Tutorial of PYNQ classification demo

1. Linux Operating System – Framework installation
   a) Please be familiar with Caffe and Theano, just some simple command.
   b) TensorFlow seems works bad on PYNQ-Z1 board, you will not meet any problems when you install TensorFlow on PYNQ. However, when you want to execute a CNN, you will meet "Illegal Instruction" errors, it can be solved but may be troublesome.
   c) You can choose the image provided with Caffe and Theano, then you can avoid to installing it on yourself, you could also install on your own. And install Theano onto PYNQ by using **apt-get install** command, just one line (*pip install Lasagne==0.1*).
   d) In this step, Caffe and Theano tools is used to deploy weight onto your board, and Theano (Lasagne) is very easy to use, and customized layer is supported.

2. Implementation – High Level Synthesis
   a) There exists two design flow in the project file. Graphic & script design flow, you can see these two file folders under the hw folder. These two design flows are different from IP package.
   b) This step is the most important, because you could replace the network in this step and optimization in your work will appears in this step too.

3. Implementation – system side (vivado)
   a) At the same time when you want to set up the base project, you should ensure that the library and IP are existed.
   b) Under the /hw/base_project folder, it provides a .tcl file, a .xdc file, a .v file, and a .bd file, these make up the base project in vivado, you can set up the project by running the .tcl file in the content of base_project.
   c) After you set up the base project, you could run the synthesis and implementation, in generally speaking, it won't meet error, but if it appears, please check whether some files are in the wrong place.

4. Script – python
   a) Under the /python_notebooks/../CIFAR_10 and /python_notebooks/../Lenet folder, there exist two .ipynb files and other python files, these script files help make the system run.

For more details, you can see at the PYNQ Classification pdf file, or explore this demo at https://github.com/awai54st/PYNQ-Classification.