



PROBLEM

Professor Selcuk Uluagac created the Cyber-Physical Systems Security Lab in the Engineering Campus which through out the years, the lab gathered a diverse collection of smart devices, which serves as an invaluable resource for students and professors research associates. At the beginning the lab was primarily using Excel spreadsheets which these approaches lack adequate security measures and inventory accuracy. Relying in Excel spreadsheet to track for the inventory has led to update and reliable inventory. Using specialized inventory management software that will track the smart devices in the Cyber-Physical Systems Security Lab which is going to let us track in real time which will also let us put the data entry in real time and will ensure productivity and efficiency. We where exploring the usage of RFID which is going to help reduce manual efforts and any potential errors we may encounter in the data entry.

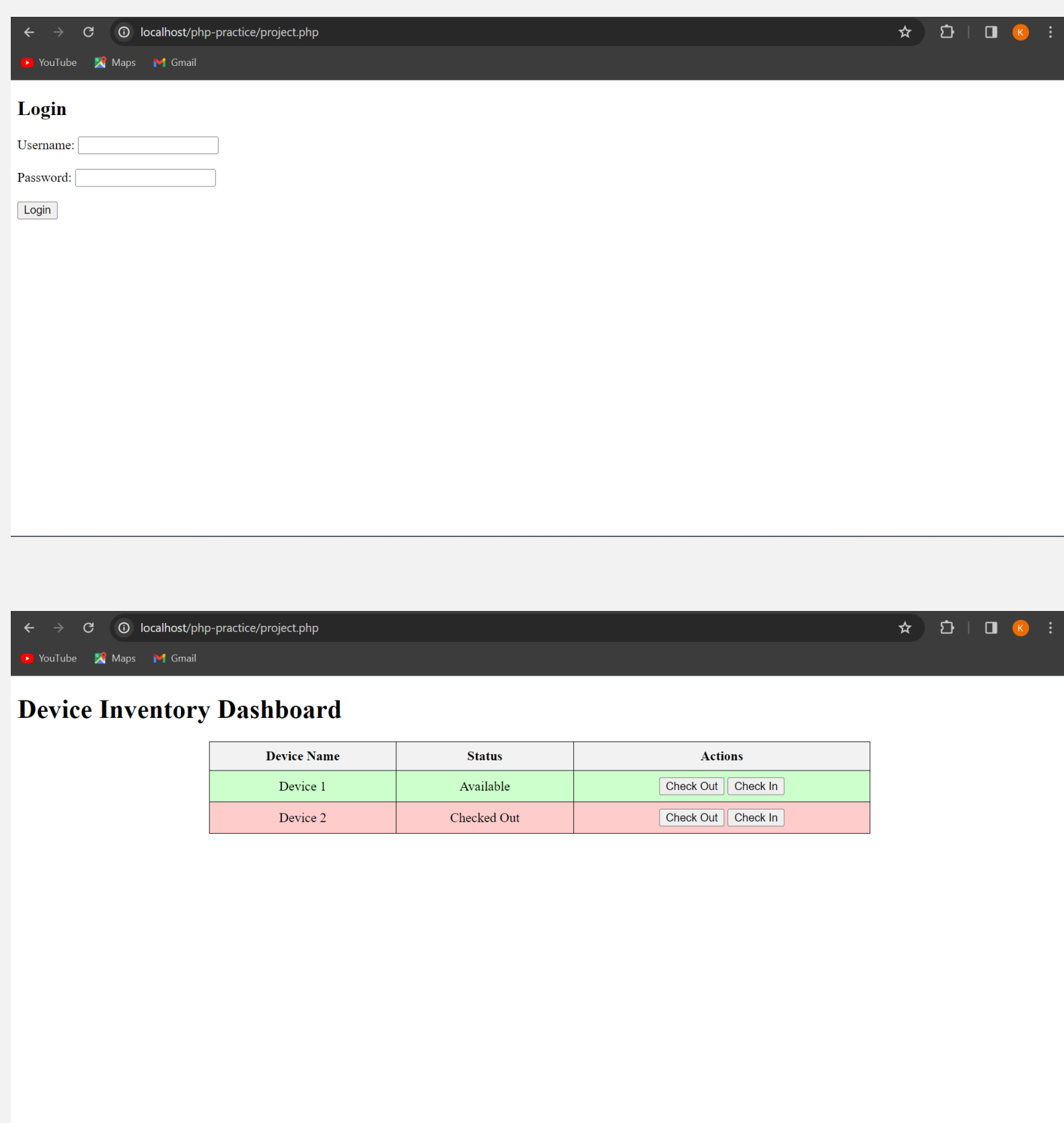
Project View

Our project was centered on creating an Inventory Management System and a website that would specifically tailored for the Cyber-Physical System Security Lab. Our focus and aim was to develop a intuitive and efficient application serving as the central control for the lab and will increase productivity in the lab. The project involved a lot of integrating API backends, utilizing SQL for the database management, designing user-friendly website interface and a innovating mobile application. We utilized open-source technologies' flexibility and collaborative potential to construct a secure, robust, and accessible platform. Emphasizing adherence to industry-accepted practices throughout the development process, our objective was to surpass expectations in terms of security, reliability, and usability within an academic research setting.

REQUIREMENTS

First start creating the user interface which will be what the product owner would see and interact and get update on which devices are check-out and which one are check-in and a update on which students have which devices. The website used HTML, for the structure, CSS for the styling and the visual presentation, JavaScript which helps with the interactivity of the website. For the database we created a SQL database and created the queries which is going to be connected to the website and show the devices that are in the database, the ID of each device which will be used to check-out, manufacturer, etc. For the architecture of the Inventory Management System, we chose Python, which is known for the security and knowledge that we had work on it and construct a web framework and API. Which these components will enable and secure communication with the Microsoft SQL server. These will effectively guard against any SQL injections attack.

SYSTEM DESIGN



OBJECT DESIGN

Item ID	Item Name	Item Type	Item Category	Item Status	Item Location	Item Description
1	Smart LED Desk Lamp	True	AUTOMATION	accessory	LAMP	smart-led-lamp
2	Onyxus	True	COMPUTER	VR	HEAD SET	AR-VR-NULL
3	LG Smart Watch	True	COMPUTER	WEARABLES	WATCH	LG WATCH URBANE-NULL
5	Homemeter Motion sensor	True	AUTOMATION	security	Sensor	HS-D510P-homemeter.com-NULL
6	Leap Motion sensor	True	AUTOMATION	security	Sensor	LEAP MOTION Model LM-610-NULL
7	SmartThings Water Leak Sensor	True	AUTOMATION	security		SmartThings M5N-D4800-W10P118
8	Google Nest Hub	True	AUTOMATION	Smart Speaker	with display	7 inch display / 3rd generation / Bluetooth and Wi-Fi-NULL
9	Amazon Echo dot 3rd	True	AUTOMATION	Smart Speaker		Amazon / 3rd generation / Bluetooth and Wi-Fi-NULL
10	Amazon Echo Alexa	True	AUTOMATION	Smart Speaker		Amazon / 3rd generation / Bluetooth and Wi-Fi-NULL
11	Next Protect	True	AUTOMATION	security	Base Station	Next Protect (S301)WES / Wi-Fi / next.com/nextpro-NULL
12	Amazon Echo Show 5	True	AUTOMATION	Smart Speaker	with display	Amazon / Wi-Fi and Bluetooth / NULL
13	Next Learning Thermostat	True	AUTOMATION	Thermostat		Wi-Fi / next.com/works / Model T300TES
14	Fibaro FGIRB01 Motion Sensor	True	AUTOMATION	security	Sensor	"Motion, Light, and Temperature Sensor FGIRBES-001 v 1.0"
15	Philips Hue White and Color Amb	True	AUTOMATION	accessory		800 Lumens / Zigbee and Bluetooth / Model 929002205AA
16	Samsung SmartThings Kit	True	AUTOMATION	security		"Three Monitoring Eye / SmartThings Hub 3e / Multiroom Sensors (door/windows), Motion Sensor, and Outlet / Zigbee / NULL"
17	ADOTEC MotionSense 6 ADOTEC	True	AUTOMATION	security		"Model: ZW100-A / Motion, Temperature, Light, Humidity, Vibration, 125 Sensors / NULL"
18	Fibaro FGIRB01 Motion Sensor	True	AUTOMATION	security		Model: FGMS-001 ZWS v2.2 / Zigbee-NULL
19	EaseWave Wireless Home Automation Smart Device	True	AUTOMATION	security		"Plug in Smart Meter Diagnostics Module / ZW5-325M / EaseWAVE / Works with: SmartThings, Vera, Wink, Fibaro" / NULL
20	ADOTEC Data for View Sensor 6	True	AUTOMATION	security	Sensor	ADOTEC Model: ZW100-Z-NULL

IMPLEMENTATION



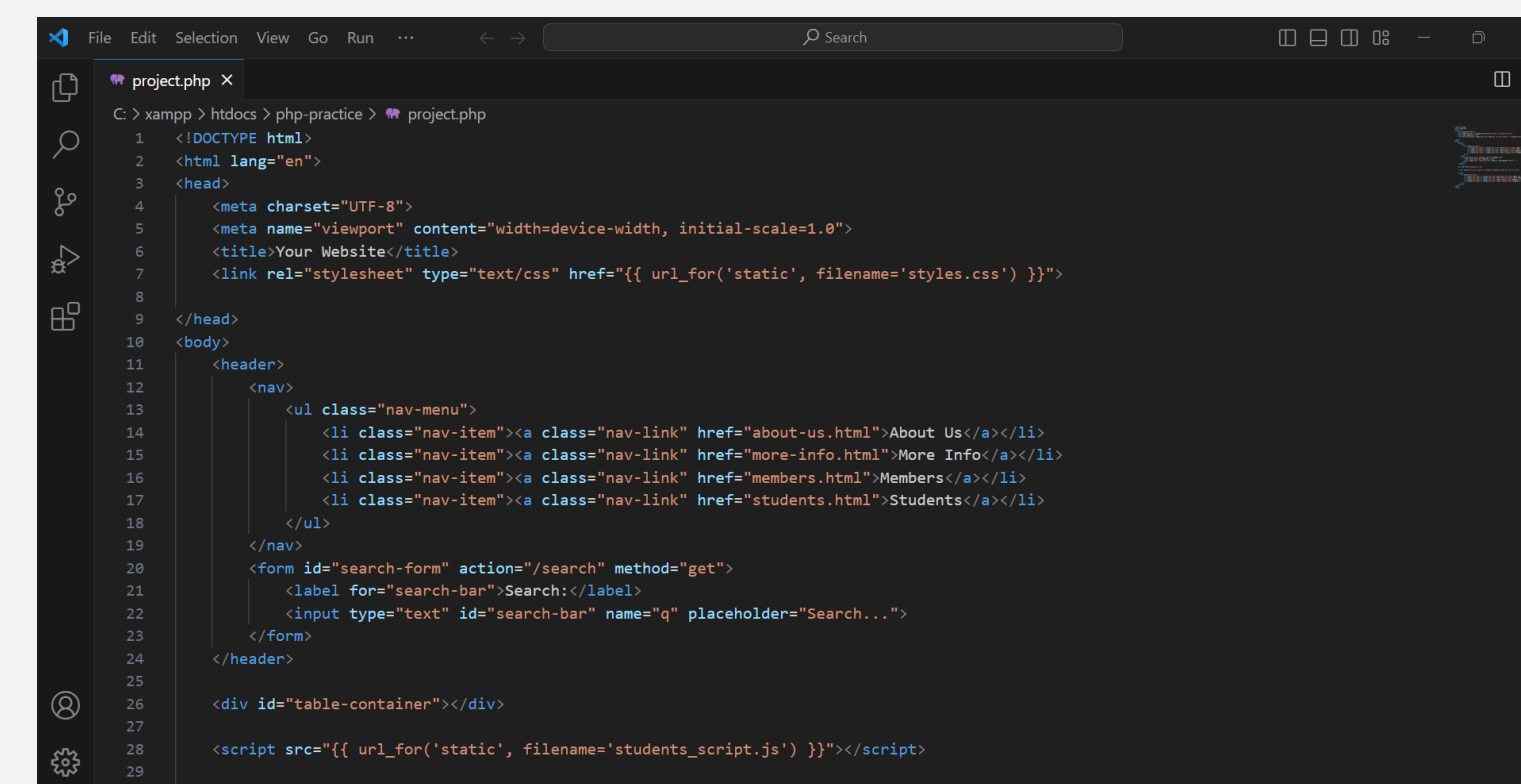
Individual Contribution

My contribution for this project was to research and get familiarize with RFID Tags or mostly known as NFC which we where going to implement in our project by putting it on every device from Professors Selcuk Uluagac Lab which was going to increase productivity when students are going to check-in and check-out the devices. I also research how to secure the NFC tags in order to store the adequate information from every device so at the moment when a student want to scan it will show them characteristics of the device and they would be able to check it out from our app. I also work diligently on the website and did the SQL queries to connect our database to the website which is going to be used for Professor Selcuk Uluagac and he can oversee the devices that students have check-in and check-out

SUMMARY

Our project successfully developed an initial prototype for the Inventory Management System of the Cyber-Physical Systems Security Lab. The prototype includes a Python-based API backend, a well-structured SQL server, and an Android mobile application. While this prototype incorporates most of the desired functionalities, we have plans for future enhancements. These enhancements will involve integrating NFC scanning to enhance user interaction and implementing SSL encryption for improved system security. The SSL encryption could be facilitated by either utilizing an FIU certificate or a self-signed certificate from a Public Key Infrastructure (PKI). These planned upgrades aim to further refine and bolster the security of the system. We also plan on separating the feature of the website where it will show a detailed graph on which devices where check-out and which weren't and also show which students have which devices from the Lab that way it will facilitate Professor Selcuk Uluagac devices inventory and incorporate FIU two-factor authentication so that way they can login with their students credentials.

Screenshots



ATTENTION: Subheadings shown above is a recommended structure for a research/scientific poster. Main elements of a poster are Introduction, Research and Conclusion. Researchers can customize the section headers based on their projects' needs. REMOVE THIS TEXT ONCE YOU START WORKING ON YOUR POSTER

ACKNOWLEDGEMENT

The material presented in this poster is based upon the work that was supported by Selcuk Uluagac who helped us and guide us with cooperation from our mentors for this project