Thoth

Challenge 4

Perseverantia est clavis!

Decoded at 11:40.
“Persistence is key!”

Steps

1. Our group started with the provided `challenge.py`. We had previously prepared two programs: `mime.py` and `duplicator_old.py`. Unfortunately, neither of these applied to the problem we were given. `mime.py` was written to copy a set of inputs which were provided through the keyboard, but the challenge program never typed anything with the keyboard. The first edition of `duplicator` took in a typing profile as a file and typed a new string based on the profile, but the challenge provided us with lists of data and not files. With hindsight, we could have used the first version of `duplicator` to solve the challenge with only a few modifications. However, writing the new version of `duplicator` did not turn out to be our main roadblock anyway.

2. We modified the duplicator script from step 1 to create our final solver script: `duplicator_new.py`. This script simply required us to copy and paste the data from challenge.py into its source code, then run. We ran this program and… Nothing. We ran into the following error, here copied verbatim:

   ```
   Type the text (make sure that the popup window has focus):

   Sample does not match the specified text!
   ```

3. We modified `duplicator_new.py` several times to try to figure out what our issue was. Were we skipping characters? Did the popup window *really* have focus? Did we have line breaks in the pasted text? Were we converting our lists of strings into floating point numbers? After all, `duplicator` did successfully type the enter key at the end of the input. Eventually, Dr. Timo mentioned that we should be seeing our typed text in the python output once his program finished. We were seeing *exactly* what is printed above at the end of step 2 - our typed text wasn’t showing up at all! By using a different virtual machine, our program finally worked and we were able to get the answer. But why didn’t our first tries work? Our speculations are below.

Why didn't `duplicator_new.py` work the first time?

Our initial trials using duplicator_new.py were not run on a virtual machine. They were run on a real installation of Arch Linux on one of our laptops. The laptop was using a window manager called dwm, which we believe to somehow have caused our problem.

dwm (stylized without capital letters) is a *tiling window manager*, which means that each new window is automatically arranged next to all of the others. dwm's scheme of managing windows in the default tiling layout, which is what our laptop used, is by designating one window as the *master* and the rest as members of the *stack* (see the first graphic on this page).

Through trial and error after the class ended, we discovered that Dr. Timo's program would only accept `duplicator_new`'s answer *if challenge.py was not the master window*. By simply moving the terminal housing `challenge.py` to the stack, we encountered no problems. Further investigation revealed that Dr. Timo's program wasn't seeing *any input at all* from `duplicator_new.py` if `challenge.py` was the master window. Regular keyboard input with real hands worked perfectly fine, but `pynput`'s synthetic keypresses were not read (except for the final enter key). Furthermore, we tested another tiling window manager (awesome) with `challenge.py` as the master window and found that our script worked perfectly fine.

While we don't have a surefire answer, we do know that either dwm, pynput, or the interaction between the two caused our issue. If we had used a VM from the start, we could have possibly finished the challenge in half of the time. 😊

Contributions

# Brendan Guillory

Helped write mime.py and duplicator.py. Troubleshooted when our solver programs were not working.

# Cameron Robertson

I Installed all the needed packages onto my virtual box, and reviewed prepared code for the challenge. Once the challenge started I was able to run the professor's code after fixing issues with the packages I installed earlier. Then I ran into another problem with the prepped code not working on my laptop.

# Christian Evans

Assisted Brendan Guillory with troubleshooting. Worked alongside trying to find errors in the old_duplicator.py Brendan created. Reviewed notes and relayed my thoughts to Drew and Brendan.

# Cody Woessner

Started the process of running the code on my machine but pivoted to helping Brendan fixing the issues on his because he was making better progress. Helped review the code during and prior to the challenge.

# Drew Young

Assisted Brendan Guillory with solving issues associated with the program typing to the challenge program. Attempted to gain help from neighbors but my mission unfortunately failed after being discovered by the mighty Dr. Timo.

# Frankie Lavall

Could not run the code with my vm so i tried to troubleshoot my linux terminal. Decided to do an upgrade which is still going on now. While waiting for my terminal I looked at the code that we had made for the challenge to see if we could figure out what was wrong.

# Tristen Barton

I helped Drew and Brendan troubleshoot problems within the program, and once we got it fixed I went my own way. I used Brendan's fixed program and got it typing in the terminal, but my timings were off for some unknown reason. Then I tried to fix the timings on my end but by that time Brendan got the message.