TI DSP, MCU 및 Xilinx Zynq FPGA
프로그래밍 전문가 과정

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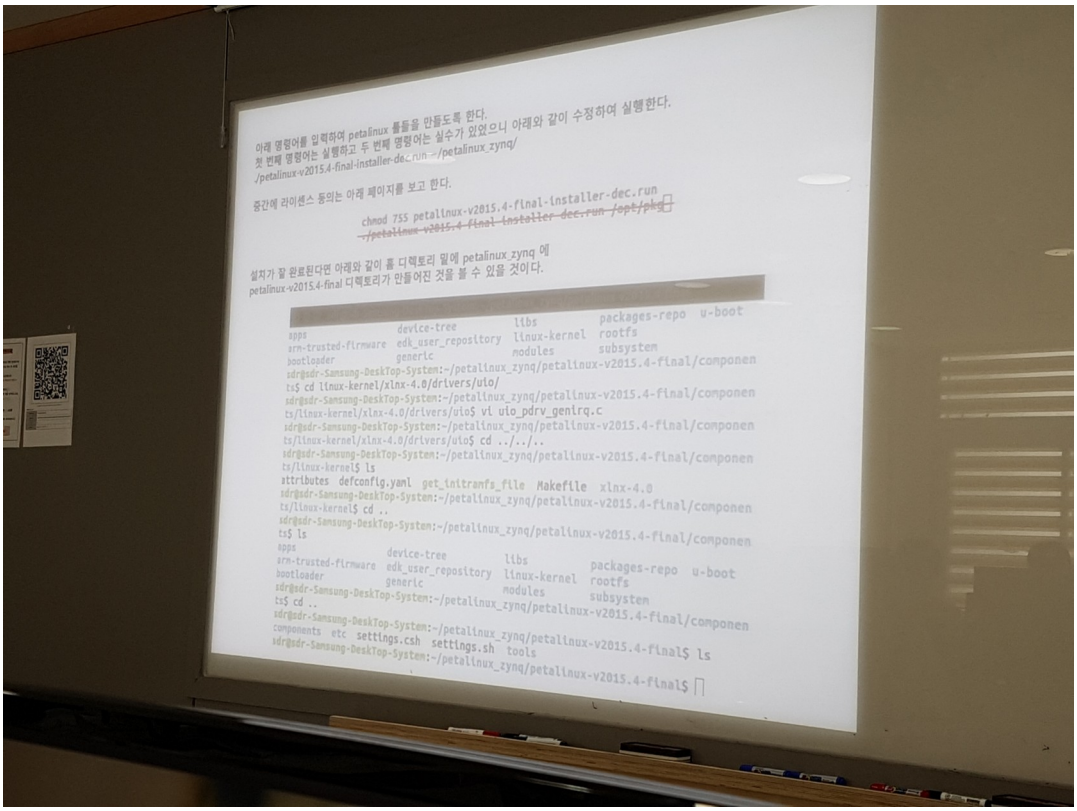
64 일차

petalinux

https://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/vivado-design-tools/archive.html
→ Embedded Development → Archive → 2015.4
2015.4 버전 다운로드



권한 먼저 주고 실행

홈에 다운로드 받고

다되면

라이브 유에스비라는걸 다운로드
LiveUSB_2015.4 다운로드

sudo apt-get update

sudo apt-get install tofrodos iproute tftpd-hpa gawk gcc git-core make net-tools libncurses5-dev zlib1g-dev libssl-dev flex bison lib32z1 lib32ncurses5 lib32stdc++6 libselinux1

chmod 755 petalinux-v2015.4-final-installer-dec.run

sudo ./petalinux-v2015.4-final-installer-dec.run ~/petalinux_zynq/

라이센스 동의 (q→y→q→y 반복)

설치가 완료된다면 아래와 같이 홈 디렉토리 밑에 petalinux-zynq 에 petalinux- v2015.4-final 디렉토리가 만들어진다

```
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final$ ls
components  etc  settings.csh  settings.sh  tools
```

```
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final/components$ ls
apps                  device-tree          libs          packages-repo  u-boot
arm-trusted-firmware  edk_user_repository  linux-kernel  rootfs
bootloader            generic              modules       subsystem
```

cd linux-kernel/xlnx-4.0/drivers/uio/
vi uio_pdrv_genirq.c
//디렉토리 확인

```
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final/components/linux-kernel/xlnx-4.0/drivers/uio$ vi uio_pdrv_genirq.c

Press ENTER or type command to continue
  tabstop=8  shiftwidth=8yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v201x-kernel/xlnx-4.0/drivers/uio$ cd ../../..
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final/components/linux-kernel$ ls
attributes  defconfig.yaml  get_initramfs_file  Makefile  xlnx-4.0
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final/components/linux-kernel$ cd ..
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final/components$ ls
apps                  device-tree          libs          packages-repo  u-boot
arm-trusted-firmware  edk_user_repository  linux-kernel  rootfs
bootloader            generic              modules       subsystem
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final/components$ cd ..
yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final$ ls
components  etc  settings.csh  settings.sh  tools
```

//petalinux- v2015.4-final 위치에서 uio 로 이동한다
cd components/linux-kernel/xlnx-4.0/drivers/uio

vi uio_pdrv_genirq.c

#ifdef CONFIG_OF 쪽 부분에 구조체에 내용을 추가해야 한다.

/ifdef → 검색

```
#ifdef CONFIG_OF
static struct of_device_id uio_of_genirq_match[] = {
    { /* This is filled with module_parm */ },
    { /* Sentinel */ },
};
MODULE_DEVICE_TABLE(of, uio_of_genirq_match);
module_param_string(of_id, uio_of_genirq_match[0].compatible, 128, 0);
MODULE_PARM_DESC(of_id, "Openfirmware id of the device to be handled by uio");
#endif
```

다음은 petalinux_zynq 디렉토리에서 시작
그곳에 petalinux-v2015.4-final 이 만들어졌기때문

그리고 cp 명령어는 아래와 같이 입력
먼저 cd 로 디렉토리를 이동한다.

cd ~/petalinux_zynq/petalinux-v2015.4-final

홈에 받은 LiveUSB_2015.4 를
unzip LiveUSB_2015.4.zip 압축풀기

cd LiveUSB_2015.4

yong@yong-Z20NH-AS51B5U:~/petalinux_zynq/petalinux-v2015.4-final$ sudo cp
/home/yong/LiveUSB_2015.4/ZYBO_petalinux_v2015_4.bsp ./

petalinux_zynq~/petalinux_zynq/petalinux-v2015.4-final 위치에서

하기전에 배쉬
./bashrc
들어가서
마지막줄에
source /home/yong/petalinux_zynq/petalinux-v2015.4-final/settings.sh
추가
wq 로 저장하고 나와서
source ~/.bashrc

```
yong@yong-Z20NH-AS51B5U:~$ source ~/.bashrc
PetaLinux environment set to '/home/yong/petalinux_zynq/petalinux-v2015.4-final'
INFO: Checking free disk space
INFO: Checking installed tools
INFO: Checking installed development libraries
INFO: Checking network and other services
```

이제 아래와 같은 명령어를 입력해서 test 프로젝트를 만들어보도록한다.
아래와 같이 ls 를 했을때 test 디렉토리가 보이면 된다

cd
mkdir fpga_test
cd fpga_test

//루트권한 얻기
yong@yong-Z20NH-AS51B5U:~/fpga_test$ sudo -s
PetaLinux environment set to '/home/yong/petalinux_zynq/petalinux-v2015.4-final'
INFO: Checking free disk space
INFO: Checking installed tools
INFO: Checking installed development libraries
INFO: Checking network and other services

root@yong-Z20NH-AS51B5U:~/fpga_test# petalinux-create -t project -n test --template zynq
INFO: Create project: test
INFO: New project successfully created in /home/yong/fpga_test/test

```
yong@yong-Z20NH-AS51B5U:~/fpga_test$ sudo -s
PetaLinux environment set to '/home/yong/petalinux_zynq/petalinux-v2015.4-final'
INFO: Checking free disk space
INFO: Checking installed tools
INFO: Checking installed development libraries
INFO: Checking network and other services
root@yong-Z20NH-AS51B5U:~/fpga_test# petalinux-create -t project -n test --template zynq
INFO: Create project: test
INFO: New project successfully created in /home/yong/fpga_test/test
```

vi uio_pdrv_

```
root@yong-Z20NH-AS51B5U:~/fpga_test# cp /home/yong/LiveUSB_2015.4/ZYBO_petalinux_v2015_4.bsp ./
root@yong-Z20NH-AS51B5U:~/fpga_test# ls
test  ZYBO_petalinux_v2015_4.bsp
root@yong-Z20NH-AS51B5U:~/fpga_test# petalinux-create -t project -s ZYBO_petalinux_v2015_4.bsp
INFO: Create project:
INFO: Projects:
INFO:   * ZYBO_petalinux_v2015_4
INFO: has been successfully installed to /home/yong/fpga_test/
INFO: New project successfully created in /home/yong/fpga_test/
root@yong-Z20NH-AS51B5U:~/fpga_test# rm -rf test
root@yong-Z20NH-AS51B5U:~/fpga_test# ls
ZYBO_petalinux_v2015_4  ZYBO_petalinux_v2015_4.bsp
```

```
root@yong-Z20NH-AS51B5U:~/fpga_test# petalinux-build
ERROR: You are not inside a PetaLinux project. Please specify a PetaLinux project!
Builds the project or the specified components.

Usage:
  petalinux-build [options]

Required:

Options:
  -h, --help                          show function usage
  -p, --project <PROJECT>             path to PetaLinux SDK project.
                                      Default is working project.
  -c, --component <COMPONENT>         Specify the component
                                      all: to build the whole project
                                      If you specify other component,it will
                                      build that component
                                      E.g. -c rootfs
                                      E.g. -c rootfs/myapp
                                      If you use -c with --help option, it will
                                      show you subcomponents.
                                      E.g. -c rootfs --help shows subcomponents
                                      of rootfs.
  -x, --execute <GNU_MAKE_TARGET>     Specify a GNU make command of the component
  --makeenv <MAKE ENV>                Pass GNU make environment variables
  -v, --verbose                       Show compile messages verbose mode
```

petalinux-build

위와 같이 petalinux-build 를 입력하면 파일을 찾을 수 없다며 에러가 나는데 아래와 같이 sudo dpkg-reconfigure dash

를 입력한다

NO 를 입력한다

sudo dpkg --add-architecture i386

sudo apt-get update

```
root@yong-Z20NH-AS51B5U:~/fpga_test# sudo dpkg --add-architecture i386
root@yong-Z20NH-AS51B5U:~/fpga_test# sudo apt-get update
Hit:1 http://kr.archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://kr.archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:3 http://kr.archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Ign:4 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:5 http://dl.google.com/linux/chrome/deb stable Release
Hit:6 https://dl.winehq.org/wine-builds/ubuntu xenial InRelease
Hit:8 http://ppa.launchpad.net/createsc/3beol/ubuntu xenial InRelease
Get:9 http://security.ubuntu.com/ubuntu xenial-security InRelease [107 kB]
Fetched 323 kB in 1s (194 kB/s)
Reading package lists... Done
```

이름은 마음대로 지정해도 상관없지만 hardware 라고 되어 있는 부분을 기억해야 한다.

```
root@yong-Z20NH-AS51B5U:~# cd lab6
root@yong-Z20NH-AS51B5U:~/lab6# mkdir hardware
root@yong-Z20NH-AS51B5U:~/lab6# cd hardware/
```