FINN Setup

This Slide is only for those who are using their own Ubuntu

If you are using BOLEDU server, you can skip this slide (see Lab-FINN slides instead!)

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Date: 2022/12/10

https://finn.readthedocs.io/en/latest/getting_started.html

Overview

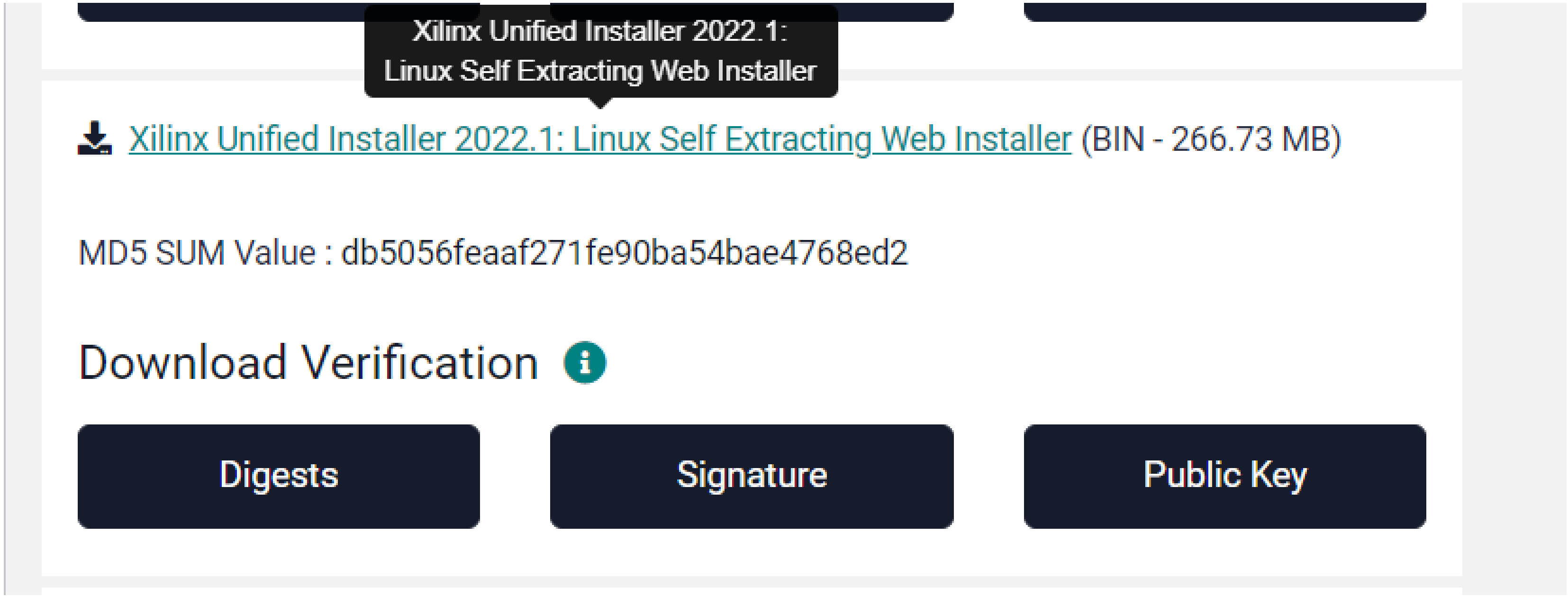
- FINN System Requirements
- Docker

FINN System Requirements

- **Version 0.8 :**
  - Vitis_hls 2022.1
  - Vivado 2022.1
- **OS: (mainly determined by Vivado tools)**
  - See below for OS choice details https://www.xilinx.com/support/documentation/sw_manuals/xilinx2020_1/ug973-vivado-release-notes-install-license.pdf
  - Ubuntu 20.04 is okay, however there might be some installation issues (See: https://wiki.archlinux.org/title/Xilinx_Vivado#Vivado_2020.1_installer_does_not_start)

Download & install

- Download Vivado 2022.1 installer:
  - https://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/vivado-design-tools/2022-1.html



Xilinx Unified Installer 2022.1: Linux Self Extracting Web Installer

Xilinx Unified Installer 2022.1: Linux Self Extracting Web Installer (BIN - 266.73 MB)

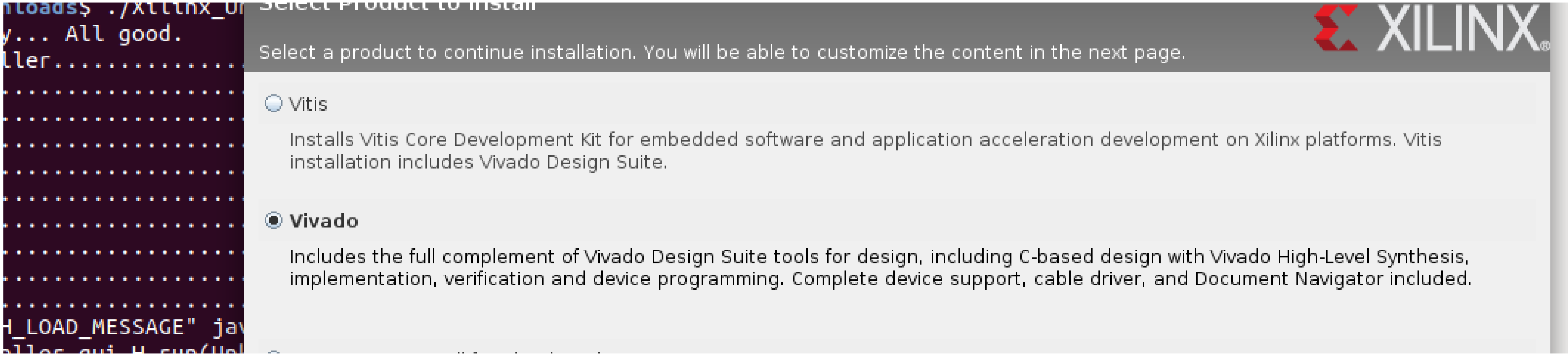
MD5 SUM Value : db5056feaaf271fe90ba54bae4768ed2

Download Verification

Download & Install

- $ sudo path/to/vivado/2022.1/installer

(sudo is for installing at /opt/Xilinx)



```
nloads$ ./xilinx_Ur
y... All good.
ller..............
H_LOAD_MESSAGE" ja
```

Select Product to Install

Select a product to continue installation. You will be able to customize the content in the next page.

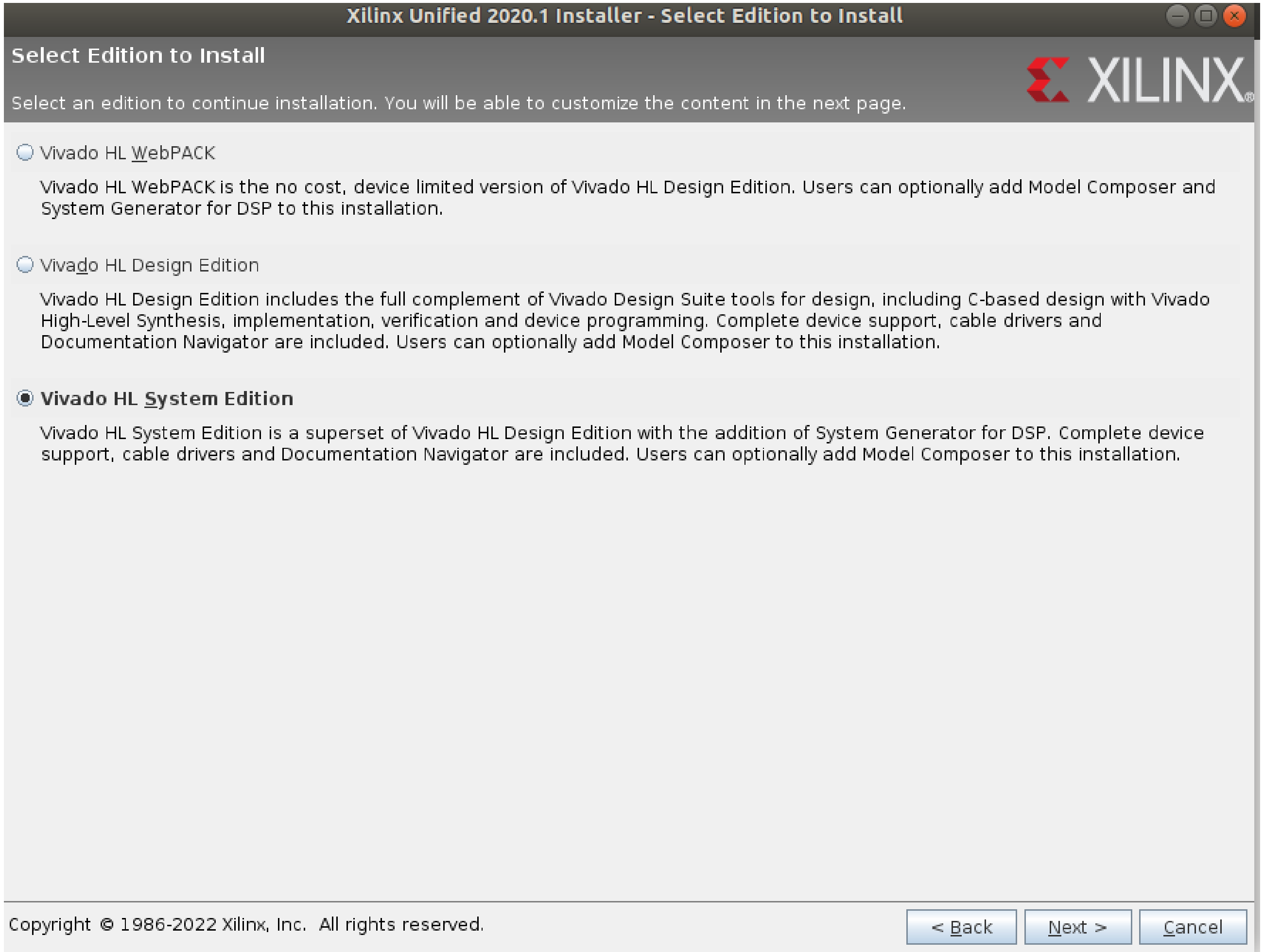
○ Vitis

Installs Vitis Core Development Kit for embedded software and application acceleration development on Xilinx platforms. Vitis installation includes Vivado Design Suite.

● **Vivado**

Includes the full complement of Vivado Design Suite tools for design, including C-based design with Vivado High-Level Synthesis, implementation, verification and device programming. Complete device support, cable driver, and Document Navigator included.

Download & Install



Xilinx Unified 2020.1 Installer - Select Edition to Install

Select Edition to Install

Select an edition to continue installation. You will be able to customize the content in the next page.

○ Vivado HL WebPACK

Vivado HL WebPACK is the no cost, device limited version of Vivado HL Design Edition. Users can optionally add Model Composer and System Generator for DSP to this installation.

○ Vivado HL Design Edition

Vivado HL Design Edition includes the full complement of Vivado Design Suite tools for design, including C-based design with Vivado High-Level Synthesis, implementation, verification and device programming. Complete device support, cable drivers and Documentation Navigator are included. Users can optionally add Model Composer to this installation.

● **Vivado HL System Edition**

Vivado HL System Edition is a superset of Vivado HL Design Edition with the addition of System Generator for DSP. Complete device support, cable drivers and Documentation Navigator are included. Users can optionally add Model Composer to this installation.

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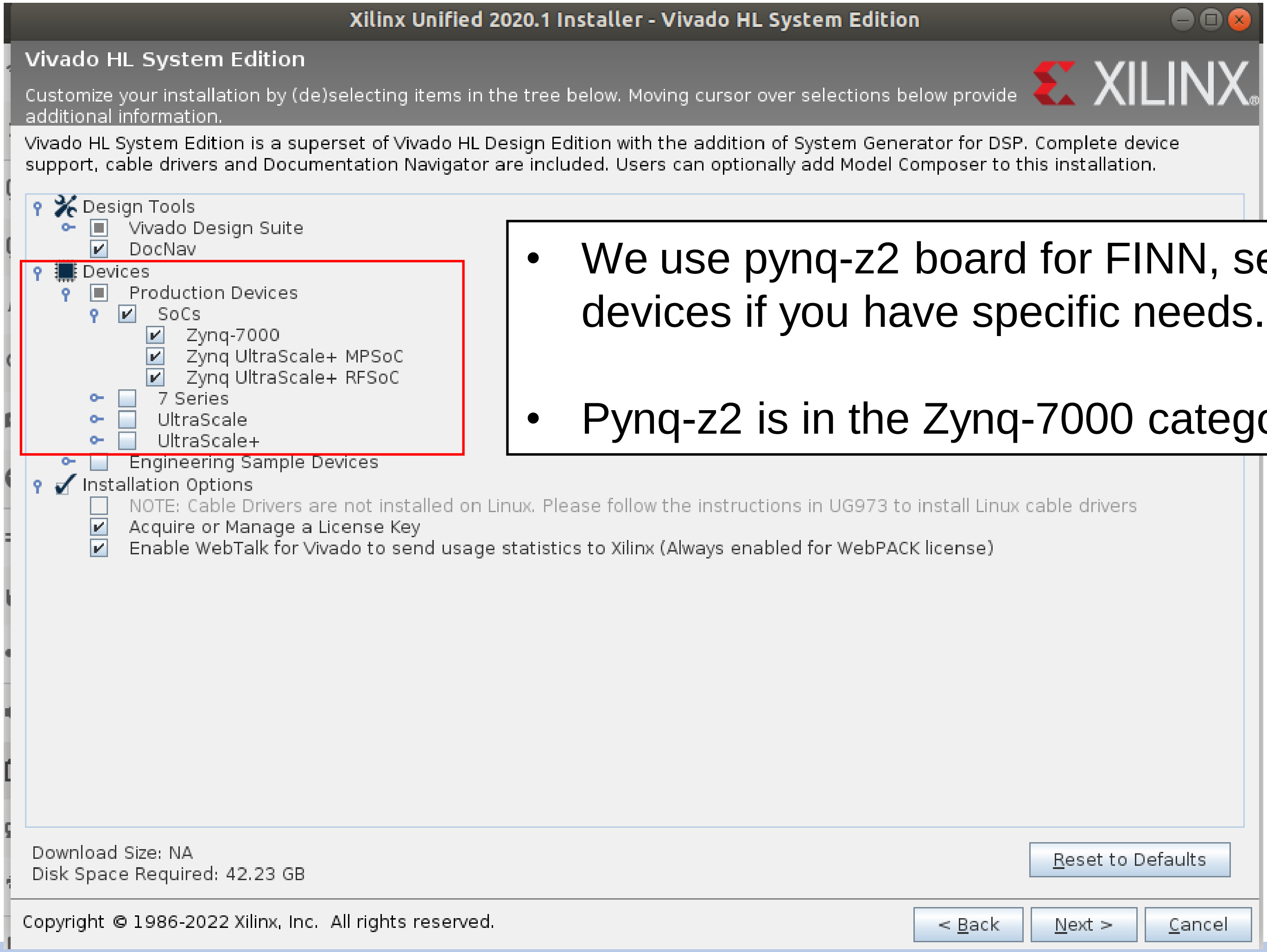
Download & Install



Xilinx Unified 2020.1 Installer - Vivado HL System Edition

Vivado HL System Edition

Customize your installation by (de)selecting items in the tree below. Moving cursor over selections below provide additional information.

Vivado HL System Edition is a superset of Vivado HL Design Edition with the addition of System Generator for DSP. Complete device support, cable drivers and Documentation Navigator are included. Users can optionally add Model Composer to this installation.

- Design Tools
  - ▣ Vivado Design Suite
  - ☑ DocNav
- Devices
  - ▣ Production Devices
    - ☑ SoCs
      - ☑ Zynq-7000
      - ☑ Zynq UltraScale+ MPSoC
      - ☑ Zynq UltraScale+ RFSoC
    - ☐ 7 Series
    - ☐ UltraScale
    - ☐ UltraScale+
  - ☐ Engineering Sample Devices
- Installation Options
  - ☐ NOTE: Cable Drivers are not installed on Linux. Please follow the instructions in UG973 to install Linux cable drivers
  - ☑ Acquire or Manage a License Key
  - ☑ Enable WebTalk for Vivado to send usage statistics to Xilinx (Always enabled for WebPACK license)

Download Size: NA
Disk Space Required: 42.23 GB

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- We use pynq-z2 board for FINN, select more devices if you have specific needs.
- Pynq-z2 is in the Zynq-7000 category

[optional] Test for vivado & vitis_hls installation

- source /opt/Xilinx/Vivado/2020.1/settings64.sh
- Then you can use
- $ vivado

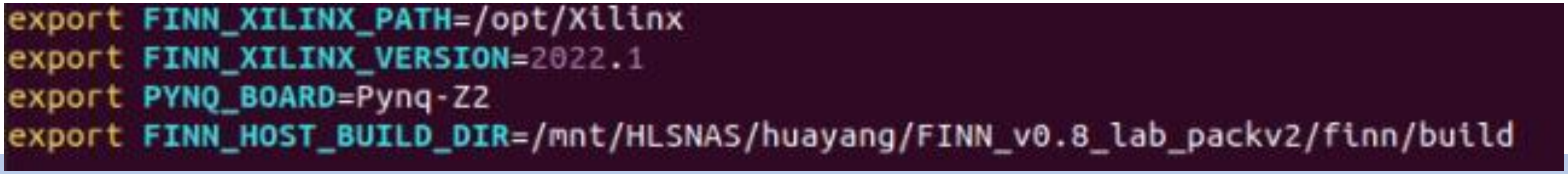
  or
- $ vitis_hls

anywhere

FINN LAB Setup

- Only needs to be set for the first time.
- Open bashrc file and edit environment vars
  - vi ~/.bashrc
- Create build directory in your home
  - mkdir ~/build
- Add the following codes at the end of ~/.bashrc file
  - export FINN_HOST_BUILD_DIR=/path/to/your/model/build
  - export FINN_XILINX_PATH =/opt/Xilinx
  - export FINN_XILINX_VERSION =2022.1

※ You need to open a new terminal to activate them!



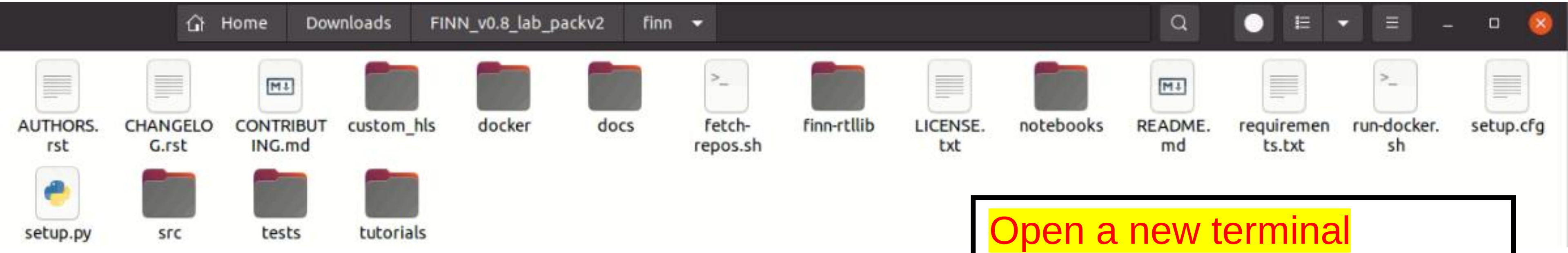
```
export FINN_XILINX_PATH=/opt/Xilinx
export FINN_XILINX_VERSION=2022.1
export PYNQ_BOARD=Pynq-Z2
export FINN_HOST_BUILD_DIR=/mnt/HLSNAS/huayang/FINN_v0.8_lab_packv2/finn/build
```

FINN Directory

- First, unzip the file FINN_v0.8_lab_packv2.zip
- finn/

Git clone/download from boledu github (https://github.com/bol-edu/course-lab_finn)

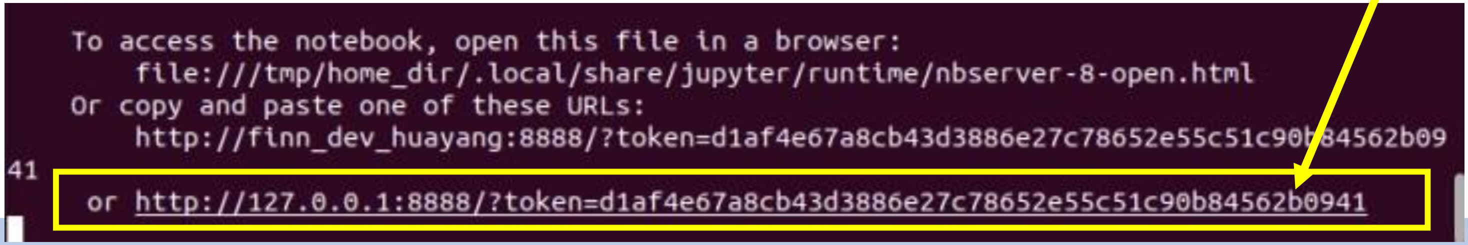
  - run-docker.sh — The script we are going to use.
  - src/ — Containing partial FINN source code
  - notebooks/ — Containing the jupyter tutorial



Open a new terminal
>> firefox&

Then copy the url to firefox!

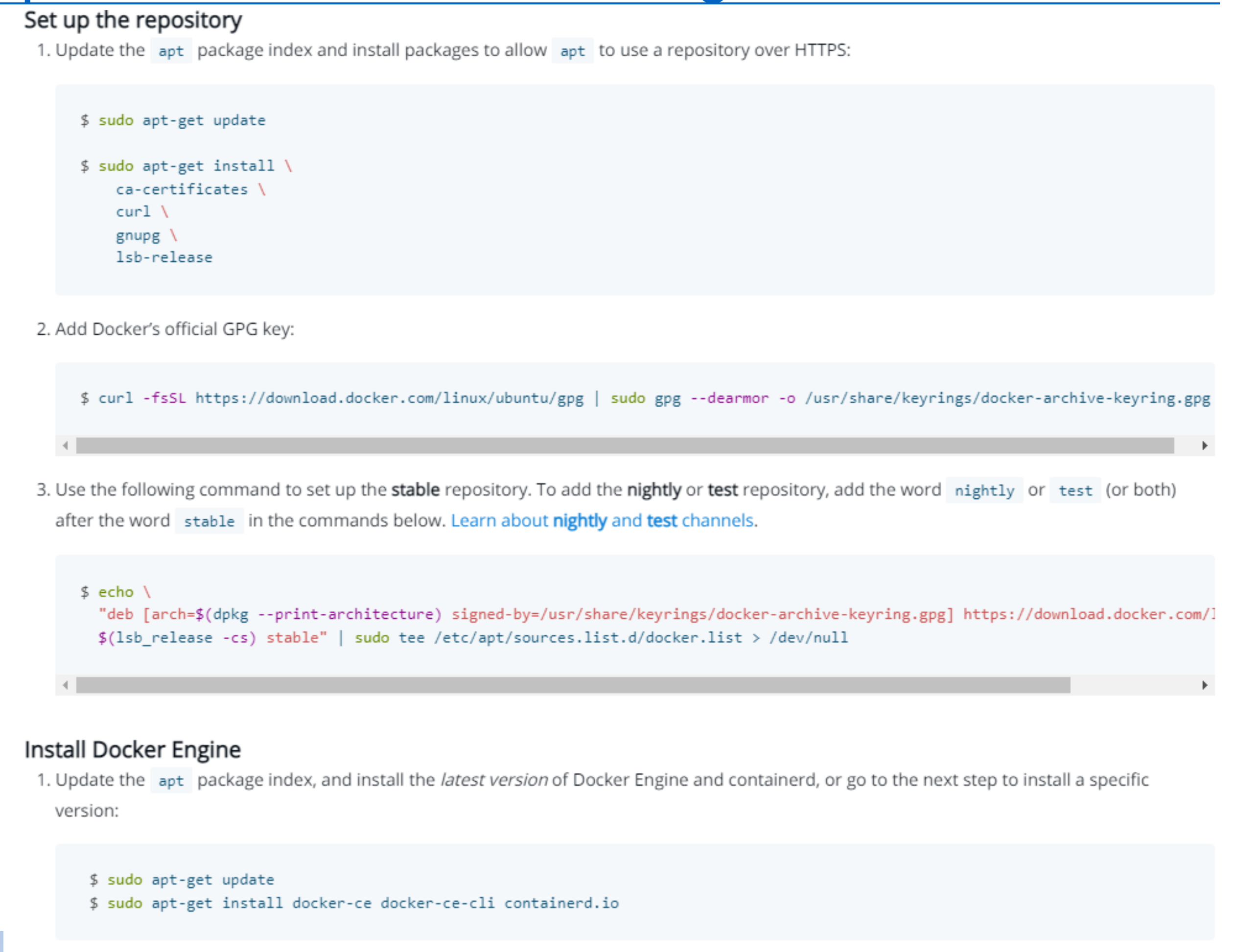
- Run docker to use FINN



```
    To access the notebook, open this file in a browser:
        file:///tmp/home_dir/.local/share/jupyter/runtime/nbserver-8-open.html
    Or copy and paste one of these URLs:
        http://finn_dev_huayang:8888/?token=d1af4e67a8cb43d3886e27c78652e55c51c90b84562b09
41
     or http://127.0.0.1:8888/?token=d1af4e67a8cb43d3886e27c78652e55c51c90b84562b0941
```

Execute run-docker.sh

- Before that, install docker first
  - https://docs.docker.com/engine/install/ubuntu/



Set up the repository

1. Update the `apt` package index and install packages to allow `apt` to use a repository over HTTPS:

```
$ sudo apt-get update

$ sudo apt-get install \
    ca-certificates \
    curl \
    gnupg \
    lsb-release
```

2. Add Docker's official GPG key:

```
$ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
```

3. Use the following command to set up the **stable** repository. To add the **nightly** or **test** repository, add the word `nightly` or `test` (or both) after the word `stable` in the commands below. Learn about **nightly** and **test** channels.

```
$ echo \
  "deb [arch=$(dpkg --print-architecture) signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] https://download.docker.com/l
  $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
```

Install Docker Engine

1. Update the `apt` package index, and install the *latest version* of Docker Engine and containerd, or go to the next step to install a specific version:

```
 $ sudo apt-get update
 $ sudo apt-get install docker-ce docker-ce-cli containerd.io
```

Execute run-docker.sh

- Run docker “without” sudo
  - https://docs.docker.com/engine/install/linux-postinstall/#manage-docker-as-a-non-root-user

- Check docker without sudo (VM might need reboot)
  - >> docker run hello-world

- After all the steps are done, open jupyter notebook

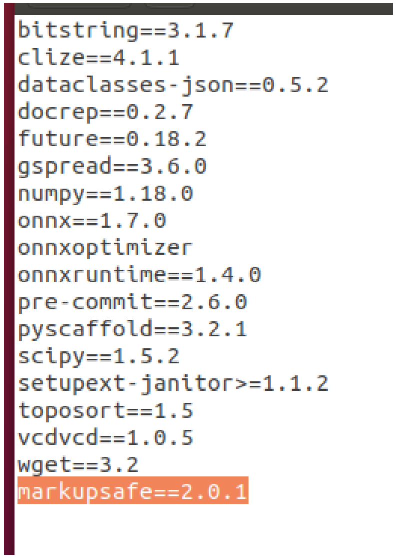
```
>> bash run-docker.sh notebook
```

(Notes: If run-docker.sh Failed)

- If you encountered this dependency issue

ImportError: cannot import name ‘soft_unicode‘ from ‘markupsafe‘

- Modify finn/requirements.txt
- Add markupsafe==2.0.1

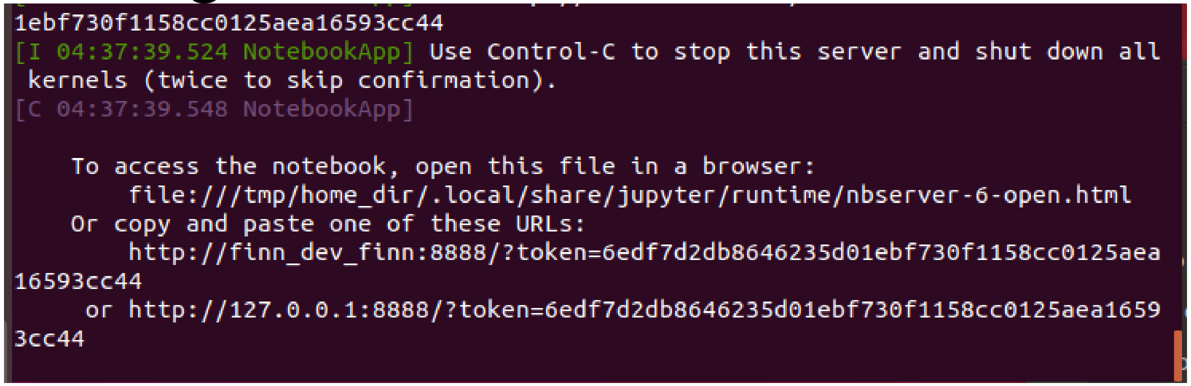


```
bitstring==3.1.7
clize==4.1.1
dataclasses-json==0.5.2
docrep==0.2.7
future==0.18.2
gspread==3.6.0
numpy==1.18.0
onnx==1.7.0
onnxoptimizer
onnxruntime==1.4.0
pre-commit==2.6.0
pyscaffold==3.2.1
scipy==1.5.2
setupext-janitor>=1.1.2
toposort==1.5
vcdvcd==1.0.5
wget==3.2
markupsafe==2.0.1
```

- See here for details
  - https://github.com/aws/aws-sam-cli/issues/3661

Finally

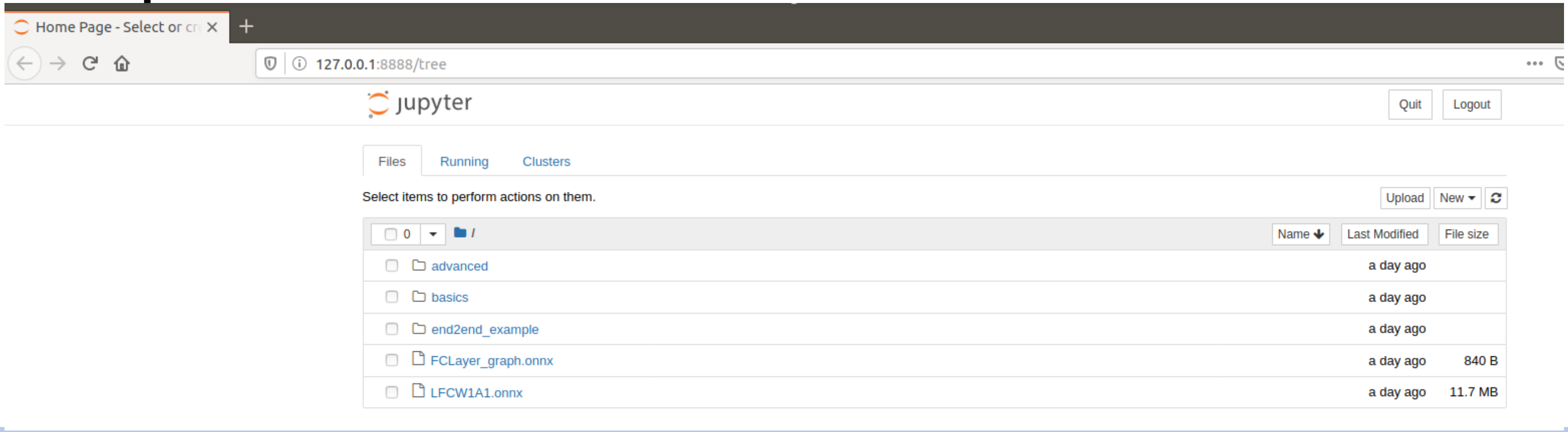
- Ctrl + right click the link



```
1ebf730f1158cc0125aea16593cc44
[I 04:37:39.524 NotebookApp] Use Control-C to stop this server and shut down all
 kernels (twice to skip confirmation).
[C 04:37:39.548 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///tmp/home_dir/.local/share/jupyter/runtime/nbserver-6-open.html
    Or copy and paste one of these URLs:
        http://finn_dev_finn:8888/?token=6edf7d2db8646235d01ebf730f1158cc0125aea
16593cc44
     or http://127.0.0.1:8888/?token=6edf7d2db8646235d01ebf730f1158cc0125aea1659
3cc44
```

- If you can open the notebook, you done the setups for FINN



Select items to perform actions on them.

Name	Last Modified	File size
advanced	a day ago	
basics	a day ago	
end2end_example	a day ago	
FCLayer_graph.onnx	a day ago	840 B
LFCW1A1.onnx	a day ago	11.7 MB