PLC 226/227 Lab Troubleshooting

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Terminal Navigation/Commands

Useful Commands

- **pwd**
  Typing this will output the path of the current working directory you are in.
- **cd**
  Type this along with the folder path in order to change to its directory, or typing it alone in order to go straight to the home folder.
  Ex:

  ```
  cd examples/scanning
  ```

  Takes you to the scanning sub directory
- **ls**
  Will list the contents of a directory. "ls -R" (without quotes) will list all contents of sub directories as well. Ex:

  ```
  ls examples/tracking
  ```

  will list all contents of the tracking folder. Simply typing "ls" alone will list contents of current working directory.
- **cp**
  Use this command in order to copy files from a current directory to another specified directory. Ex:

  ```
  cp examples/scanning/camera_input.py /~
  ```

  Copies the chosen python file to the home directory.

- **cd ..**
  Move one directory up

- **Running Multiple Commands**
  You can run multiple commands in one single command by using the ";" to separate them. For example Command1; Command2; Command3. Or use && if you only want the next command to run when the first one is successful.

- **Running Python Code**
  In order to run python code, make sure you are in the home directory and type "python3" followed by the path of the code you want to run. For Example:

  ```
  python3 examples/tracking/camera_draw.py
  ```

  OR if you pasted the code onto the desktop (home directory) using the "cp" command, simply type python3 followed by the python file name you want to run. Ex:

  ```
  python3 camera_draw.py
  ```

Keyboard Shortcuts

- **TAB auto fill**
  Simply press TAB and if the file exists in the directory it will auto fill.

- **Ctrl+C and Ctrl+Z**
  Ctrl+C and Ctrl+Z are used to stop any command that is currently working. Ctrl+C will stop and terminate the command, while Ctrl+Z will simply pause the command.

- **Ctrl+A and Ctrl+E**
  Ctrl+A moves you to the beginning of the line while Ctrl+E moves you to the end.

Navigating to Lab Code

All Laboratory code for 226 and 227 is located in the "examples" folder. This folder has 4 sub directories labeled "daq", "cnc", "scanning", and "tracking". Codes for the lab are located in its respective sub-category.
Example:

```
cp examples/scanning/*.py /~
```

where we copy the file "*.py" (where * denotes the name of the python file) onto the desktop denoted by a space then "/directory_name", in our case "/~" denotes the home (desktop) directory.

Manual Machine Control

In order to initiate manual control of the machine arm, enter the python terminal by typing:

```
python3
```

in your **home directory**. Then, enter the following:

```
from lab.cnc import CNC
c = CNC()
dir(c)
```

The above will output all the functions available to you in order to control the arm. Simply write c."function name" followed by parenthesis in order to run the command. Ex:

```
c.home()
```

will set the arm in the home position. Type quit() into the terminal to exit python and return to the home directory.

NOTE, some commands may require extra arguments in the parenthesis.

Diagnoses & Fixes to Common Issues

- **Running Python Code in The Correct Directory**
  It is important to make sure that you do not attempt to run code in any other directly other than the home (desktop) directory. Otherwise, the python interpreter will not be found and the file will not run. Check your current working directory by using pwd to verify you are in the "~" directory.

- **Camera Not Being Recognized Quick Fixes**
  If the camera is not being recognized, a cable may be loose or there is a bad connection. Unplug the camera USB cable and re-insert. If that does not work then the cable may need to be replaced.
  In addition, after the camera is used after running the respective lab code, some background process may still run. Kill these by typing in:

  ```
  clear_camera
  ```

- **Machine Arm Fixes/Tests**
  Enter the python interpreter and access manual machine control as demonstrated above. Using the same process and variables above, you may execute the following functions (don't write anything past //):

```
c.home()  // sets arm to home position
c.move(dx,dy,dz) // displaces arm to specified amount
```

- **Traditional Reset**
  Sometimes a simple reset is in order. If all the obvious fixes have been conducted, hold the power button on the front panel for a few seconds or hit the power switch on the side of the computer. Turn it back on and hopefully any problem you had was fixed! This is a good option if the monitor refuses to turn on even after its power button was pressed.

Memory Fault

Definitely the most annoying and time consuming problem to fix. Sometimes the memory card gets corrupted and needs reformatting. For this, PLC employees will be needed to resolve the issue as the front panel needs to be taken off and the card manually reformated.