**COMPILATION ON DIFFERENT TARGETS**

Document outlining the compilation steps on different targets (x86 Ubuntu, Raspberry Pi, and BeagleBone), follow these general steps:

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# **Build steps for X86**

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Run the **make** command to compile your code:

$ make

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# **Build steps for BBB**

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## **Step 1: Environment Variables Setup**

1. **Set the ARCH and CROSS\_COMPILE** **environment Variables**

$ export ARCH=arm

$ export CROSS\_COMPILE=arm-linux-gnueabihf-

1. **Set the PATH to the Cross-Toolchain:**

$ export PATH=${HOME}/ela\_lab\_exercises/bbb\_build/toolchain/gcc-linaro-7.5.0-2019.12-x86\_64\_arm-linux-gnueabihf/bin/:$PATH

## **Step 2: Compilation**

$ make

## **Step 3:** **Transfer Binary file to target**

$ scp <binary\_file> <username>@<ip\_address>:<destination\_directory>

**Example**: $scp Thread\_Termination [root@10.10.3.233:/User\_Programs](mailto:root@10.10.2.233:/User_Programs)

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# **Build steps for Raspberry Pi 4B**

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## **Step 1: Environment Variables Setup**

1. **Set the ARCH and CROSS\_COMPILE environment Variables**

$ export ARCH=arm64

$ export CROSS\_COMPILE=aarch64-linux-gnu-

1. **Set the PATH to the Cross-Toolchain**

$ export PATH=${HOME}/ela\_lab\_exercises\_rpi/rpi\_build/toolchain/gcc-linaro-7.5.0-2019.12-x86\_64\_aarch64-linux-gnu/bin/:$PATH

## **Step 2: Compilation**

$ make

## **Step 3: Transfer Binary file to target**

$ scp <binary\_file> <username>@<ip\_address>:<destination\_directory>

**Example**: $scp Thread\_Termination [root@10.10.1.27:/User\_Programs](mailto:root@10.10.1.27:/User_Programs)

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**Running on Platform (x86, Raspberry Pi, BBB)**

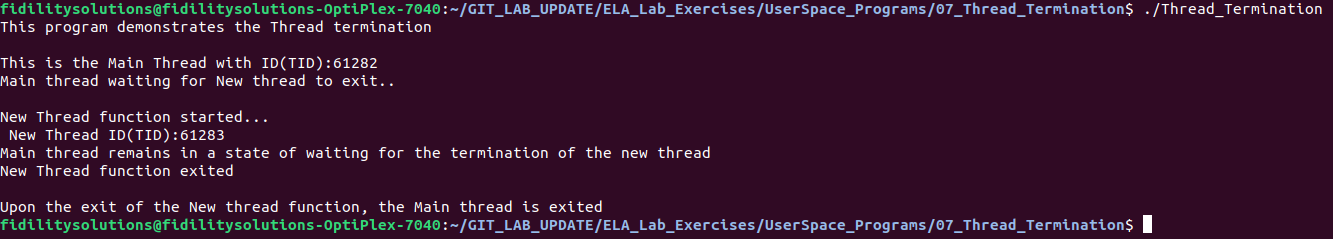
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* Once you're in the correct directory, execute the generated executable file using the **./filename** command. Replace **filename** with the name of your executable file.

$ ./filename

**Ex: $ ./**Thread\_Termination

* The overall output will be as given below:



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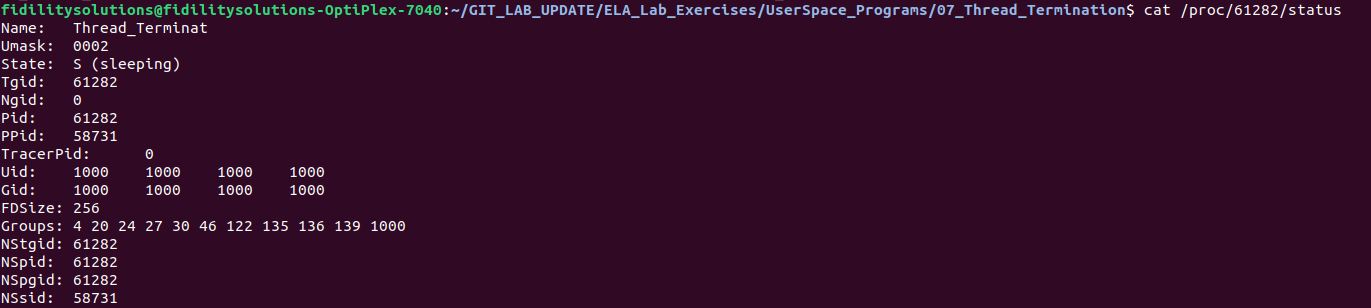
# **Understanding Processes Using /proc Interface and ps Command**

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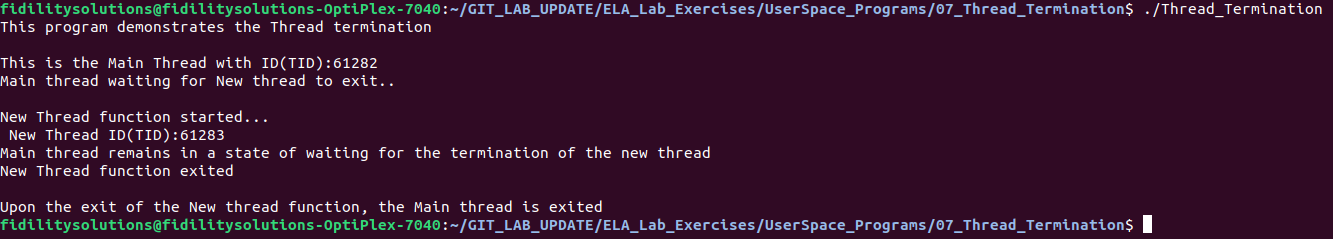
## **Using /proc Interface**

* Identify the PID (Process ID) of a running process-> 61282
* cat /proc/$pid/status.

$ cat /proc/61282/status



## **Using ps Command:**

* The **ps -T -p <PID>** command provides a concise overview of all processes running on the system, displaying detailed information in a full-format listing.
  + The image illustrates a scenario where one thread is created within the main thread, and both threads run concurrently. Eventually, the main thread awaits the termination of the created thread using the pthread\_join() system call.
  + The below image displays the execution of a command along with the respective thread statuses when running the 'ps -T -p 61282' command.

$ ps -T -p 61282

