National Institute of Technology Karnataka, Surathkal

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GEM5 FULL SYSTEM MODE(FS) REPORT

SUBMITTED BY

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CONTENTS:

In this report, assuming gem5 is installed and various architectures such as arm, alpha and x86 are built ,I have explained the steps to run gem5 in full system mode for various architectures such as arm, alpha and x86.First, steps to run gem5 in full system mode using default disk image is shown and screenshots are attached to further aid the process.

Next, steps are shown to run gem5 in full system mode for various architectures such as arm, alpha and x86 by specifying the disk image specified for that particular architecture. Relevant screenshots are attached to further aid the process. Once gem5 can be run on full system mode we can run programs in full system mode.

GEM5 FULL SIMULATION :

Assuming GEM5 Simulator has been installed following are the steps to setup GEM5 Full simulation mode.

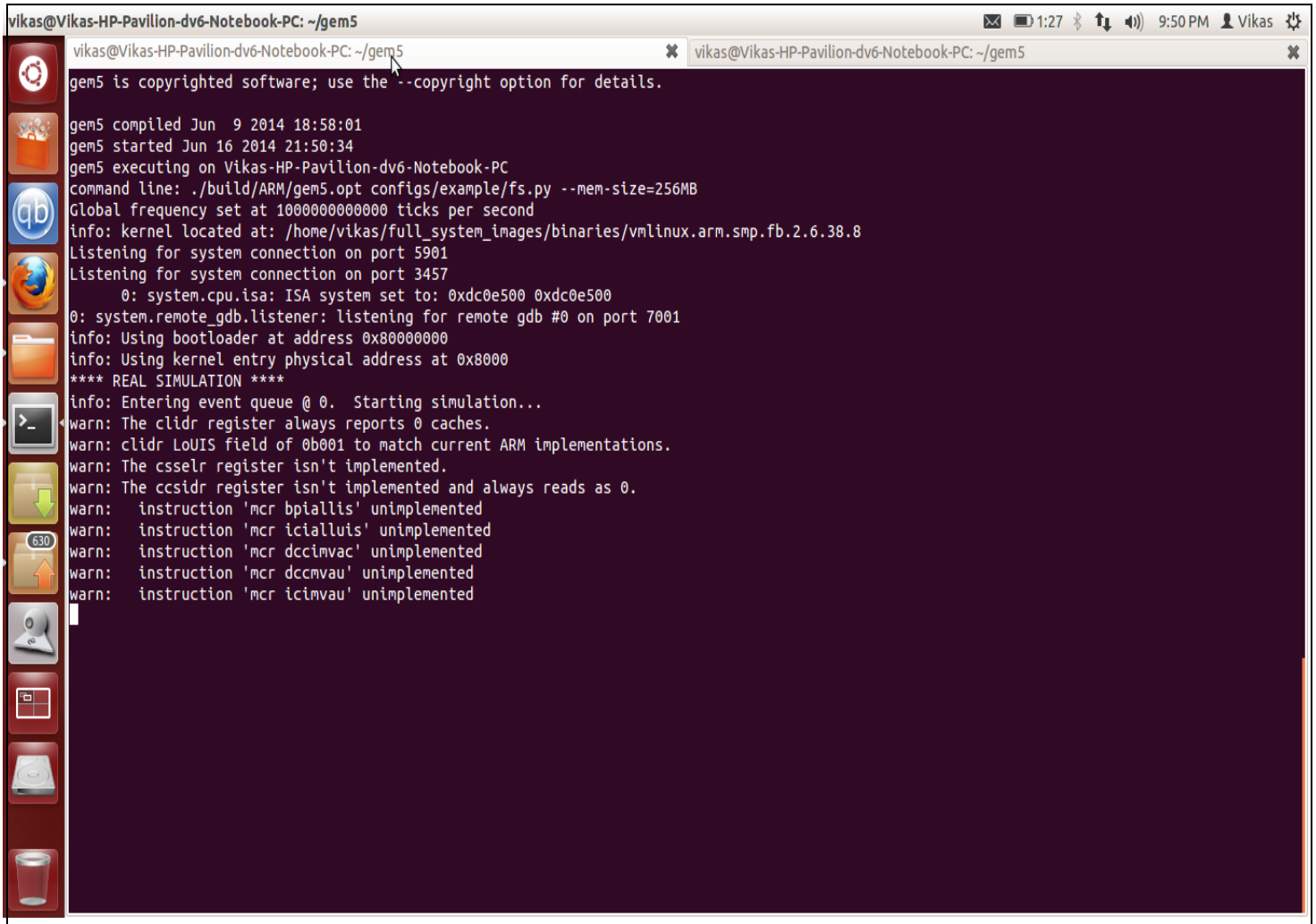
STEPS FOR ARM:

1. Open the terminal and make a new directory called full_system_images
2. Change the directory to full_system_images
3. Downlaod Arm package from gem5 or paste arm package downloaded manually to folder full_system_images
4. Type tar -xzf arm64-system-02-2014.tgz or tar jxf arm-system-2011-08.tar.bz2 depending upon the package you have downloaded.
5. Add M5_PATH into .bashrc file to tell the system where the image is .Point the M5_PATH to full_system_images to bashrc
6. type command M5_PATH="/home/vikas/full_system_images/" >> ./.bashrc
7. To check whether successful type echo $M5_PATH if it shows as follows then successful =/home/vikas/full_system_images/
8. Path can also be changed by the following method
    - Open gem5->configs->common-SysPath.py file
    - Then under def system paste the path where you have extracted the downloaded images
    - Eg:path = [/dist/m5/system',/home/vikas/full_system_images']

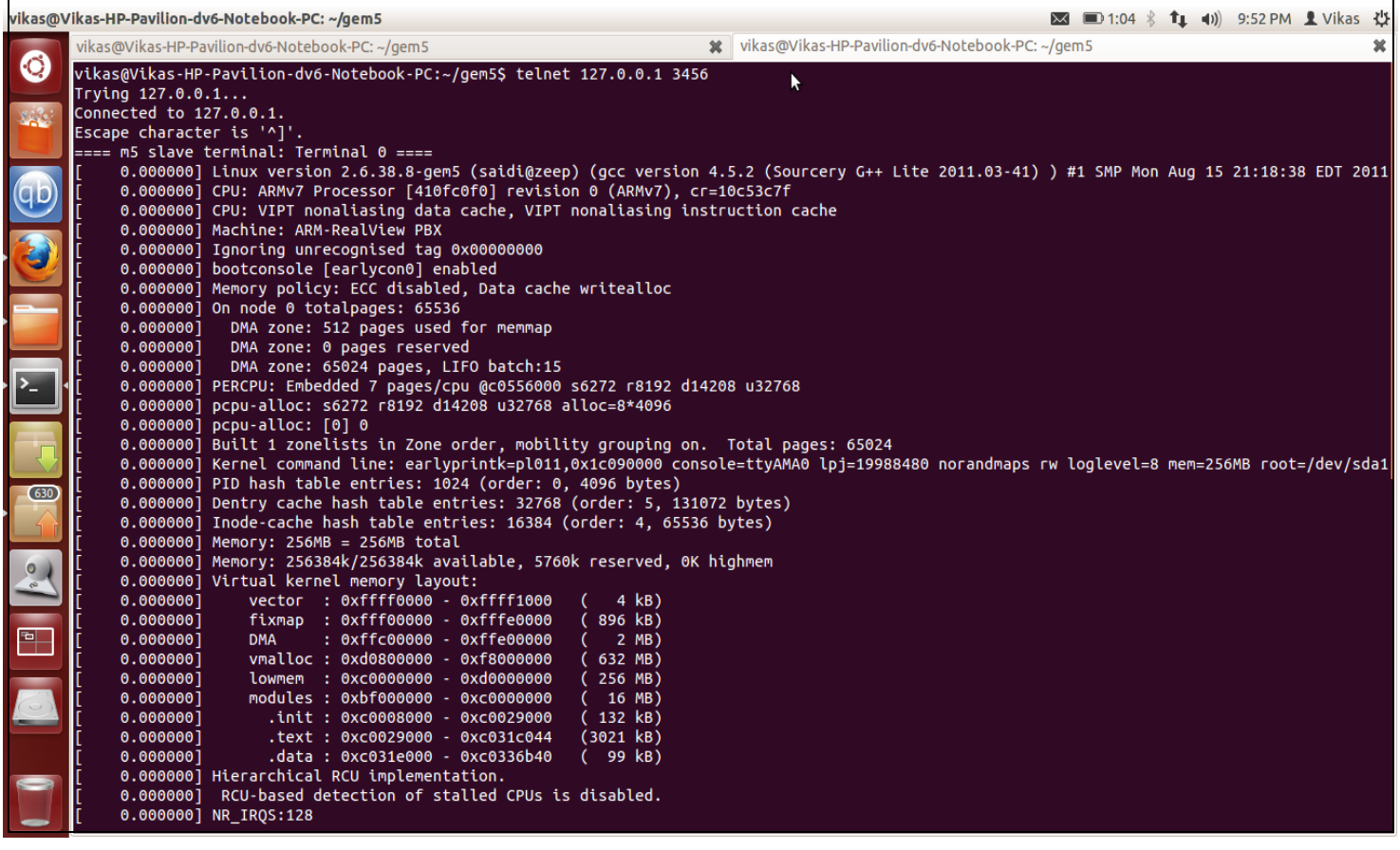
RUNNING A PROGRAM :

By default, the fs.py script boots Default Linux and starts a shell on the system console. To keep console traffic separate from simulator input and output, this simulated console is associated with a TCP port. To interact with the console, you must connect to the port using a program such as telnet

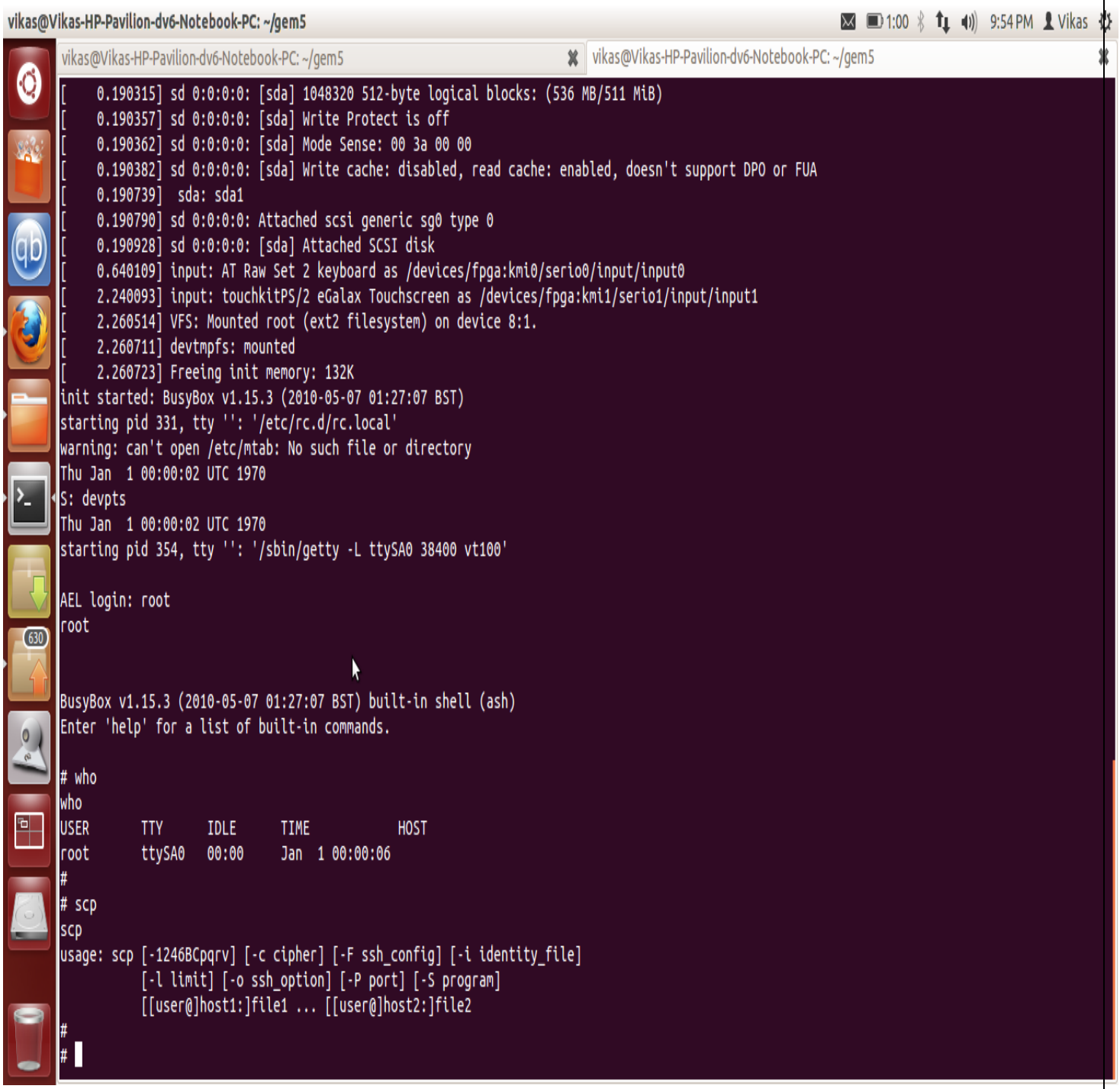
1. Set the directory to gem5 and Type the command ./ build/ARMgem5.opt configs/example/fs.py –mem-size=256MB.Specify Memory size for arm as default gem5 arm build does not support more than 256 MB. Default Linux Image at binaries in full_system _images folder will be loaded



2. Now open a new terminal tab by typing ctr +shift +t and type telnet 127.0.0.1 3456 .Now you will be logged on to on the simulated system



3. Type root as login to begin with. Output when commands who and scp is typed is shown below. We get the outpout of the commands in the simulated GEM5 System.

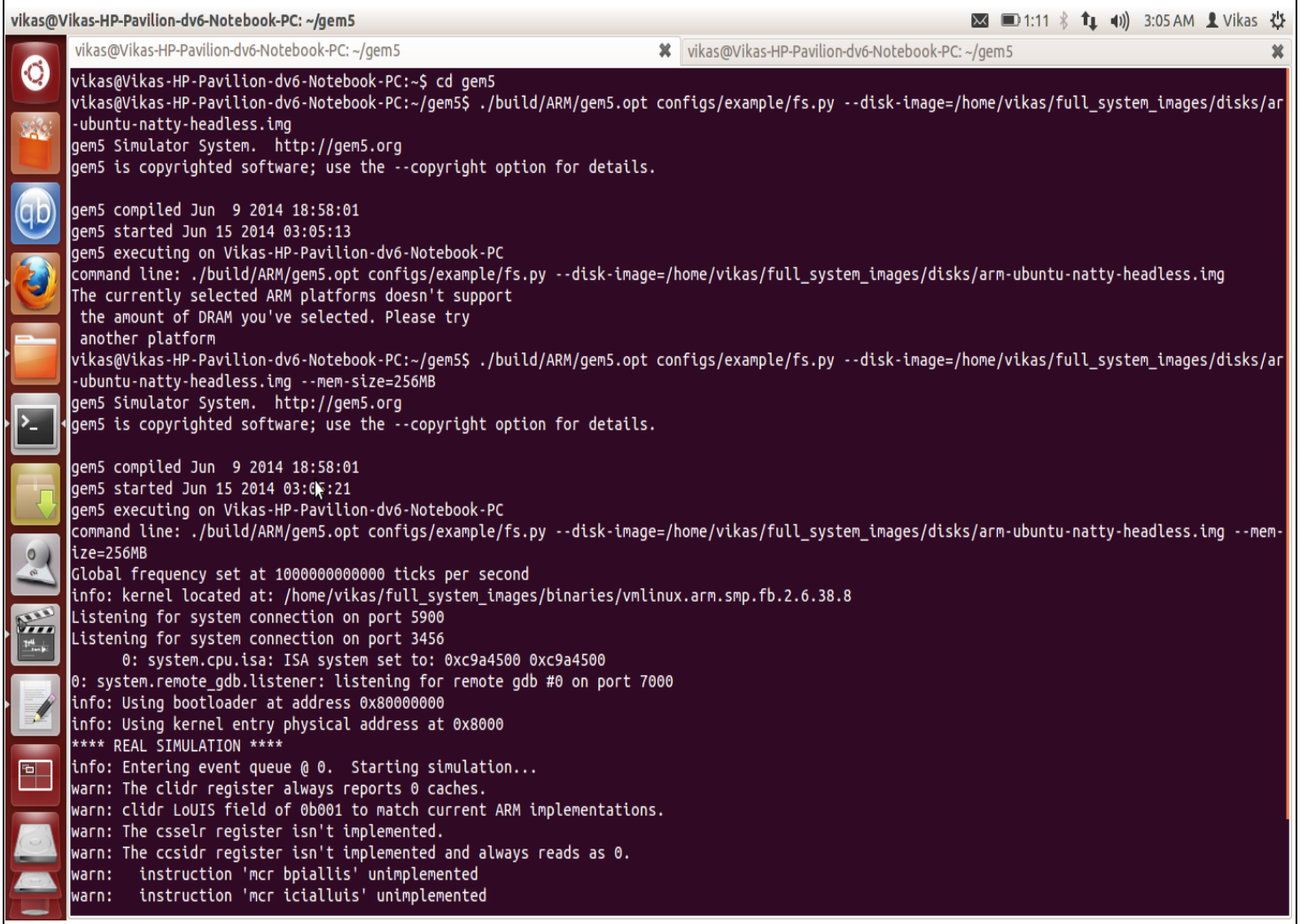


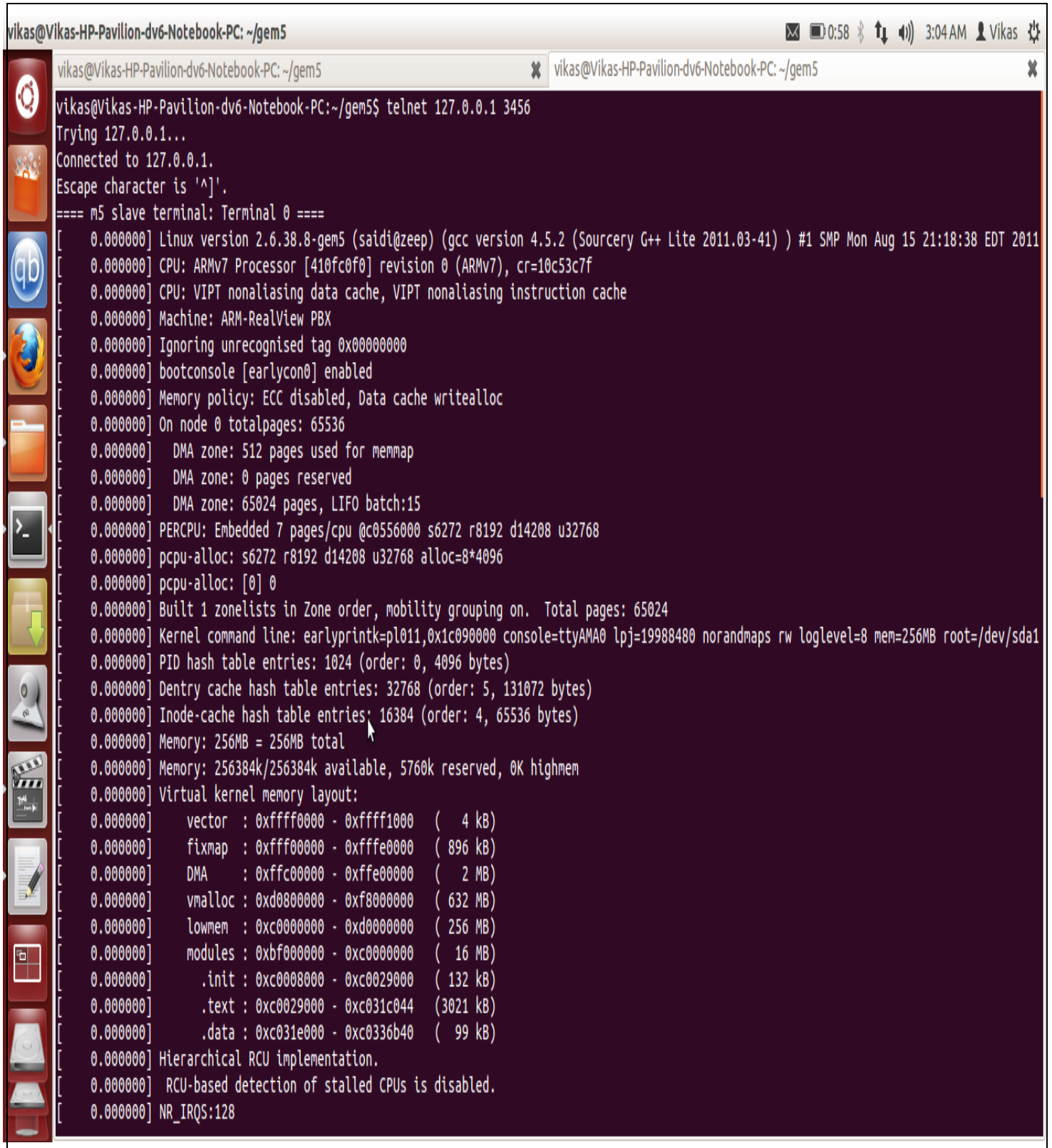
To run arm full system with more than 256 MB install Pcie express machine and pass that to command line for the full system run

NOW WE RUN FULL SIMULATION BY SPECIFYING THE DISK IMAGE.

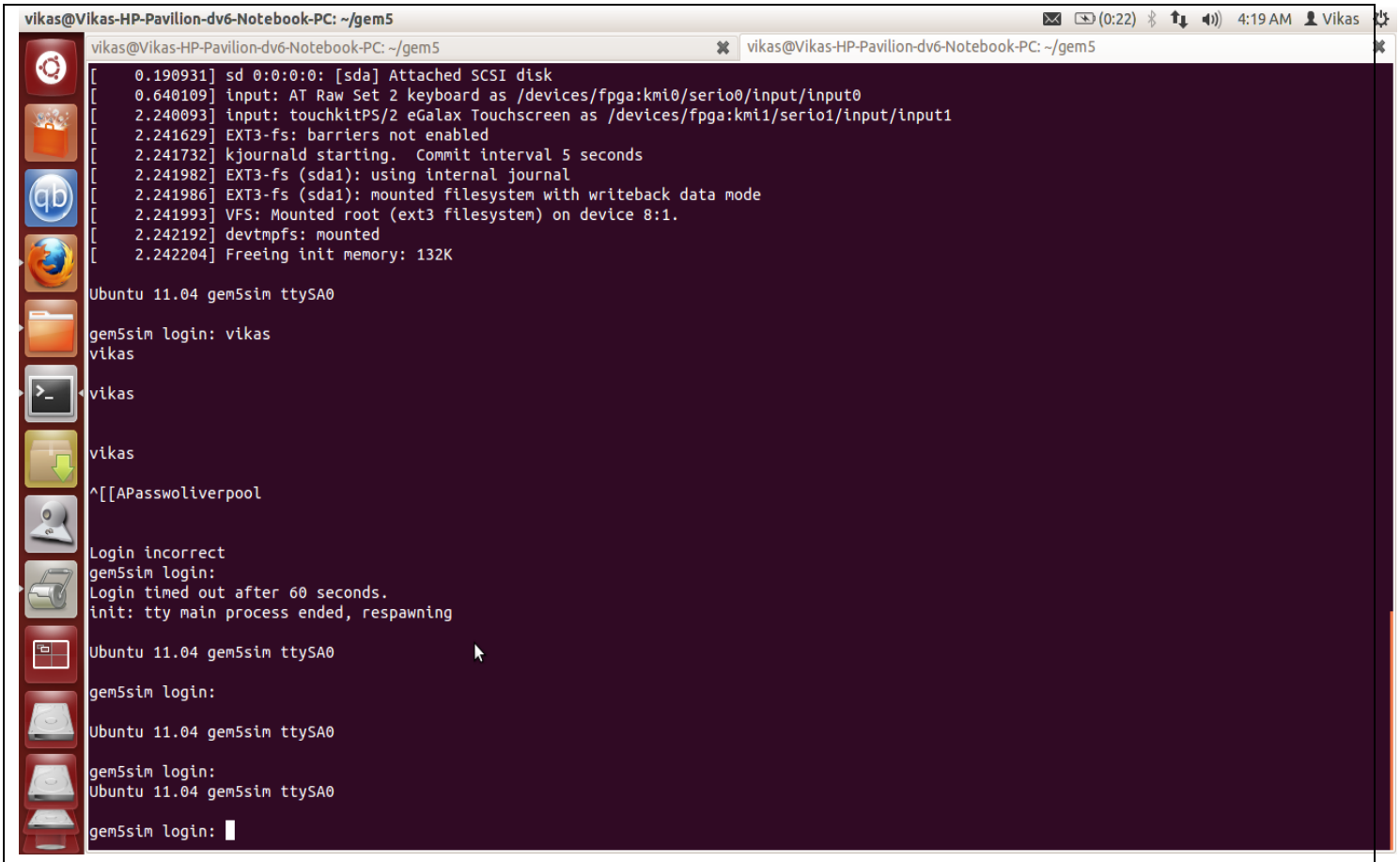
STEPS IN ARM:

1. Open the terminal and change the directory to gem5
2. Type the command build/ARM/gem5.opt configs/example/fs.py --disk-image=/home/vikas/full_system_images/disks/arm-ubuntu-natty-headless.img –mem-size=256MB. We get the inforamtion about the system and os we are booting.(/home/vikas….is path to the disk image).



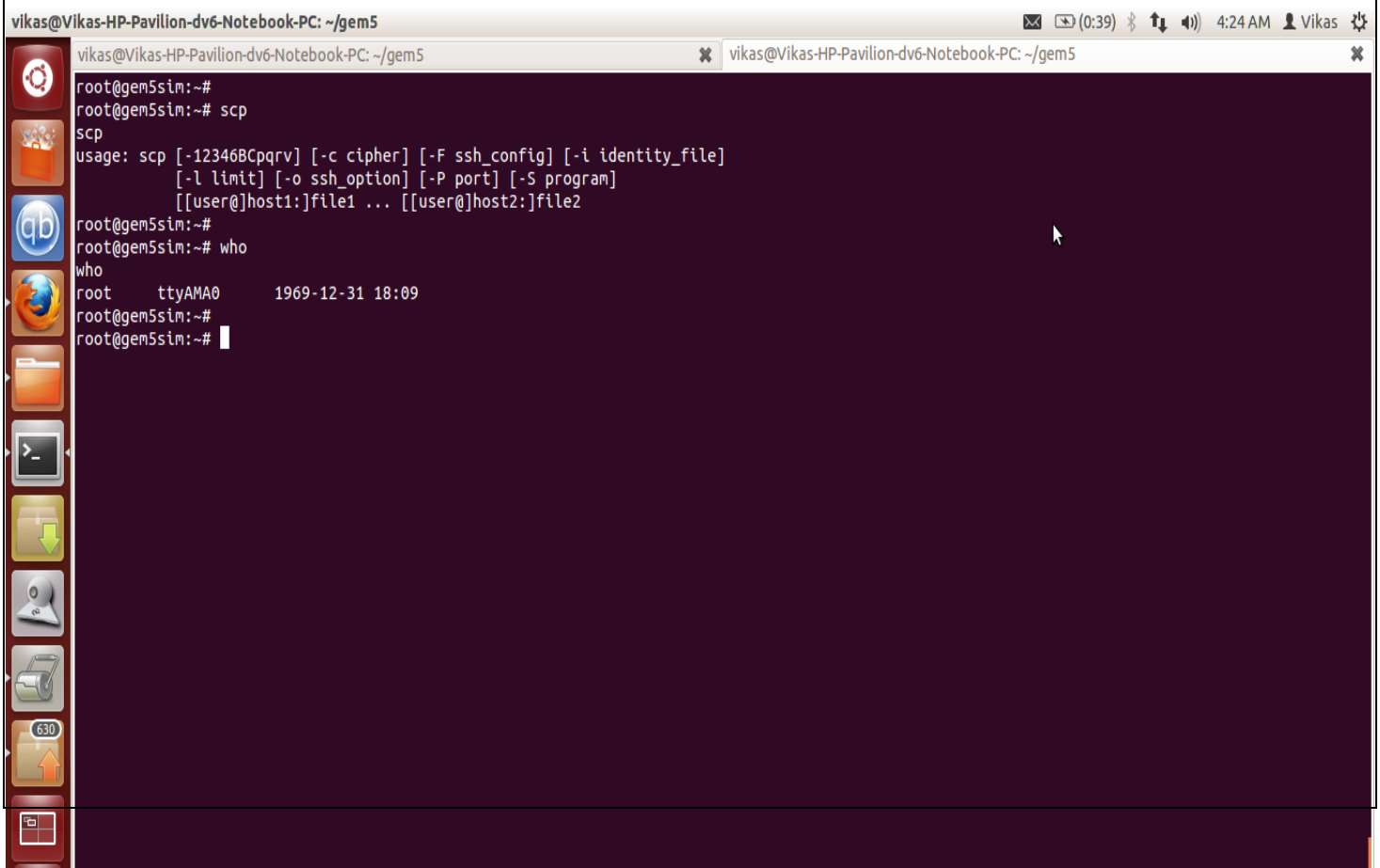


3. Now Press ctrl +shift +t to open new terminal tab and type telnet 127.0.0.1 3456 to connect with the simulated system. We get information about simulated system.Output



4. Wait for 30 minutes for the image to bootup.The image we used here is arm-ubuntu-natty-headless.img .Type root to login and type command who ,scp to test the running of simulated image

5. Output when commands scp and who are typed



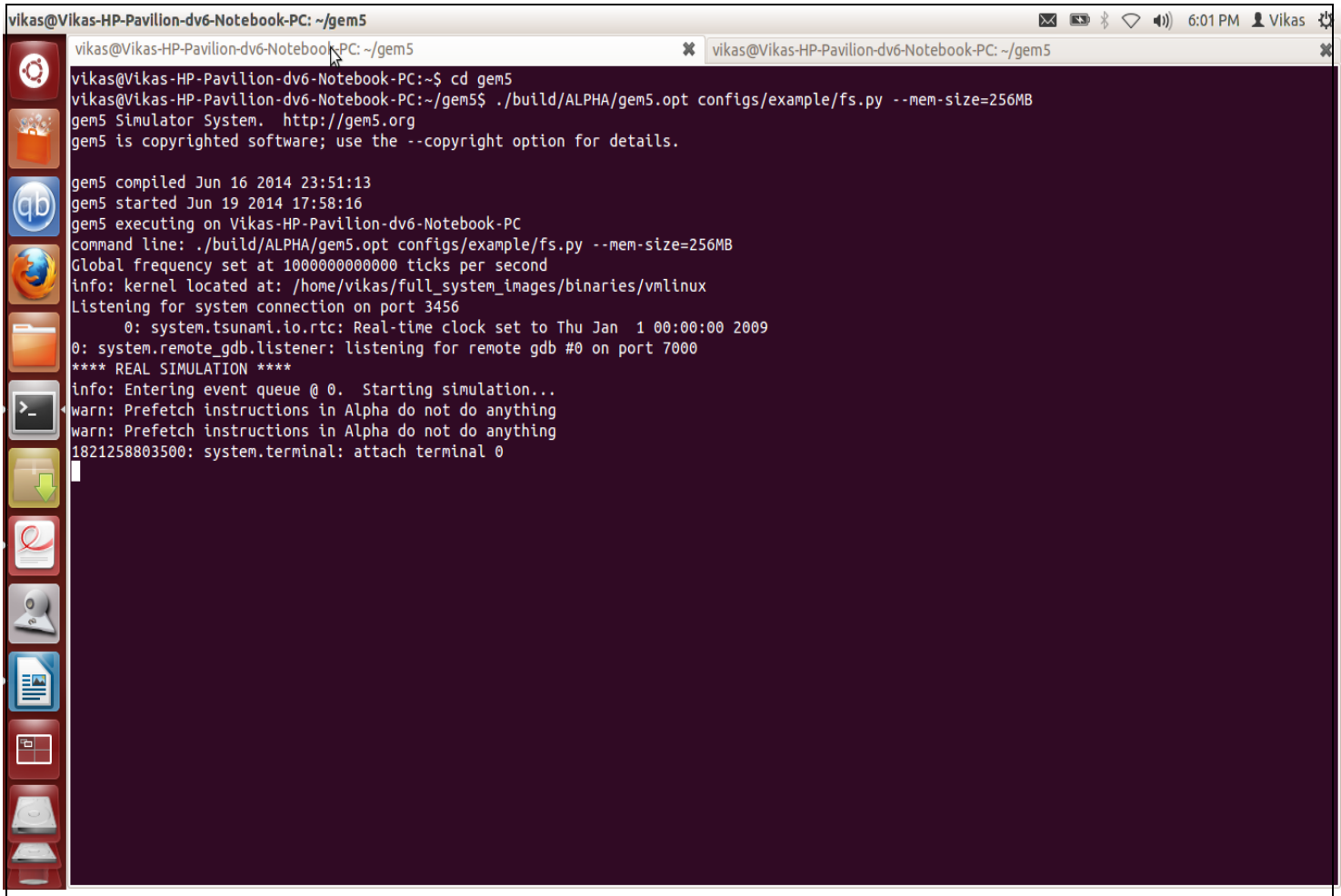
STEPS FOR ALPHA:

1. Open the terminal.We have already created full_system_images directory
2. Change the directory to full_system_images
3. Downlaod ALPHA(M5 system package) from gem5 website or paste ALPHA package downloaded manually to folder full_system_images
4. Type tar jxf M5_system_2.0b3.tar.bz2 depending upon the package you have downloaded.
5. Since we already changed the M5_Path we need not do it again. If not set then do the following
6. Add M5_PATH into .bashrc file to tell the system where the image is .Point the M5_PATH to full_system_images to bashrc
7. type command M5_PATH="/home/vikas/full_system_images/" >> ./.bashrc
8. To check whether successful type echo $M5_PATH if it shows as follows then successful =/home/vikas/full_system_images/
9. Path can also be changed by the following method
    - Open gem5->configs->common-SysPath.py file
    - Then under def system paste the path where you have extracted the downloaded images
    - Eg:path = [/dist/m5/system',/home/vikas/full_system_images']

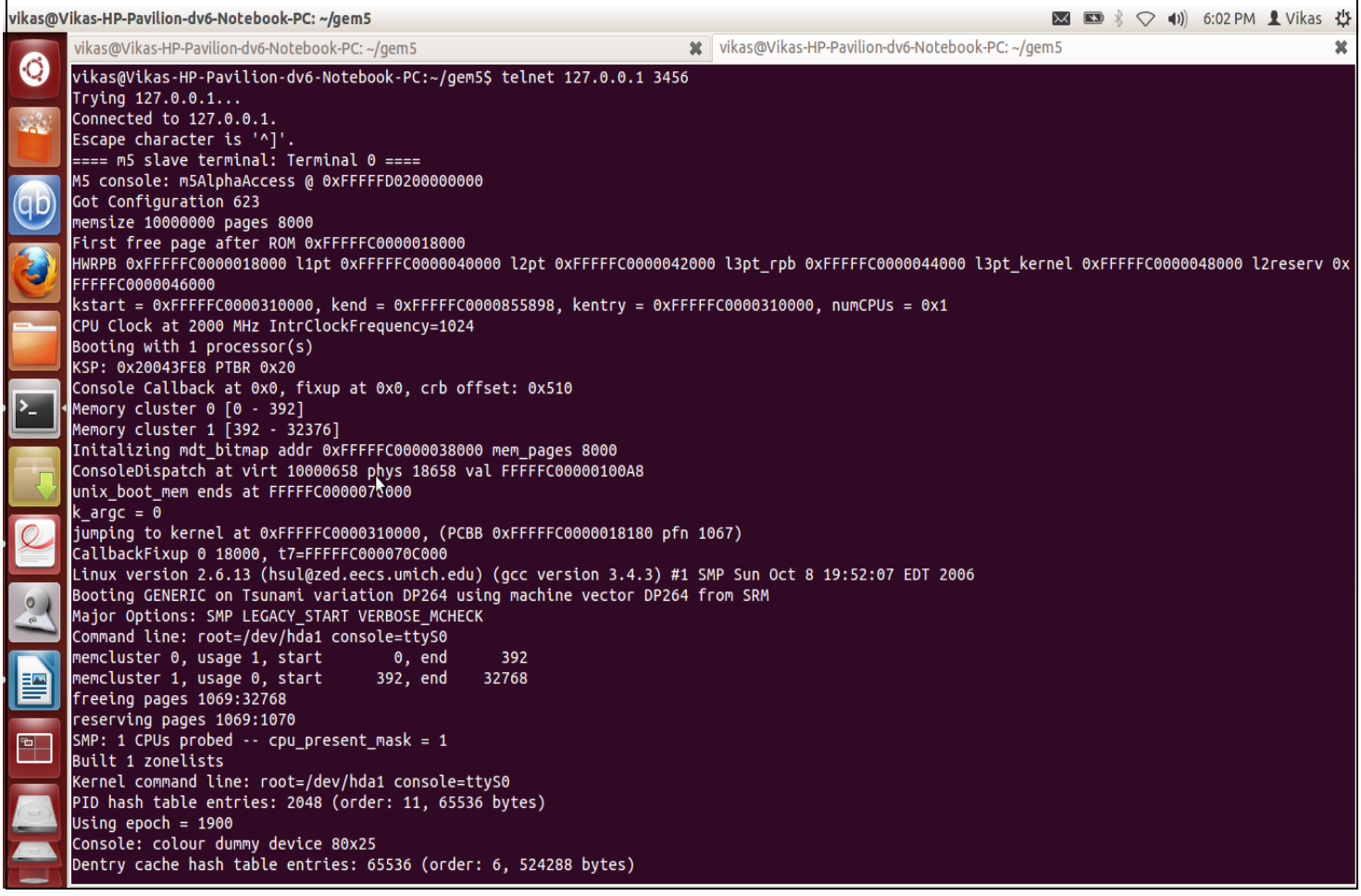
RUNNING ALPHA IN FS :

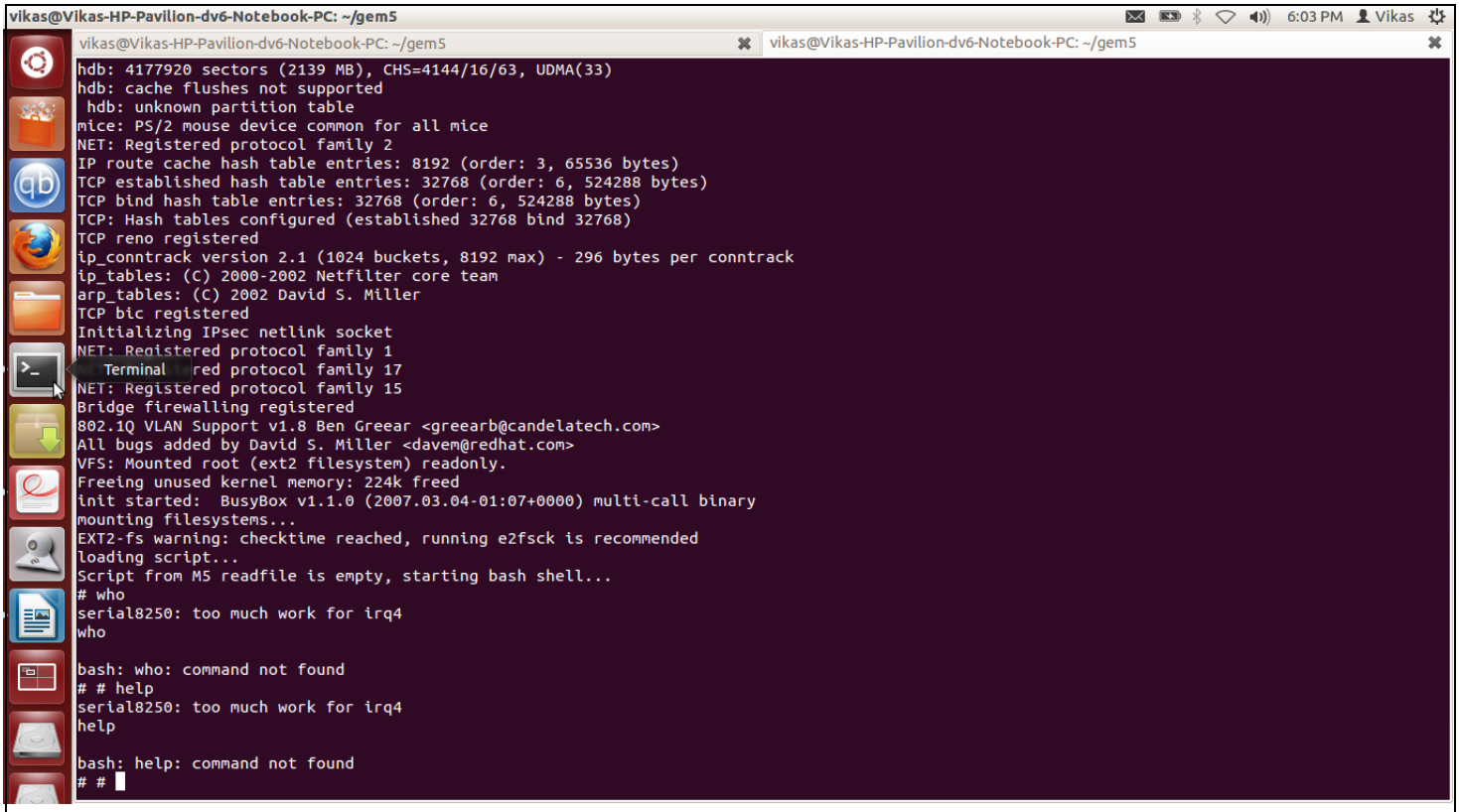
By default, the fs.py script boots Linux and starts a shell on the system console. To keep console traffic separate from simulator input and output, this simulated console is associated with a TCP port. To interact with the console, you must connect to the port using a program such as telnet

1. Type the command .build/ALPHA/gem5.opt / configs/example/fs.py . Default Linux image at full_system _images folder will be loaded.



2. Now open a new terminal tab by typing ctr +shift +t and type telnet 127.0.0.1 3456 .Wait for a bit .Now you will be logged on to on the simulated system linux version and you can type commands you want.

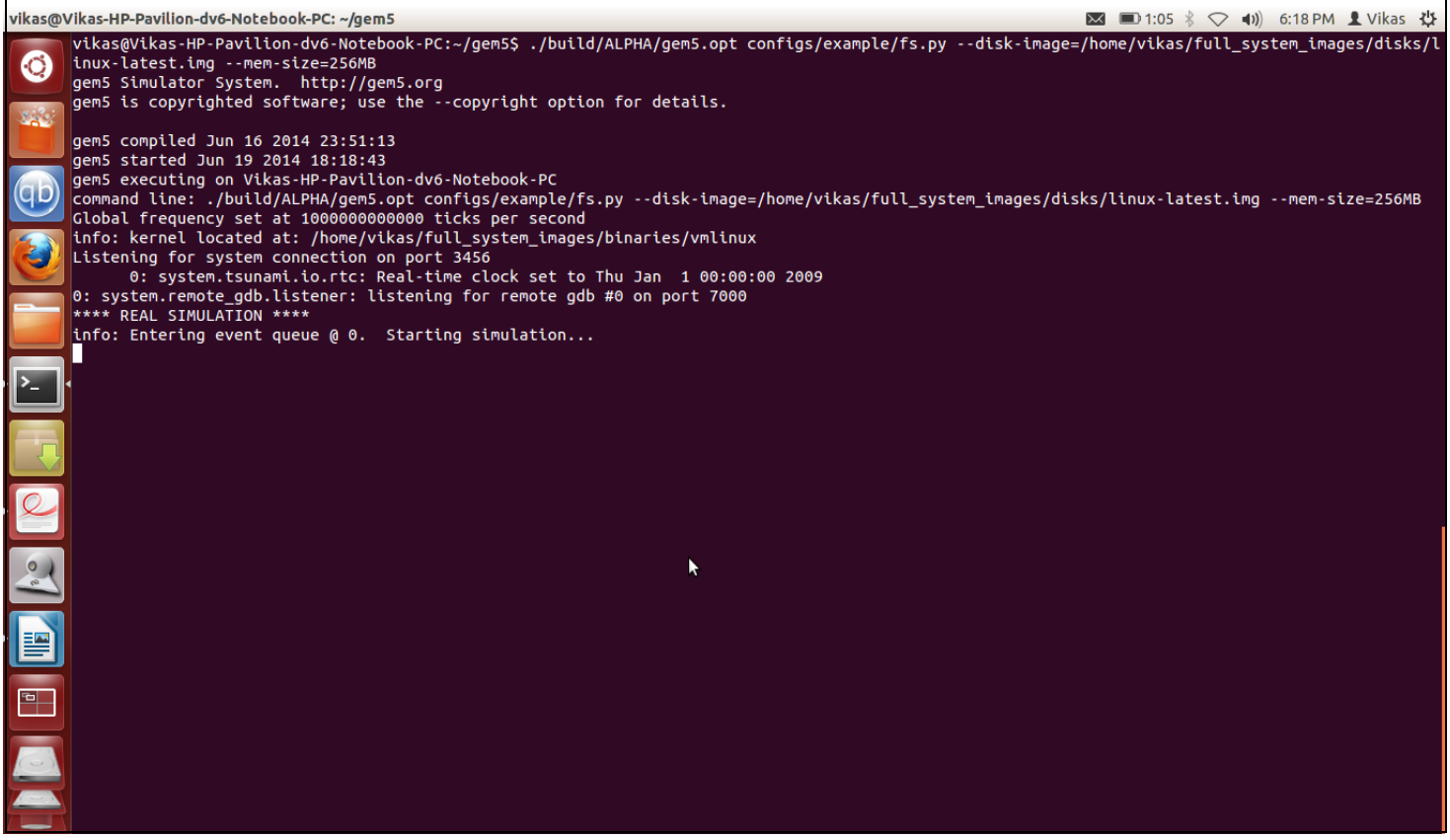




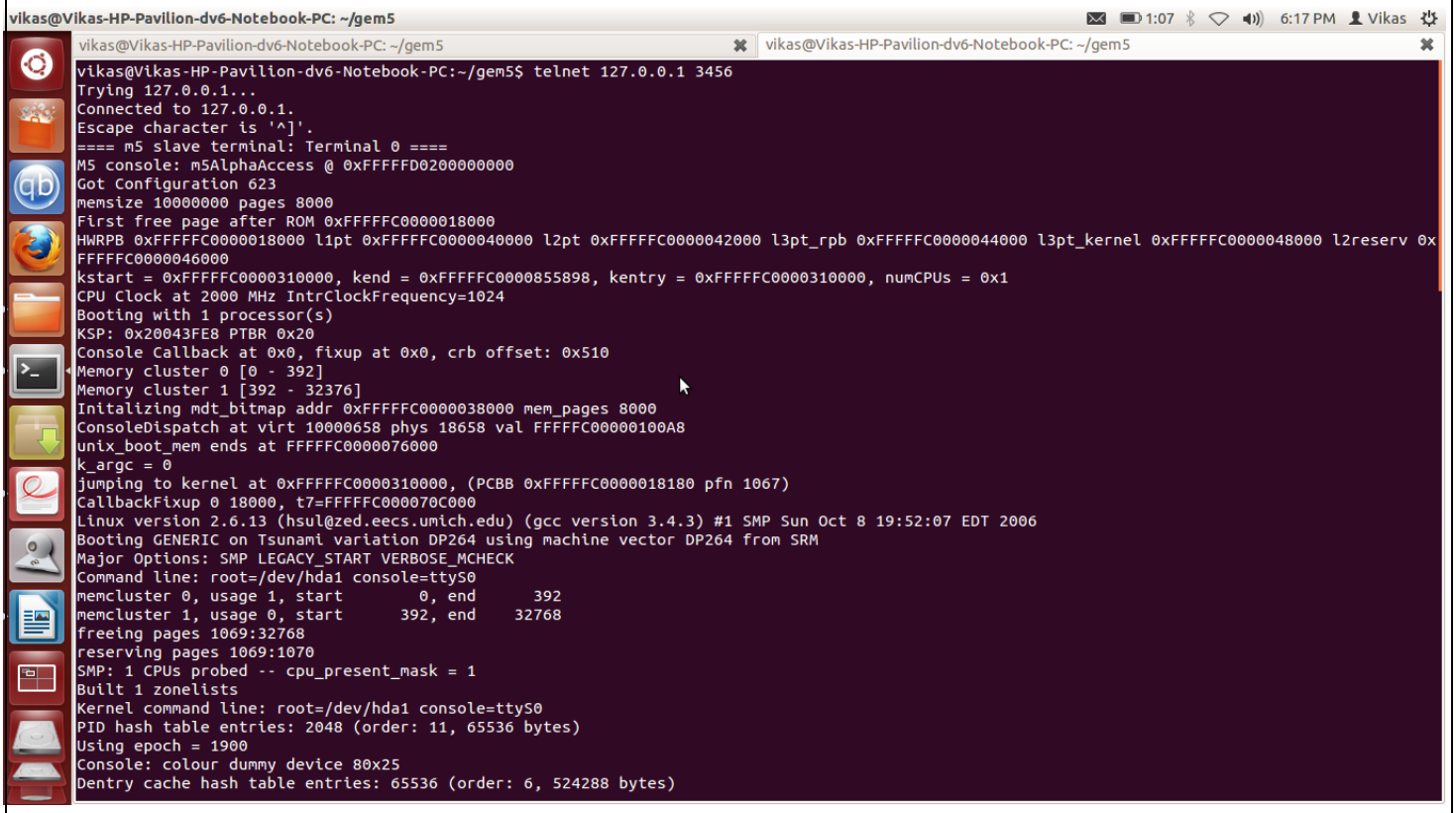
NOW WE RUN FULL SIMULATION BY SPECIFYING THE DISK IMAGE.

STEPS IN ALPHA:

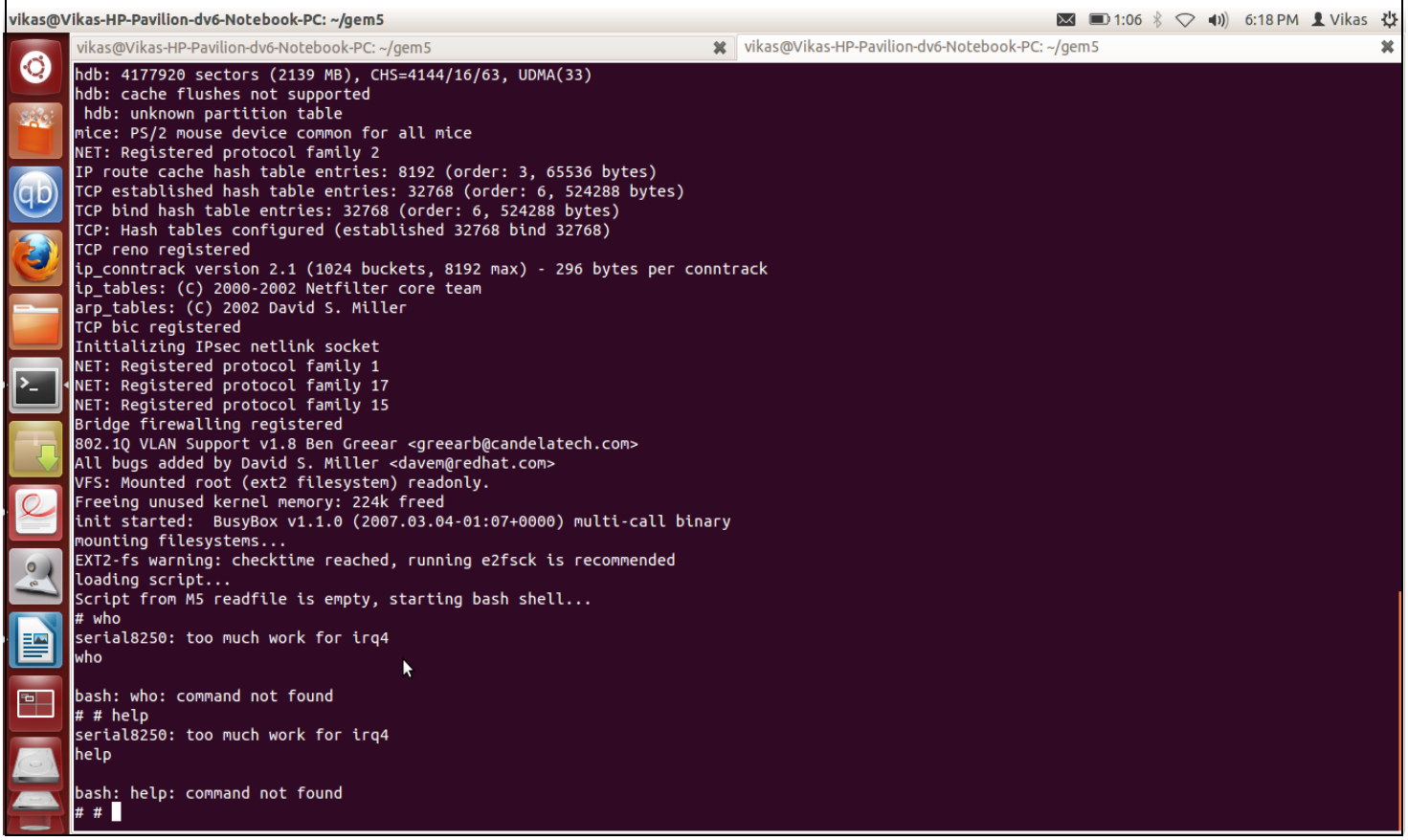
1. Open the terminal and change the directory to gem5
2. Type the command ./build/ALPHA/gem5.opt configs/example/fs.py --disk-image=/home/vikas/full_system_images/disks/linux-latest.img --mem-size=256MB. (Gem5 ALPHA build Supports memory size till 2047 MB) We get the information about the system and os we are booting.



3. Now Press ctrl +shift +t to open new terminal tab and type telnet 127.0.0.1 3456 to connect with the simulated system. We get information about simulated system



4. Wait for the image to boot to type in the commands you want



STEPS FOR X86:

10. Open the terminal.We have already created full_system_images directory
11. Change the directory to full_system_images
12. Downlaod X86 from gem5 website or paste X86 package downloaded manually to folder full_system_images. Also download M5 system package to the same folder
13. Type tar jxf M5_system_2.0b3.tar.bz2 and depending upon the package you have downloaded.
14. Since we already changed the M5_Path we need not do it again. If not set then do the following
15. Add M5_PATH into .bashrc file to tell the system where the image is .Point the M5_PATH to full_system_images to bashrc
16. type command M5_PATH="/home/vikas/full_system_images/" >> ./.bashrc
17. To check whether successful type echo $M5_PATH if it shows as follows then successful =/home/vikas/full_system_images/
18. Path can also be changed by the following method
    - Open gem5->configs->common-SysPath.py file
    - Then under def system paste the path where you have extracted the downloaded images
    - Eg:path = [/dist/m5/system',/home/vikas/full_system_images']

RUNNING IN FULL SYSTEM MODE :

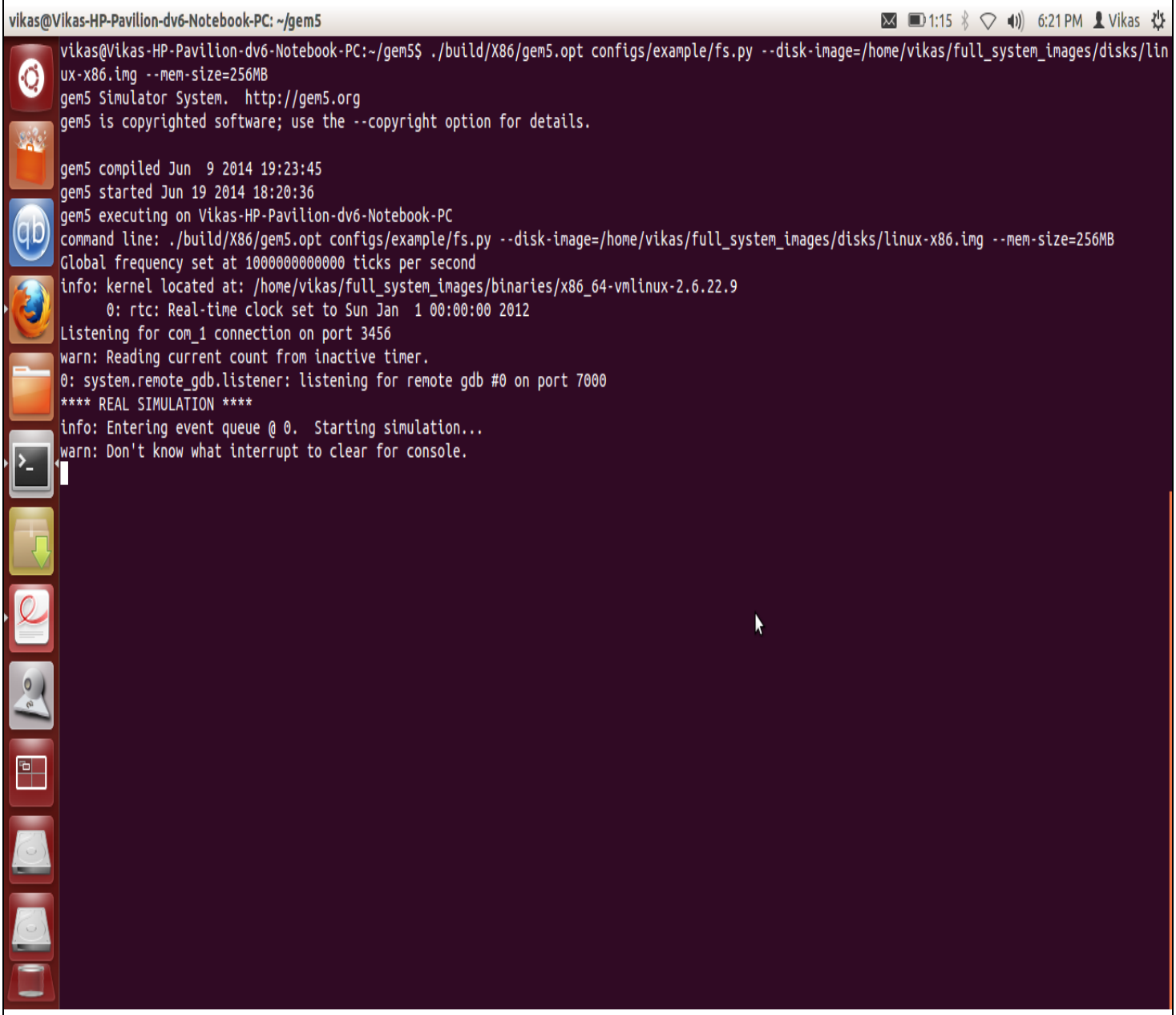
By default, the fs.py script boots Linux and starts a shell on the system console. To keep console traffic separate from simulator input and output, this simulated console is associated with a TCP port. To interact with the console, you must connect to the port using a program such as telnet

1. Type the command .build/ALPHA/gem5.opt / configs/example/fs.py . Default Linux at binaries in full_system _images folder will be loaded.

NOW WE RUN FULL SIMULATION BY SPECIFYING THE DISK IMAGE.

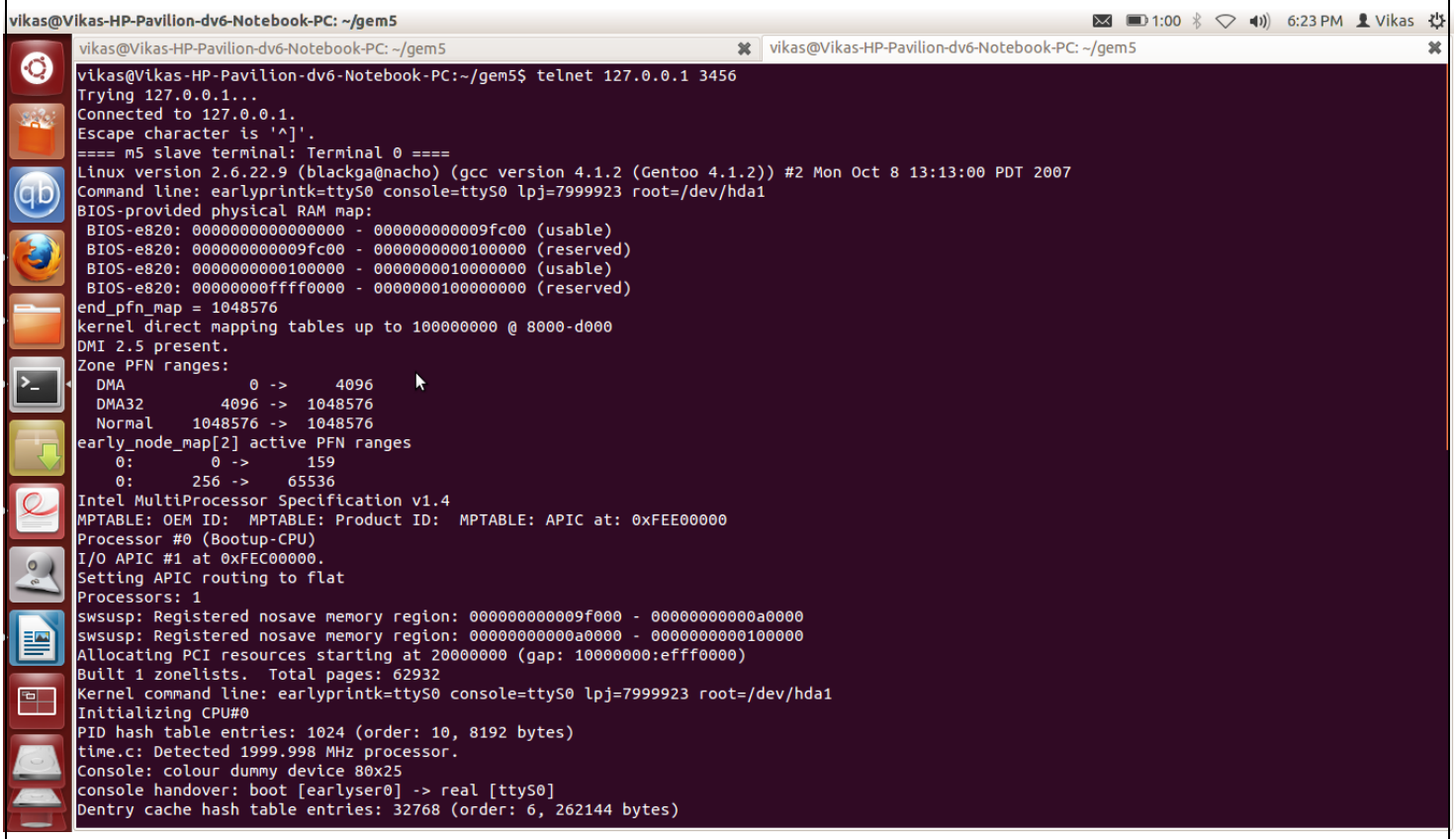
STEPS IN X86:

1. Open the terminal and change the directory to gem5
2. Type the command ./build/X86/gem5.opt configs/example/fs.py --disk-image=/home/vikas/full_system_images/disks/linux-x86.img --mem-size=256MB.(Gem5 ALPHA build Supports memory size till 2047 MB) We get the information



about the system and os we are booting.

3. Now Press ctrl +shift +t to open new terminal tab and type telnet 127.0.0.1 3456 to connect with the simulated system. We get information about simulated system



4. Wait for the image to boot to start typing the commands you want