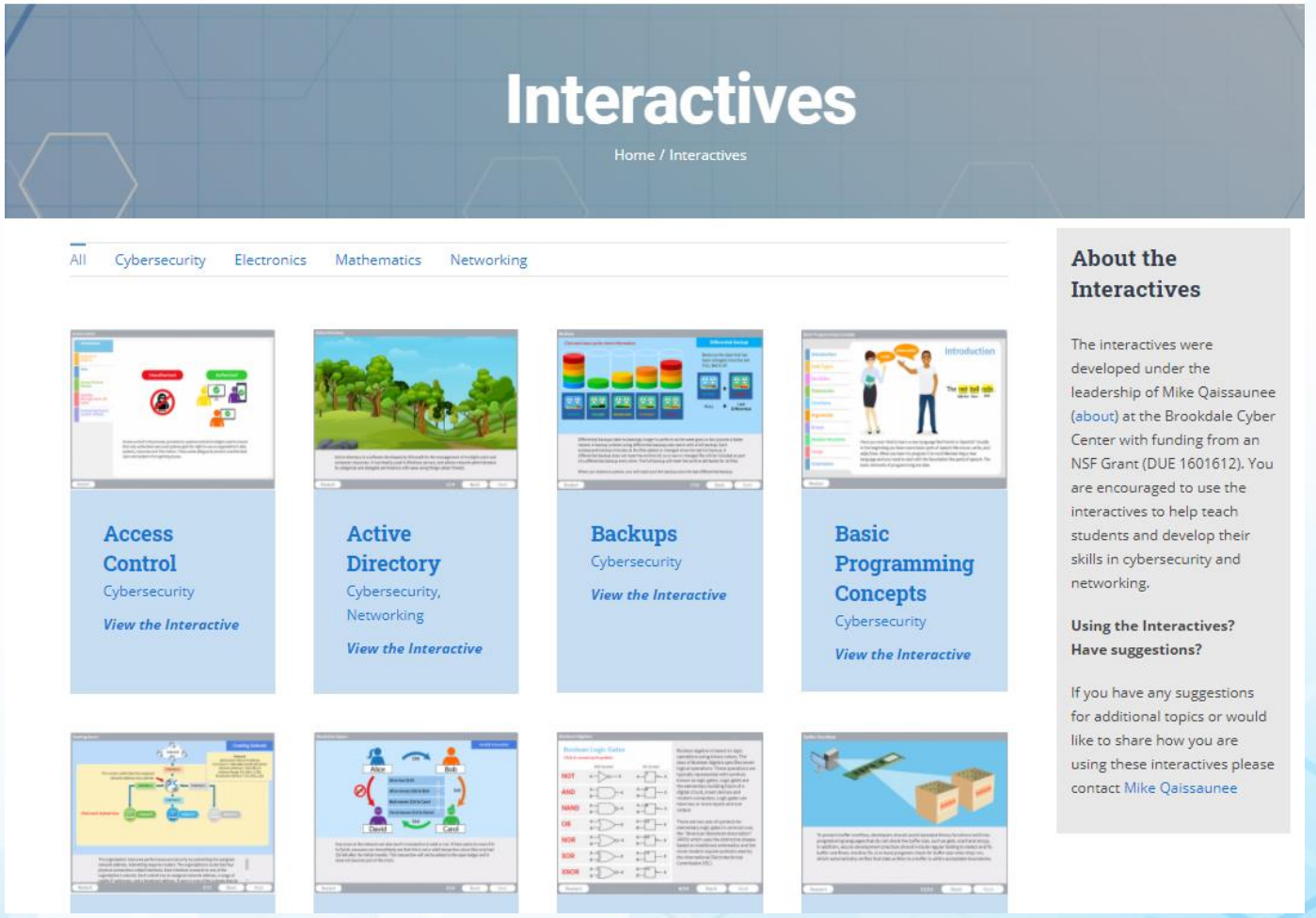
LEARN MORE ABOUT USCC

The National Cyber League (NCL) is a biannual cybersecurity competition for high school and college students. The competition consists of a series of challenges that allows students to demonstrate their ability to identify hackers from forensic data, break into vulnerable websites, recover from ransomware attacks, and more. Students compete in the NCL to build their skills, obtain scouting reports of their performance for hiring purposes, and to represent their school.

LEARN MORE ABOUT NCL

Additional Resources

- VM Image Sharing
- NDG NETLAB+ Supported Content List
  - NETLAB+ Supported Labs (listed on NDG's Website)
- CSSIA's Learning Video Channel



Internet of Things (IoT) Educators Academy

Faculty development for faculty interested in learning more about electronics and embedded systems who want to introduce IoT concepts into their curriculum

Basic Electronics for IoT

For faculty who either do not have an electronics background or need a refresher.

IoT Fundamentals

Same content as our credit course and offers faculty a student perspective as well as resources that will assist them to include concepts into their curriculum.

All material is freely shared with participants via Canvas.

Upcoming Workshops

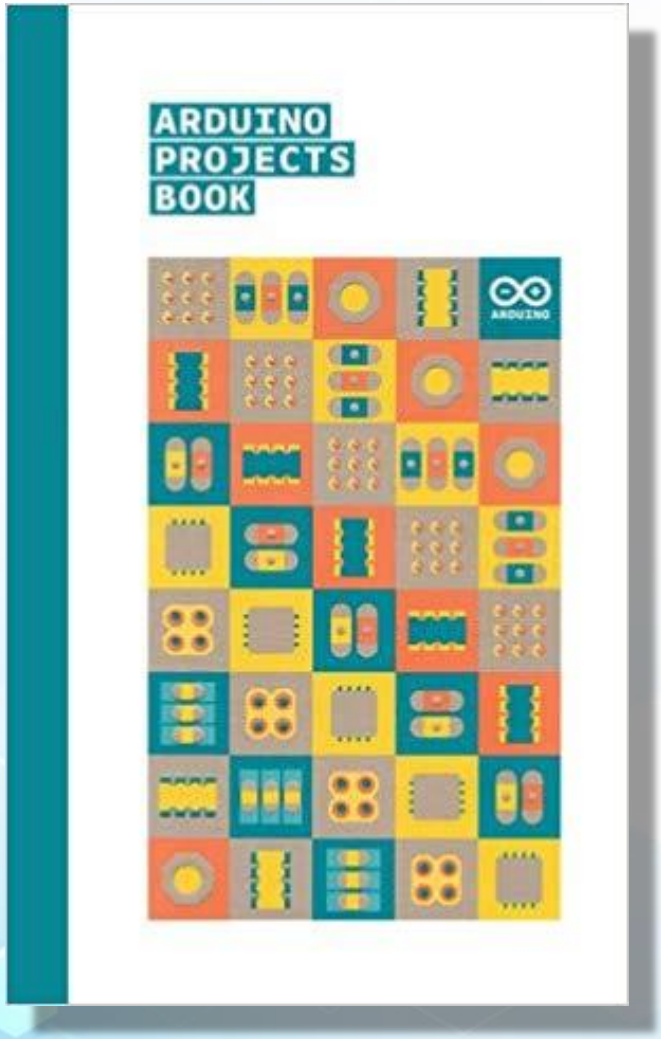
May 31 – June 3

August 1 – 4

IoT Fundamentals Course

- Introductory course with no prerequisites
- **Multidisciplinary**: electronics & programming
- Project-based learning
- Focuses on designing **embedded systems**
- Maps to **Arduino Fundamentals Certificate**
- Future courses will focus on **IoT connectivity**

Arduino Certification Program



IoT Brewery Workbook

- **IoT Workbook** that exposes students to real-world problems and solutions.
- Problem-based learning that uses scaffolding to expose students to a variety of **embedded systems utilizing sensors, actuators, and programming using Tinkercad**.
- **Tinkercad** is a ***free*** online tool used for electronics prototyping and to make exercises more accessible.
- **Multidisciplinary** workbook that can supplement course work in a variety of subject matters.

INTRODUCE COMPONENTS

- Electronic Components
- Sensors
- Actuators

DISCUSS CIRCUITRY

- Schematic Diagrams
- I/O Connections

DISCUSS PROGRAMMING

- Format
- Syntax
- Structure
- Debugging

TEST & DISCUSS IOT/ APPLICATION

- Test Embedded System
- Debug
- Collect Data
- Analyze

An Example Exercise

Brewmaster Project 1

Instructions:

You have been asked by the brewmaster to create a device that uses a button to open a valve which will allow fluid to enter the vessel. A servo motor will be used to open and close the valve. A servo motor is an actuator that uses feedback for precise control of angular or linear positions. To open the valve, the servo will need to rotate 180 degrees.

Brewmaster Project 1 Components, Wiring, and Code

Make It

For this project, you will need the following components.

- Arduino Uno
- Small Breadboard
- 1 x Pushbutton
- 1 x 1 kΩ Resistor
- 1 x Micro Servo
- 1 x 100 µF Capacitor
- Jumper Wires

Input / Output Devices

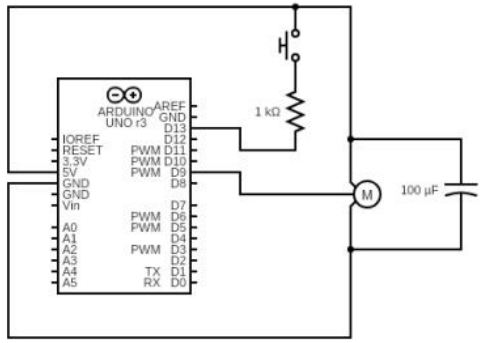
Input: Pushbutton
Output: Micro Servo

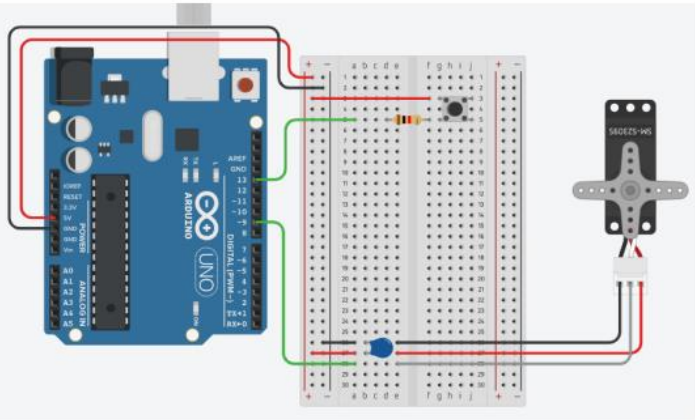
Helpful Wiring Notes:

- The white servo wire is the signal wire, the black wire is ground, and the red wire is for power.

Wire It

Use the schematic and circuit illustration below to wire this project in Tinkercad.





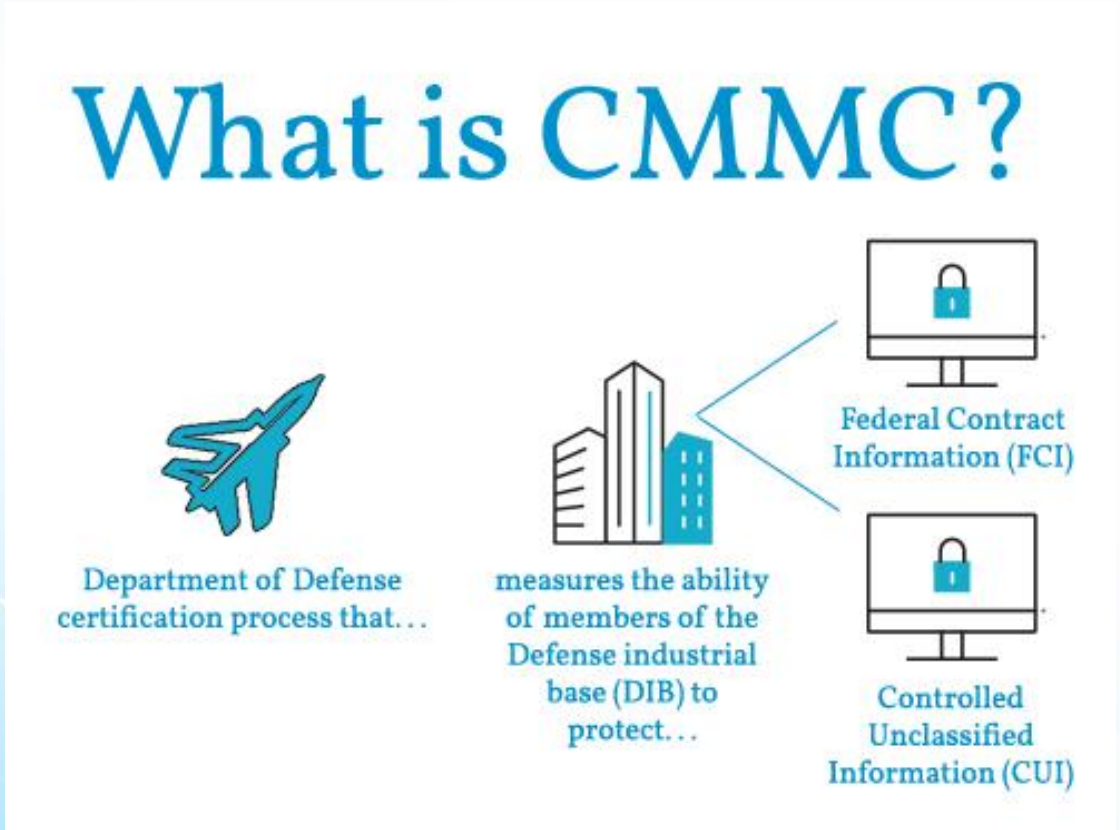
Code It

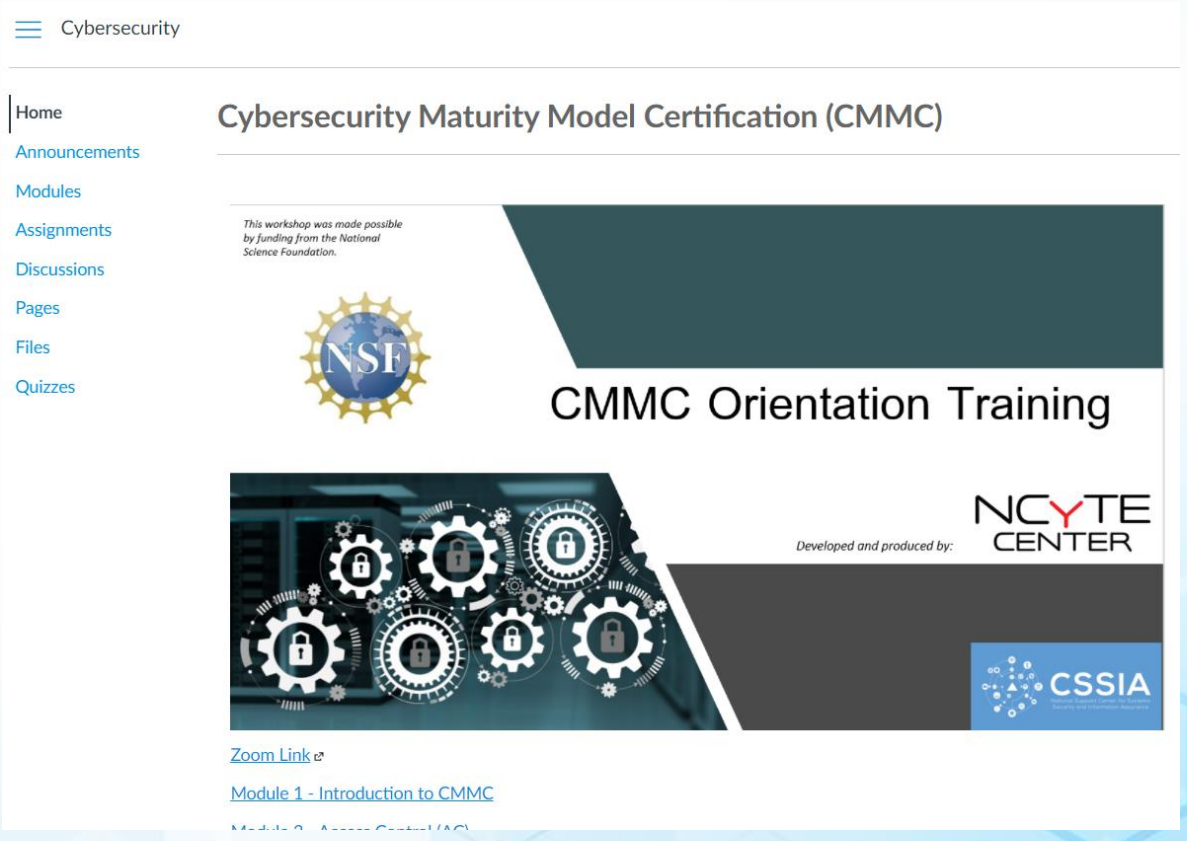
Below is the code you will need to add to the project in order for it to work. The program will cause the servo to rotate to the open or close position when a button is pressed. Add comments to this code so that its purpose and functions can be clearly understood by other readers.

```
#include <Servo.h>                                  Import the library for the servo
Servo valveServo;                                   Create the Servo object

int const onOffPin = 13;                            Declare constants for the digital pins
int const servoPin = 9;

int const valveOpen = 180;                          Declare constants for the servo position
int const valveClose = 0;

bool isOpen = false;                                Declare and initialize initial state variables
int onOffState = 0;

void setup(){
  valveServo.attach(servoPin);                      Attach the servo to the digital pin, initialize the
  Serial.begin(9600);                               serial port for communication, and set the I/O
  pinMode(onOffPin, INPUT);                         status of the digital pin for the button

  valveServo.write(valveClose);                     Initialize the servo starting position
}

void loop(){                                        This loop will repeat until the program is ended

  onOffState = digitalRead(onOffPin);               Store the current button state

  if (onOffState == HIGH){                          If the button is pressed...

    if (isOpen == true){                            ... and the valve is open then close the valve.
      valveServo.write(valveClose);                 Delay 1.5 seconds for the servo to operate and
      delay(1500);                                  update the status of the valve.
      isOpen = false;
    }
    else {
      valveServo.write(valveOpen);                  ... and the valve is closed then open the valve.
      delay(1500);                                  Delay 1.5 seconds for the servo to operate and
      isOpen = true;                                update the status of the valve.
    }
  }
}
```

Make It **Wire It** **Code It**

Cybersecurity Maturity Model Certification (CMMC) Training





Register for Workshops

Visit

https://www.cssia.org/

Training Events

SSCP: Systems Security Certified Practitioner
October 29 - November 19

IoT Educators Academy: IoT Fundamentals
November 5 - November 20

Certified Ethical Hacker
December 3 - December 11

Red Hat Academy
December 17

Cisco Cybersecurity Essentials
December 27 - December 29

ISACA CISA: Certified Information Systems Auditor
January 4, 2022 - January 7, 2022

Working Lunch

Iowa Cyber Hub Presentation

Extracurricular Resources

GenCyber Camps| Lynne Clark

NIST K12 Conference & National K12 Cybersecurity Resources | Davina Pruitt-Mentle

NetLabs Virtual Environment | Mike Masino

New National Cybersecurity Competition Opportunities | Jake Mihevc

National Cybersecurity POS Registry| Tony Brown

K12 CyberTalk Show | Kristine Christensen

Q & A | Discussion of state Needs

Closing Remarks & Action Items

Thank you for attending!

Please complete the survey: https://forms.gle/M2T1kuWeqWTPx5bZ8