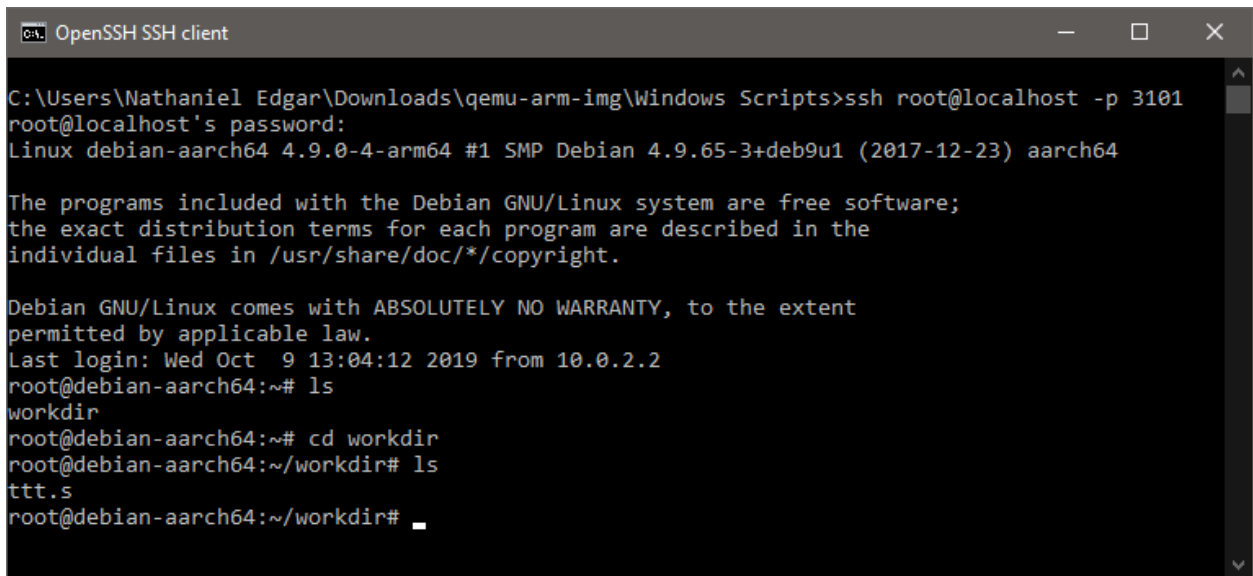


ARM Emulator Use

1. Start the emulator as outlined in the installation guides.
2. Code your ARM program in your editor of choice.
3. Save the .s file in "qemu-arm-img/workdir".
4. Windows:
 - a. Navigate to "Windows Scripts".
 - b. Run "transfer.bat".
 - c. Bypass SmartScreen as outlined in the installation guides.
 - d. Enter "root" as the password when prompted.
5. Linux
 - a. Navigate in the terminal to "Unix Scripts".
 - b. Run the following command: "./transfer.sh"
 - c. Enter "root" as the password when prompted.
6. All files present on your local PC in "qemu-arm-img/workdir" will now be present in a directory called "workdir" on your emulator, similar to the below image:



```
OpenSSH SSH client

C:\Users\Nathaniel Edgar\Downloads\qemu-arm-img\Windows Scripts>ssh root@localhost -p 3101
root@localhost's password:
Linux debian-aarch64 4.9.0-4-arm64 #1 SMP Debian 4.9.65-3+deb9u1 (2017-12-23) aarch64

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.
Last login: Wed Oct  9 13:04:12 2019 from 10.0.2.2
root@debian-aarch64:~# ls
workdir
root@debian-aarch64:~# cd workdir
root@debian-aarch64:~/workdir# ls
ttt.s
root@debian-aarch64:~/workdir#
```

7. To compile your program, run the following command: "gcc -o <program name> <filename>.s -g"
 - a. "-o <program name>" determines the name of the resulting executable
 - b. "<filename>.s" specifies which ARM source file to attempt to assemble
 - c. "-g" links the program for debugging

8. The result should look something like this:

```
root@debian-aarch64:~/workdir# ls
ttt.s
root@debian-aarch64:~/workdir# gcc -o ttt ttt.s -g
root@debian-aarch64:~/workdir# ls
ttt  ttt.s
root@debian-aarch64:~/workdir# _
```

9. Now to run your program, run “./<program name>”, like so:

```
root@debian-aarch64:~/workdir# ./ttt
Welcome to Tic-Tac-Toe! Initializing...
| |
-----
| |
-----
| |
Player 1, what is your move?
```

10. When you are finished with your program, you can type Ctrl+C/Cmd+C to exit.
11. When you are finished with the emulator, **run the command “poweroff”** in the emulator window:

```
root@debian-aarch64:~/workdir# poweroff_
```

This step ensures that the emulator gracefully exits, and no data is lost.