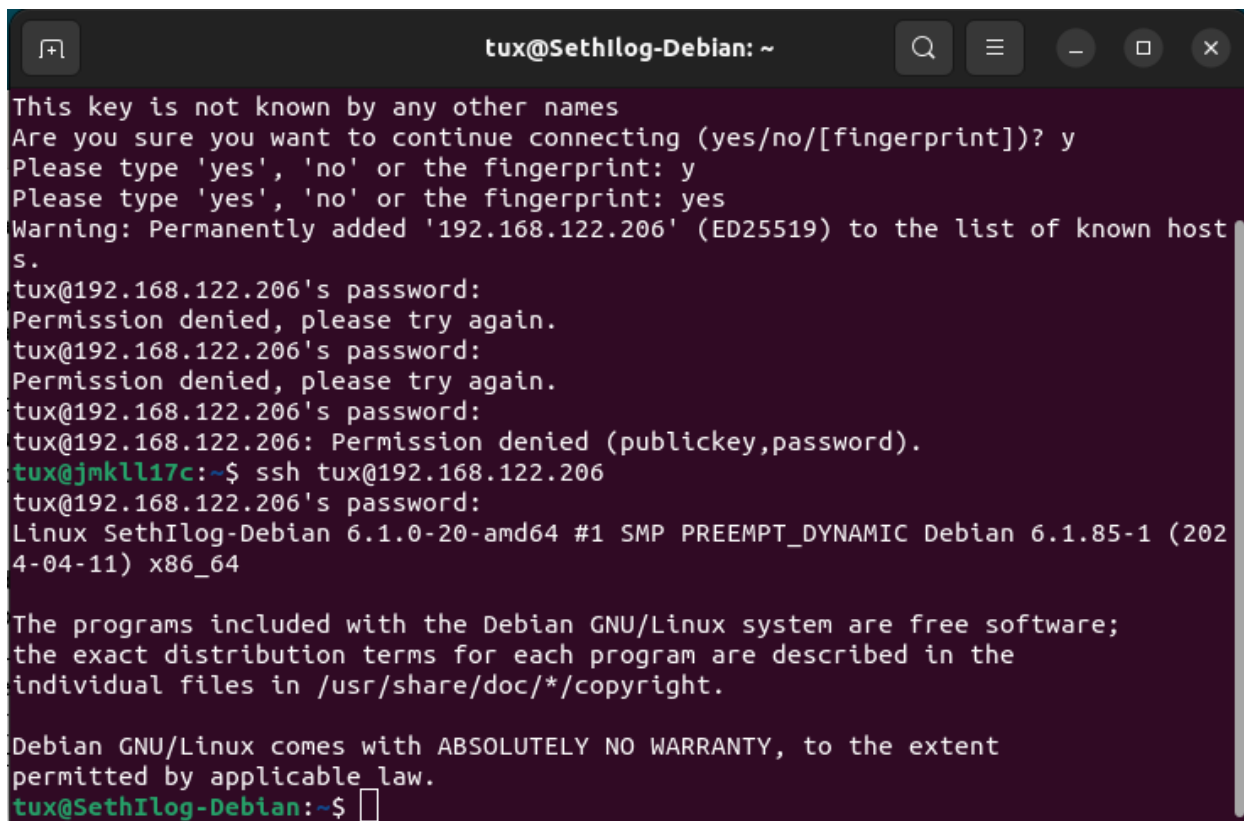


Seth Andrew Ilog

Creating a Virtual Machine on Linux

The IP address designated for the newly created virtual machine with the confirmation of being able to connect to said virtual machine from the *tux* host machine.

A terminal window titled 'tux@SethIlog-Debian: ~' with standard window controls. The terminal shows an SSH connection attempt to 192.168.122.206. It displays a warning about a new host key, prompts for a password three times (all denied), and then shows the system banner for Linux SethIlog-Debian 6.1.0-20-amd64. The prompt returns to the user's shell.

```
tux@SethIlog-Debian: ~  
This key is not known by any other names  
Are you sure you want to continue connecting (yes/no/[fingerprint])? y  
Please type 'yes', 'no' or the fingerprint: y  
Please type 'yes', 'no' or the fingerprint: yes  
Warning: Permanently added '192.168.122.206' (ED25519) to the list of known hosts.  
tux@192.168.122.206's password:  
Permission denied, please try again.  
tux@192.168.122.206's password:  
Permission denied, please try again.  
tux@192.168.122.206's password:  
tux@192.168.122.206: Permission denied (publickey,password).  
tux@jmkll17c:~$ ssh tux@192.168.122.206  
tux@192.168.122.206's password:  
Linux SethIlog-Debian 6.1.0-20-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.85-1 (2024-04-11) x86_64  
  
The programs included with the Debian GNU/Linux system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent  
permitted by applicable law.  
tux@SethIlog-Debian:~$
```

Updated software packages for virtual machine and found the home URL used for the default Debian webpage.

```

silog@SethIlog-Debian: ~
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Hit:1 http://deb.debian.org/debian bookworm InRelease
Hit:2 http://security.debian.org/debian-security bookworm-security InRelease
Hit:3 http://deb.debian.org/debian bookworm-updates InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Linux SethIlog-Debian 6.1.0-20-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.85-1 (2024-04-11) x86_64 GNU/Linux
Linux version 6.1.0-20-amd64 (debian-kernel@lists.debian.org) (gcc-12 (Debian 12.2.0-14) 12.2.0, GNU ld (GNU
Binutils for Debian) 2.40) #1 SMP PREEMPT_DYNAMIC Debian 6.1.85-1 (2024-04-11)
PRETTY_NAME="Debian GNU/Linux 12 (bookworm)"
NAME="Debian GNU/Linux"
VERSION_ID="12"
VERSION="12 (bookworm)"
VERSION_CODENAME=bookworm
ID=debian
HOME_URL="https://www.debian.org/"
SUPPORT_URL="https://www.debian.org/support"
BUG_REPORT_URL="https://bugs.debian.org/"
silog@SethIlog-Debian: ~$

```

Found my local host IP address (192.168.122.206) of my virtual machine to replace the Debian default webpage with my own custom webpage.

```

silog@SethIlog-Debian: ~$ nmap localhost
Starting Nmap 7.93 ( https://nmap.org ) at 2024-04-25 18:21 PDT
Nmap scan report for localhost (127.0.0.1)
Host is up (0.00013s latency).
Other addresses for localhost (not scanned): ::1
Not shown: 997 closed tcp ports (conn-refused)
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
631/tcp   open  ipp

Nmap done: 1 IP address (1 host up) scanned in 0.06 seconds
silog@SethIlog-Debian: ~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: enp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 52:54:00:69:ab:33 brd ff:ff:ff:ff:ff:ff
    inet 192.168.122.206/24 brd 192.168.122.255 scope global dynamic noprefixroute enp1s0
        valid_lft 3047sec preferred_lft 3047sec
    inet6 fe80::5054:ff:fe69:ab33/64 scope link noprefixroute
        valid_lft forever preferred_lft forever

```

Adjusted *index.html* to insert the header, body, and footer to my custom webpage.

whdr() containing the contents to the header of my webpage.

The results of the **calcit()** command being used for the body of my webpage.

wftr() containing the contents to the footer of my webpage.

```
silog@SethIlog-Debian:~$ whdr >> index.html
silog@SethIlog-Debian:~$ fortune
bash: fortune: command not found
silog@SethIlog-Debian:~$ calcit "355/115"
3.08
silog@SethIlog-Debian:~$ calcit "355/115" >> index.html
silog@SethIlog-Debian:~$ wftr >> index.html
silog@SethIlog-Debian:~$ cat index.html
<!DOCTYPE html><head><title>bash web</title></head><body><pre>
3.08
</pre></body></html>
silog@SethIlog-Debian:~$ sudo mv index.html /var/www/html/
silog@SethIlog-Debian:~$
```

Results of my newly built, custom webpage utilizing my virtual machine' IP address (192.168.122.206):



Created a new vi text file under, */etc/fstab*, which would contain the UUIDs of the created logical volumes of the physical drives manually installed onto the virtual machine via virtual hardware.

Used the **vi /etc/fstab** command to create the default, pre-made text file for */etc/fstab*.

Added the UUIDs for the logical volumes of */mnt/data1*, */mnt/data2*, and */mnt/data3* manually with each volume containing 2GB of usable space.

```

silog@Sethllog-Debian: ~
# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# systemd generates mount units based on this file, see systemd.mount(5).
# Please run 'systemctl daemon-reload' after making changes here.
#
# <file system> <mount point>    <type>  <options>          <dump>  <pass>
# / was on /dev/vda1 during installation
UUID=07aaa8d9-a224-4dad-922d-d27fa8ec7f94 /          ext4      errors=remount-ro 0      1
# swap was on /dev/vda5 during installation
UUID=9204cf55-6f2e-4795-a94f-5649fa19c2d5 none      swap      sw          0      0
UUID=f2fb59bd-8805-4c49-b34d-bc049e046bf0 /mnt/data1 ext4      defaults    0      2
UUID=744649df-ed55-43b4-ba23-74d968c62cc6 /mnt/data2 ext4      defaults    0      2
UUID=ee31fdc1-9692-44f7-8e1f-858d5ff20c49 /mnt/data3 ext4      defaults    0      2

```

Used the **pvccreate** command to create physical volumes for the virtual machine.

Created 2 new physical volumes under, *vdb1* and *vdc1*.

Used the **pvddisplay** command to showcase the 2 newly created physical volumes added to the virtual machine.

With the full names of the physical volumes being */dev/vdb1* and */dev/vdc1*.

```
silog@SethIlog-Debian:~$ sudo pvddisplay
[sudo] password for silog:
--- Physical volume ---
PV Name           /dev/vdb1
VG Name           datavg
PV Size           <5.00 GiB / not usable 3.00 MiB
Allocatable       yes (but full)
PE Size           4.00 MiB
Total PE          1279
Free PE           0
Allocated PE       1279
PV UUID           PMXpv4-cxR0-k60j-atP4-AJQA-GJQG-dGajcn

--- Physical volume ---
PV Name           /dev/vdc1
VG Name           datavg
PV Size           <5.00 GiB / not usable 3.00 MiB
Allocatable       yes
PE Size           4.00 MiB
Total PE          1279
Free PE           254
Allocated PE       1025
PV UUID           N5rTyI-0Tba-XY2h-m603-kUjP-PUIW-cfP0JZ
```

Used the **vgcreate** command to create a new volume group that contains both of the 2 newly created physical volumes.

The new volume group being named, *datavg*.

The physical volumes being */dev/vdb1* and */dev/vdc1*.

Used the **vgdisplay** command to review the newly created volume group called, *datavg*, which contains the 2 previously created physical volumes.

```
silog@SethIlog-Debian:~$ sudo vgdisplay
--- Volume group ---
VG Name                datavg
System ID
Format                 lvm2
Metadata Areas         2
Metadata Sequence No   4
VG Access              read/write
VG Status              resizable
MAX LV                 0
Cur LV                3
Open LV                3
Max PV                 0
Cur PV                2
Act PV                 2
VG Size                9.99 GiB
PE Size                4.00 MiB
Total PE               2558
Alloc PE / Size        2304 / 9.00 GiB
Free PE / Size         254 / 1016.00 MiB
VG UUID                7H8VIY-4ITJ-mfXp-S2FY-FZCx-NJnW-RaICM2
```

Used the **lvcreate** command to create 3 logical volumes based upon the previously created volume group named, *datavg*.

Created 3 separate logical volumes named, *data1lv*, *data2lv*, and *data3lv*.

Each of the logical volumes contain 2GB of usable space with the exception of *data1lv* which contains a full 5GB of usable space.

data1lv:

```
silog@SethIlog-Debian:~$ sudo lvdisplay
--- Logical volume ---
LV Path                /dev/datavg/data1lv
LV Name                 data1lv
VG Name                 datavg
LV UUID                 7Sdfx6-d1zp-Uflj-mJV1-IlYw-gFmD-CiF51d
LV Write Access         read/write
LV Creation host, time SethIlog-Debian, 2024-04-18 17:29:12 -0700
LV Status                available
# open                  1
LV Size                 5.00 GiB
Current LE              1280
Segments                2
Allocation               inherit
Read ahead sectors      auto
- currently set to     256
Block device            253:0
```

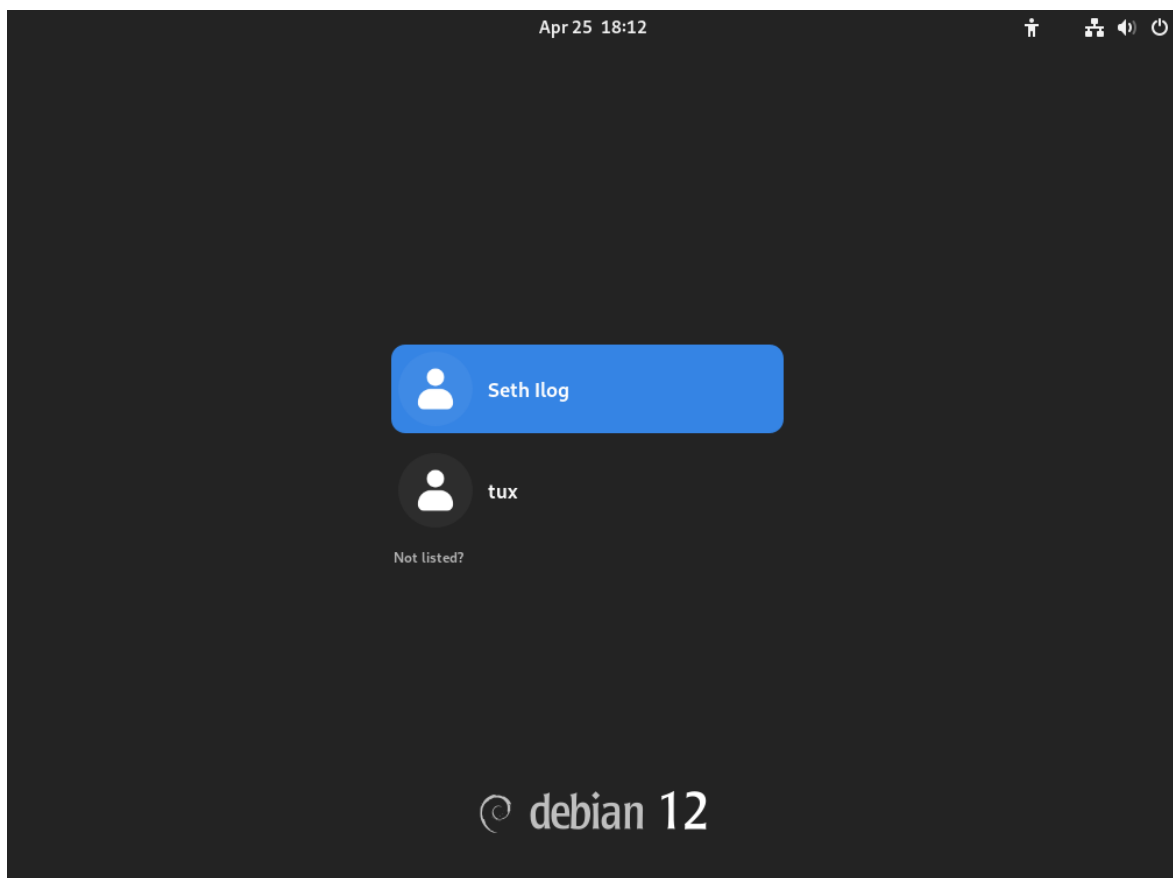
data2lv:

```
--- Logical volume ---
LV Path                /dev/datavg/data2lv
LV Name                 data2lv
VG Name                 datavg
LV UUID                 Cork8a-b5Zv-T4JX-GkyH-9nub-pZdD-nxAZG5
LV Write Access         read/write
LV Creation host, time SethIlog-Debian, 2024-04-18 17:34:38 -0700
LV Status                available
# open                  1
LV Size                 2.00 GiB
Current LE              512
Segments                1
Allocation               inherit
Read ahead sectors      auto
- currently set to     256
Block device            253:1
```

data3lv:

```
--- Logical volume ---
LV Path                /dev/datavg/data3lv
LV Name                data3lv
VG Name                datavg
LV UUID                nJZifX-wspu-npXV-tf0g-Hkia-0Ng0-g2NokY
LV Write Access        read/write
LV Creation host, time SethIlog-Debian, 2024-04-18 17:35:41 -0700
LV Status              available
# open                 1
LV Size                2.00 GiB
Current LE             512
Segments               1
Allocation              inherit
Read ahead sectors     auto
- currently set to    256
Block device           253:2
```

Additional user, *Tux*, added onto my virtual machine.



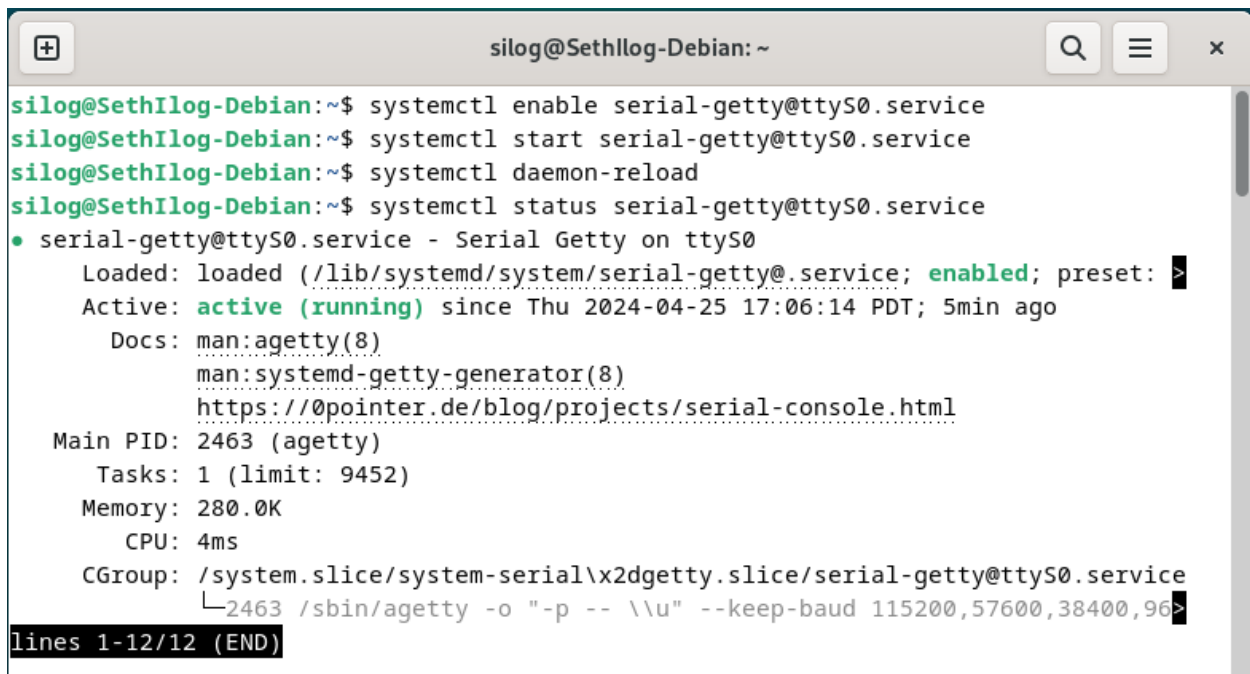
Serial console setup for my virtual machine utilizing **systemctl (...) serial-getty@ttyS0.service** commands as well as the **systemctl daemon-reload** command.

systemctl enable serial-getty@ttyS0.service enables the serial console for the virtual machine so that the system can be directly connected to, and interacted with, by another host's system.

systemctl start serial-getty@ttyS0.service starts the process of the serial console up so that the virtual machine can be interacted with by another host's system.

systemctl daemon-reload reloads the virtual machine's system configuration files without fully restarting the system or any of its services.

systemctl status serial-getty@ttyS0.service checks on the status of the serial console for the virtual machine; in essence, checking to see if it's enabled, disabled, active, inactive, etc.



```

silog@SethIlog-Debian: ~
silog@SethIlog-Debian:~$ systemctl enable serial-getty@ttyS0.service
silog@SethIlog-Debian:~$ systemctl start serial-getty@ttyS0.service
silog@SethIlog-Debian:~$ systemctl daemon-reload
silog@SethIlog-Debian:~$ systemctl status serial-getty@ttyS0.service
• serial-getty@ttyS0.service - Serial Getty on ttyS0
   Loaded: loaded (/lib/systemd/system/serial-getty@.service; enabled; preset: >
   Active: active (running) since Thu 2024-04-25 17:06:14 PDT; 5min ago
     Docs: man:agetty(8)
           man:systemd-getty-generator(8)
           https://0pointer.de/blog/projects/serial-console.html
   Main PID: 2463 (agetty)
     Tasks: 1 (limit: 9452)
    Memory: 280.0K
       CPU: 4ms
    CGroup: /system.slice/system-serial\x2dgetty.slice/serial-getty@ttyS0.service
            └─2463 /sbin/agetty -o "-p -- \u" --keep-baud 115200,57600,38400,96>
lines 1-12/12 (END)
  
```

bin and *inclass* directories added into home directory.

```

silog@SethIlog-Debian: ~
silog@SethIlog-Debian:~$ ls -la
total 144
drwx----- 19 silog silog 4096 Apr 25 18:03 .
drwxr-xr-x  4 root  root  4096 Apr 18 18:20 ..
-rw-r--r--  1 silog silog  244 Apr 25 18:05 .bash_aliases
-rw-----  1 silog silog 3626 Apr 25 18:03 .bash_history
-rw-r--r--  1 silog silog  220 Apr 11 17:33 .bash_logout
-rw-r--r--  1 silog silog 3752 Apr 25 18:05 .bashrc
-rw-r--r--  1 silog silog   8 Apr 25 18:05 .brcrc
drwxr-xr-x  2 silog silog 4096 Apr 25 17:56 bin
drwx----- 11 silog silog 4096 Apr 23 17:39 .cache
drwx----- 13 silog silog 4096 Apr 23 17:53 .config
drwxr-xr-x  2 silog silog 4096 Apr 18 17:36 data1lv
drwxr-xr-x  2 silog silog 4096 Apr 18 17:36 data2lv
drwxr-xr-x  2 silog silog 4096 Apr 18 17:36 data3lv
drwxr-xr-x  2 silog silog 4096 Apr 11 17:34 Desktop
drwxr-xr-x  2 silog silog 4096 Apr 11 17:34 Documents
drwxr-xr-x  2 silog silog 4096 Apr 11 17:34 Downloads
-rw-r--r--  1 silog silog 5290 Apr 11 17:33 .face
lrwxrwxrwx  1 silog silog   5 Apr 11 17:33 .face.icon -> .face
-rw-r--r--  1 silog silog   87 Apr 23 17:13 for_loop_SI
-rw-r--r--  1 silog silog  177 Apr 25 18:05 .funcs
-rw-r--r--  1 silog silog  419 Apr 23 17:22 if_loop_SI
drwxr-xr-x  2 silog silog 4096 Apr 25 17:15 inclass
-rw-----  1 silog silog   20 Apr 25 17:14 .lessht
drwx-----  4 silog silog 4096 Apr 11 17:34 .local
drwxr-xr-x  2 silog silog 4096 Apr 11 17:34 Music
drwxr-xr-x  3 silog silog 4096 Apr 23 17:25 Pictures
drwx-----  3 silog silog 4096 Apr 23 17:53 .pki
-rw-r--r--  1 silog silog  807 Apr 11 17:33 .profile
drwxr-xr-x  2 silog silog 4096 Apr 11 17:34 Public
-rw-r--r--  1 silog silog 1400 Apr 25 17:37 sp24_mkstuff.txt

```

bin and *inclass* directories added to \$PATH.

```

silog@SethIlog-Debian: ~
silog@SethIlog-Debian:~$ echo $PATH
/home/silog/bin:/home/silog/inclass:/home/silog/bin:/usr/local/bin:/usr/bin:/bin:/usr/local/games:/usr/games
silog@SethIlog-Debian:~$

```

Added *.funcs* via *calcit()*, *whdr()*, and *wftr()* to use to create custom webpage.

```

silog@SethIlog-Debian:~$ whdr
<!DOCTYPE html><head><title>bash web</title></head><body><pre>
silog@SethIlog-Debian:~$ wftr
</pre></body></html>
silog@SethIlog-Debian:~$ calcit "355/115"
3.08
silog@SethIlog-Debian:~$

```

Created a simple **for** loop which results in my first and last name being listed 10 times with each string containing its own full line of text.

```
#!/bin/bash
#for_loop_SI

LST=$(seq 1 10)
for i in $LST
do
    echo "Seth Ilog"
done

#--
```

Results of **for** loop utilizing the **bash** command:

[illegible]

Created an **if** loop which results in an output that corresponds to the user's input.

If the user enters any of the 3 colors of a stoplight, in ALL lowercase letters, the output of the **if** loop will respond to the input with a specifically written response that relates to what a driver should do during a green, yellow, or red stoplight.

green = "Green stoplight = GO"

yellow = "Yellow stoplight = YIELD or SLOW DOWN"

red = "Red stoplight = STOP"

If the user enters anything else other than the 3 stoplight colors in ALL lowercase letters, the if loop will output a response appropriately telling the user it "Cannot."

If the user enters the letter "q", the **if** loop will stop and the program will cease to continue.

```
#!/bin/bash
# stoplight
# simple if test

display_light() {
  case $1 in
    "red") echo "Red stoplight = STOP";;
    "yellow") echo "Yellow stoplight = YIELD or SLOW DOWN";;
    "green") echo "Green stoplight = GO";;
    *) echo "Cannot.";;
  esac
}
# main
while true
do
  echo -n "Enter a stoplight color with ALL lowercase letters. "
  read light
  if [ $light == "q" ]
  then break
  fi
  display_light $light
done
#--
"if_loop_SI" 23L, 419B
```

7,38

All

Results of **if** loop utilizing the **bash** command:

```
silog@SethIlog-Debian:~$ bash if_loop_SI
Enter a stoplight color with ALL lowercase letters. red
Red stoplight = STOP
Enter a stoplight color with ALL lowercase letters. yellow
Yellow stoplight = YIELD or SLOW DOWN
Enter a stoplight color with ALL lowercase letters. green
Green stoplight = GO
Enter a stoplight color with ALL lowercase letters. blah
Cannot.
Enter a stoplight color with ALL lowercase letters. q
silog@SethIlog-Debian:~$
```

The **if** loop will always respond to the correct and incorrect inputs accordingly.

Correct inputs: green, yellow, red, q

Incorrect inputs: anything OTHER than what is listed as a correct input.