KEYLOGGERS

COMPUTER NETWORKING

Time: 60 mins

Introduction

In this class, the student/s will learn how keystroke data can lead to keyloggers endangering data security.

New Commands Introduced

● keyboard.Key.enter:	Adds a newline character to the text
● keyboard.Key.tab:	Adds a tab character to the text
● keyboard.Key.space:	Adds a space to the text
● keyboard.Key.cmd:	Adds a tab character to the text
● keyboard.Key.backspace	Ignores the *backspace* keys if the text variable doesn't have any value.
● keyboard.Key.shift:	Ignores the *cmd* keys
● keyboard.Key.ctrl_l or key == keyboard.Key.ctrl_r:	Ignores the *ctrl_l* and *ctrl_r* keys
● keyboard.Key.esc:	Return false if it is escape key is press
● str(key).strip("'")	Appends the keystroke to the string text and prints the text value
● listener.join()	Calls the join() method from listener
● keyboard.Key.cmd:	Adds a tab character to the text
● keyboard.Key.backspace	Ignores the *backspace* keys if the text variable doesn't have any value.

Vocabulary

- **Keyloggers** are malicious software or hardware designed to record a computer or device user's keystrokes without their knowledge or agreement.
- The **Firebase Realtime Database** is a cloud-hosted NoSQL database that lets you store and sync data between your users in real time.

- A **keystroke** is one touch of one of the keys on a computer or typewriter keyboard.
- **Website cloning** is a popular method to scam people out of money and/or to damage the credibility of reputable websites and companies.

Learning Objectives

Student/s should be able to:

- ***Recall*** using key events to control the game characters and explain that these can be recorded as keystrokes.
- ***Demonstrate*** how the key values are stored on the button press.
- ***Explain*** how key presses can be listened to, stored and sent by the hacker.

Activities

Class Narrative: *(3 mins)*

- Brief the student/s that sometimes opening a file gives an error and can throw a notification to inform on a cybersecurity attack.

Concept Introduction Activity: *(4 mins)*

- Let the student/s observe that the files are locked with an encryption key and a text file is shared to inform and trade for the attack performed.
- Explain how ransomware attacks are performed, different sources of ransomware and its kinds.
- Using the slides, explain that the student/s will learn:
    - to Detect the Button Press
    - to Store the Key Values
    - to Send and Listen the Keystroke Data

Activity 1: Detect the Button Press *(16 mins)*

Teacher Activity: *(8 mins)*

- Introduce keystrokes detection without user's knowledge.
- Demonstrate how to capture keystrokes on key press, release and record it using key events.

Student Activity: *(8 mins)*

- Guide the student/s to detect the keystrokes by listening to the keyboard events and print the key data to the terminal.

Activity 2: Store the Key Values *(10 mins)*

- Explain how we will send the keystroke values to the server at regular intervals of time.
- Explain how we will define a Flask route to accept POST requests, process incoming JSON data, and update a path in the Firebase Realtime Database.

  Student Activity: *(10 mins)*

- Guide the student/s to define a Flask route and update keystroke values data in the Firebase Realtime Database

Activity 3: Send and Listen the Keystroke Data *(12 mins)*

- Explain how you can send the keystroke data as a JSON response and listen for real-time updates on the Firebase Realtime Database.
- Explain how we will use jQuery to perform AJAX requests to asynchronously fetch data from the server and update the content on a web page at regular intervals.

  Student Activity: *(6 mins)*

- Guide the students to send the keystroke data and listen for real-time updates on the Firebase.

Introduce the Post class project: *(2 min)*

- Detect the key press to find out the user's typing speed.

Test and Summarize the class learnings: *(5 mins)*

- Check for understanding through quizzes and summarize learning after respective activities.
- Summarize the overall class learning towards the end of the class.

Additional activities:

- Encourage the student/s to modify the keylogger to detect arrow keys.
- Encourage the student/s to Highlight the email addresses in the keylogger text.

State the Next Class Objective: *(1 min)*

- In the next class, student/s will learn about the ransomware attacks performed using manipulation.

U.S. Standards:

CSTA: 2-AP-11, 2-AP-12, 2-AP-13, 2-AP-14, 2-AP-19

Links Table

Activity	Activity Name	Link
Class Presentation	KEYLOGGERS	https://s3-whjr-curriculum-uploads.whjr.online/7ae56223-08c6-43d9-a9ab-37ccff918e10.html
Explore Activity	KEYLOGGERS	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS-BP
Teacher Activity 1	Detect the Button Press	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-TAS-BP
Teacher Reference: Teacher Activity 1 Solution	Detect the Button Press	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-TAS
Student Activity 1	Detect the Button Press	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS-BP
Teacher Reference: Student Activity 1 Solution	Detect the Button Press	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS
Teacher Activity 2	Store the Key Values	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-TAS-BP
Teacher Reference: Teacher Activity 2 Solution	Store the Key Values	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-TAS
Student Activity 2	Store the Key Values	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS-BP
Teacher Reference: Student Activity 2 Solution	Store the Key Values	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS
Teacher Activity 3	Send and Listen the Keystroke Data	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-TAS-BP
Teacher Reference: Teacher Activity 3 Solution	Send and Listen the Keystroke Data	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-TAS
Student Activity 3	Send and Listen the Keystroke Data	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS-BP
Teacher Reference: Student Activity 3 Solution	Send and Listen the Keystroke Data	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS

Student's Additional Activity 1	Handle Arrow Keys	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS-BP
Teacher Reference: Student's Additional Activity 1 Solution	Handle Arrow Keys	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS
Student's Additional Activity 2	Highlight the Email	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS-BP
Teacher Reference: Student's Additional Activity 2 Solution	Highlight the Email	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-SAS
Post Class Project	Typing Speed Test	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-PCP-BP
Teacher Reference: Post Class Project Solution	Typing Speed Test	https://github.com/Tynker-Computer-Networks/TNK-M16-C124-PCP