TI DSP, MCU 및 Xilinx Zynq FPGA 프로그래밍 전문가 과정

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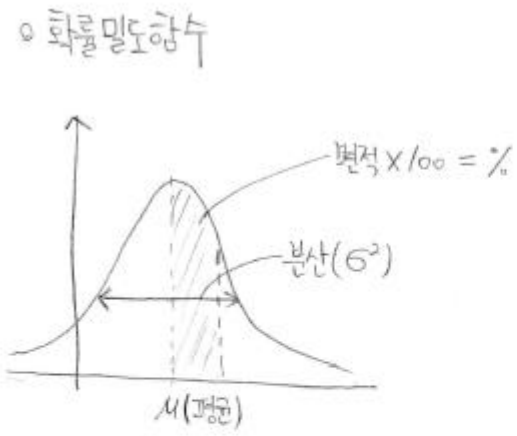
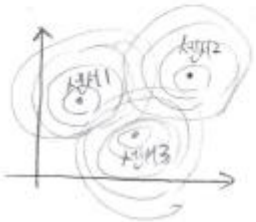
목차

1) 확률밀도함수



확률밀도 함수는
전구간에 대해 적분하면
그 결과는 언제나 1이다.



⇒ 랜덤프로세스

- 서로 다른 정규분포 합성
- ⇒ 감마함수
- 칼만 필터

○ 감마함수 - 팩토리얼 실수로 확장

$$\gamma(x) = \int_0^\infty e^{-t} t^{x-1} dt \quad , t = -\ln u \; , du = -e^{-t} dt$$

$$\gamma(x) = \int_0^1 [-\ln(u)]^{x-1} du$$

$$\gamma(x+1) = \int_0^\infty e^{-t} t^x dt$$

$$= \left[-e^{-t} t^x\right]_0^\infty - \int_0^\infty -e^{-t} x t^{x-1} dt$$

$$= x\gamma(x)$$

$\gamma(1) = 1$

- 팩토리얼 함수의 일반화
- 정규분포 해석용이

2) 감마함수와 정규분포 1

○ 감마함수와 정규분포 1

$y = e^{-ax^2}$

$$\int_{-\infty}^{\infty} e^{-ax^2} dx = S \times \int_{-\infty}^{\infty} e^{-ay^2} dy = S$$

$$\Rightarrow \int_{-\infty}^{\infty}\int_{-\infty}^{\infty} e^{-a(x^2+y^2)} dx\,dy = S^2$$

원의방정식 $x^2+y^2=r^2$

$$\Rightarrow \int_0^{2\pi}\int_0^{\infty} e^{-ar^2} \cdot r\, dr\, d\theta = S^2$$

치환 $t = ar^2$ $\quad dr = \frac{dt}{2ar}$

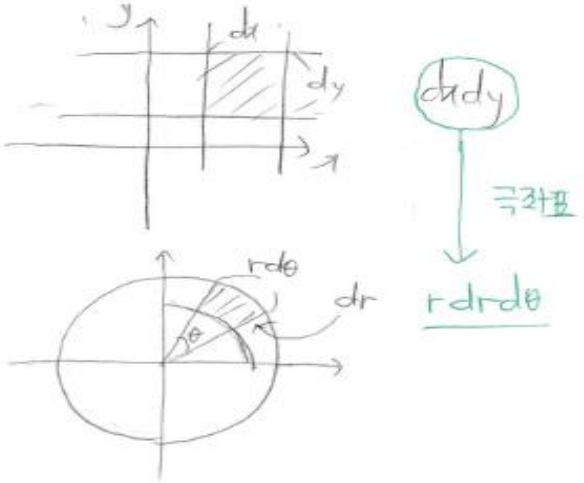
$$= \int_0^{2\pi}\int_0^{\infty} e^{-t} \frac{1}{2a} dt\, d\theta = \int_0^{2\pi} \left[e^{-t}\frac{1}{2a}\right]_0^{\infty} d\theta = \int_0^{2\pi} \frac{1}{2a} d\theta = \frac{\pi}{a} = S^2$$

$$\therefore \int_{-\infty}^{\infty} e^{-ax^2} dx = \sqrt{\frac{\pi}{a}}$$

$$* y = \sqrt{\frac{a}{\pi}}\, e^{-ax^2} \quad (\text{정규분포})$$

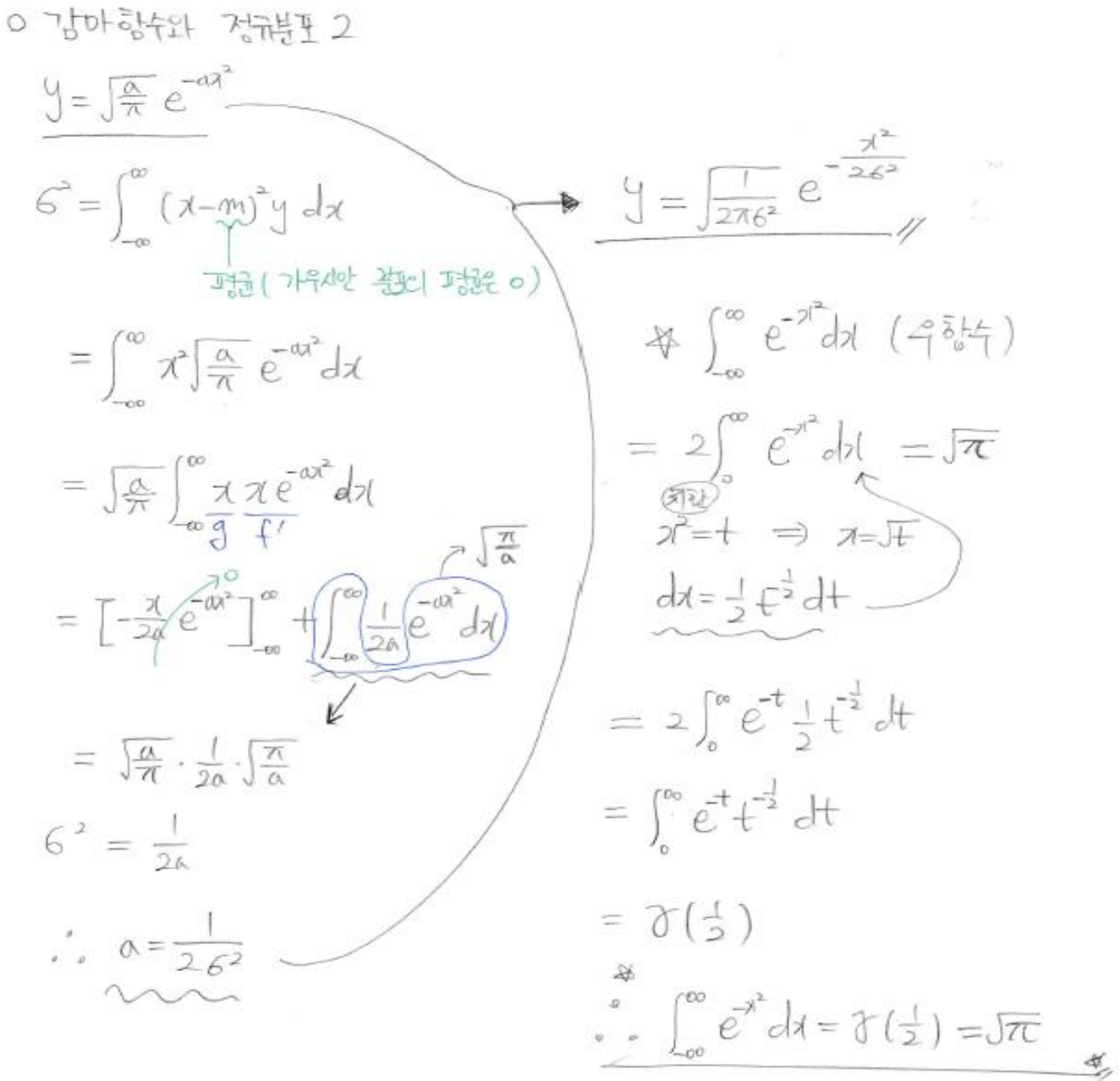
↑ a가 분산을 결정함.

* 좌표계 → 극좌표계

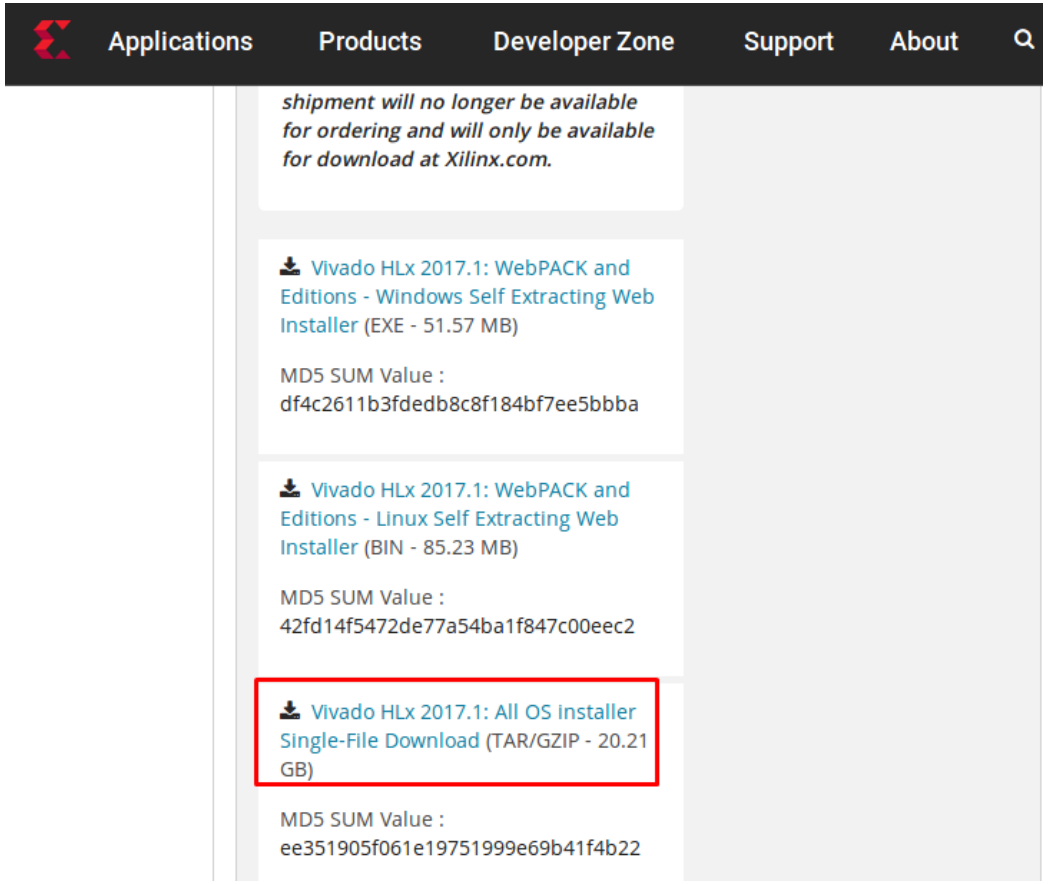


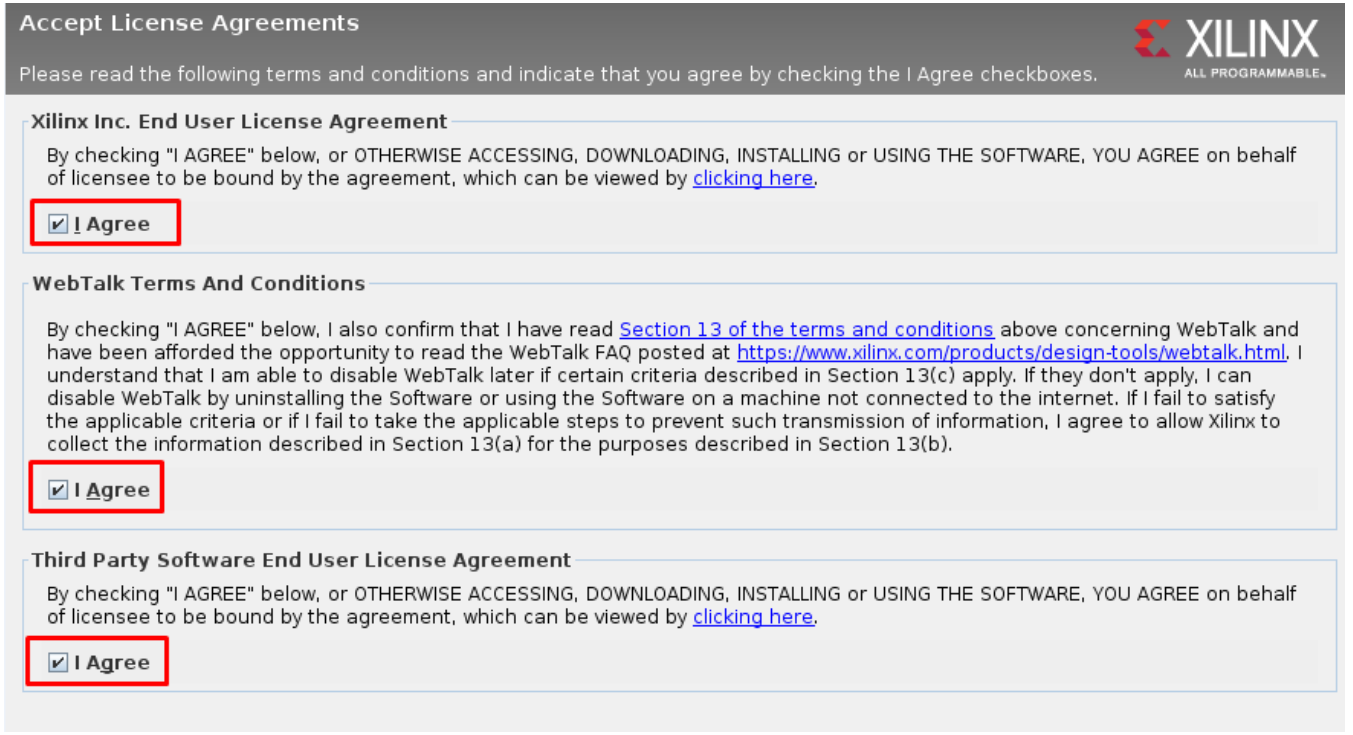
* 추가 공부
1. 프아송 분포
2. chi-square distribution

3) 감마함수와 정규분포 2

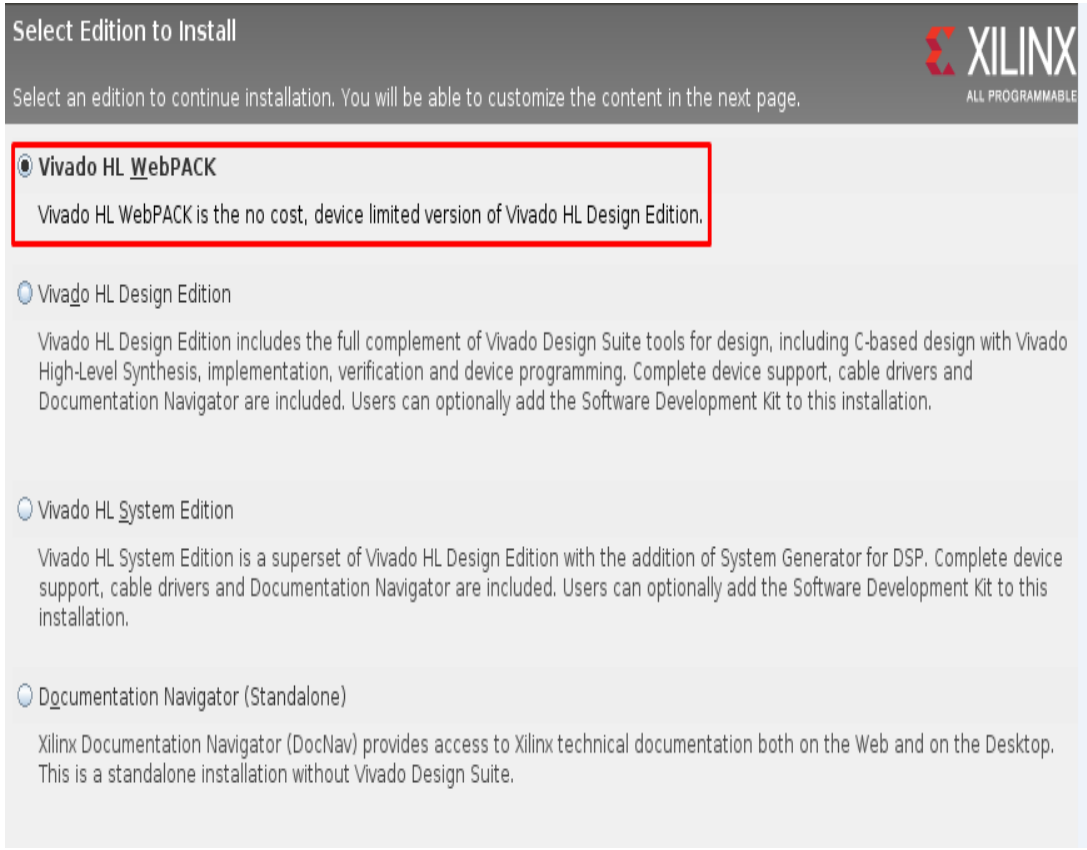


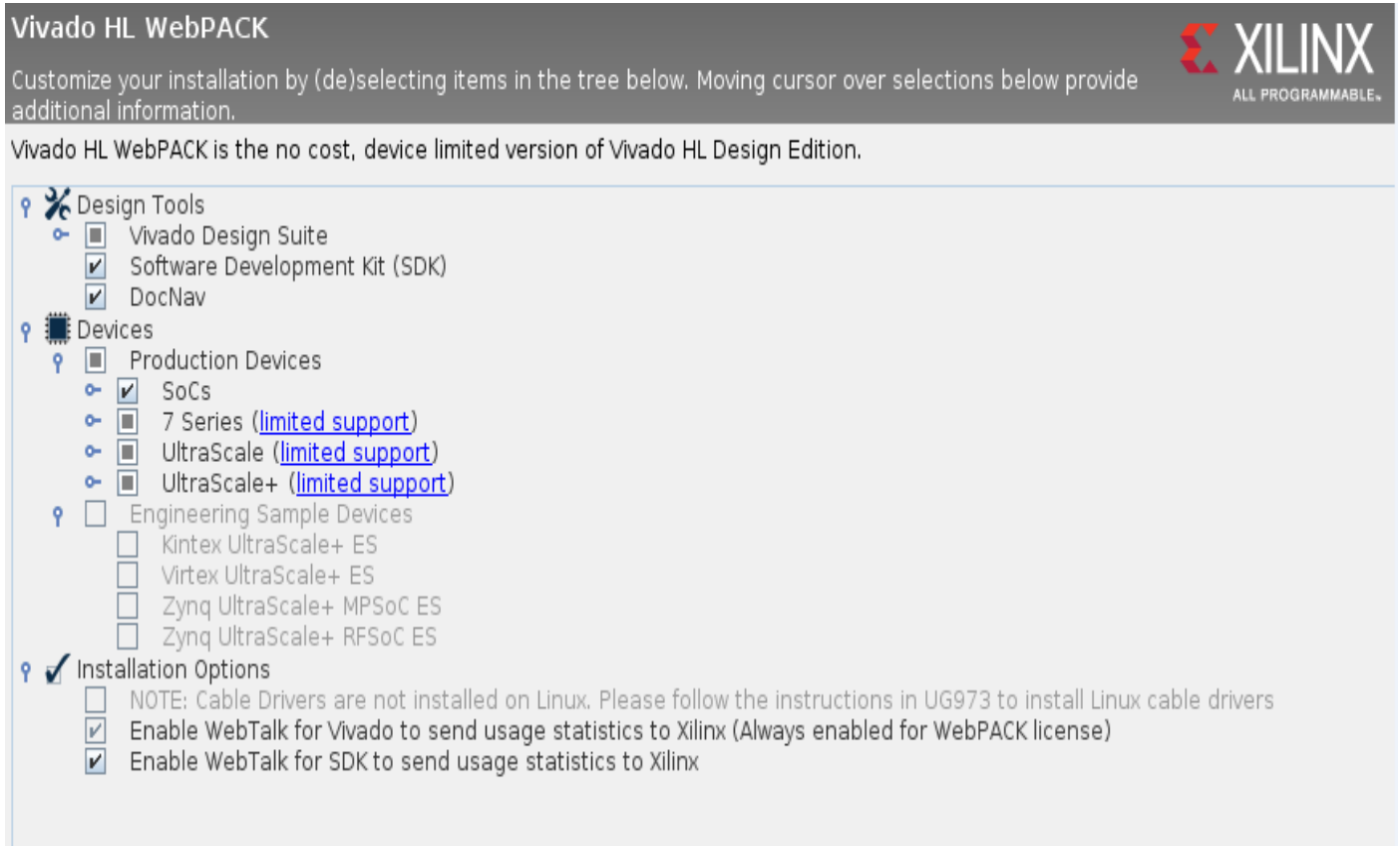
FPGA 환경설정 (Xilinx) 1



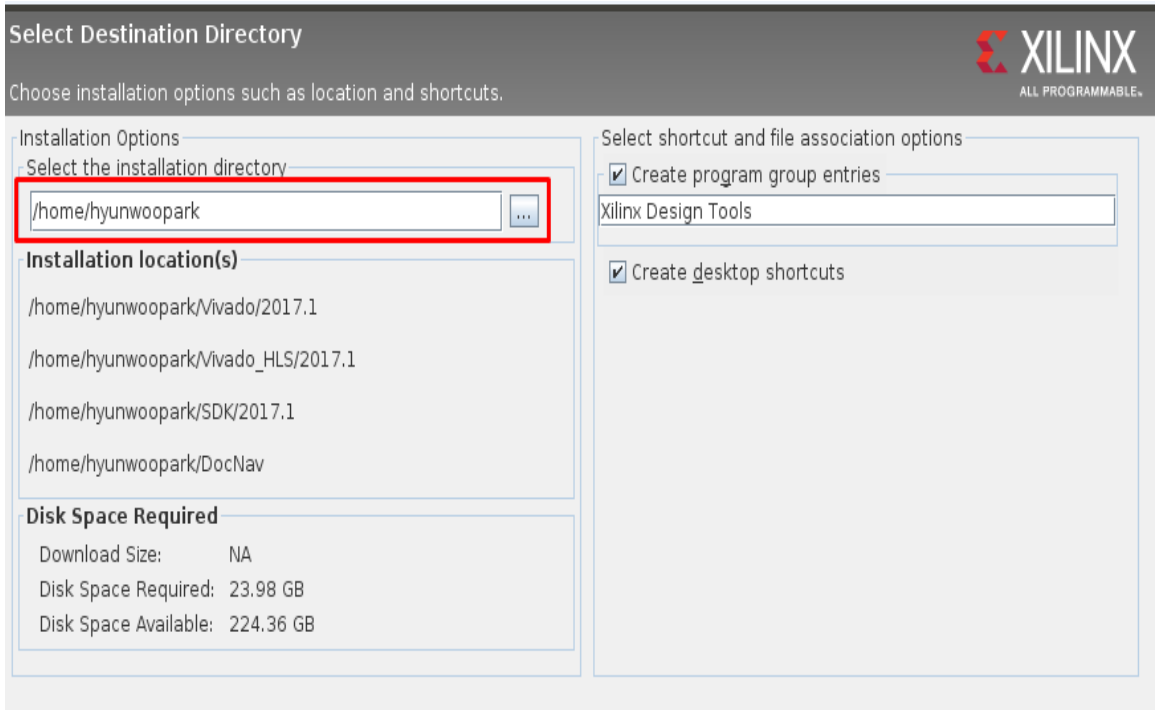


FPGA 환경설정 (Xilinx) 2

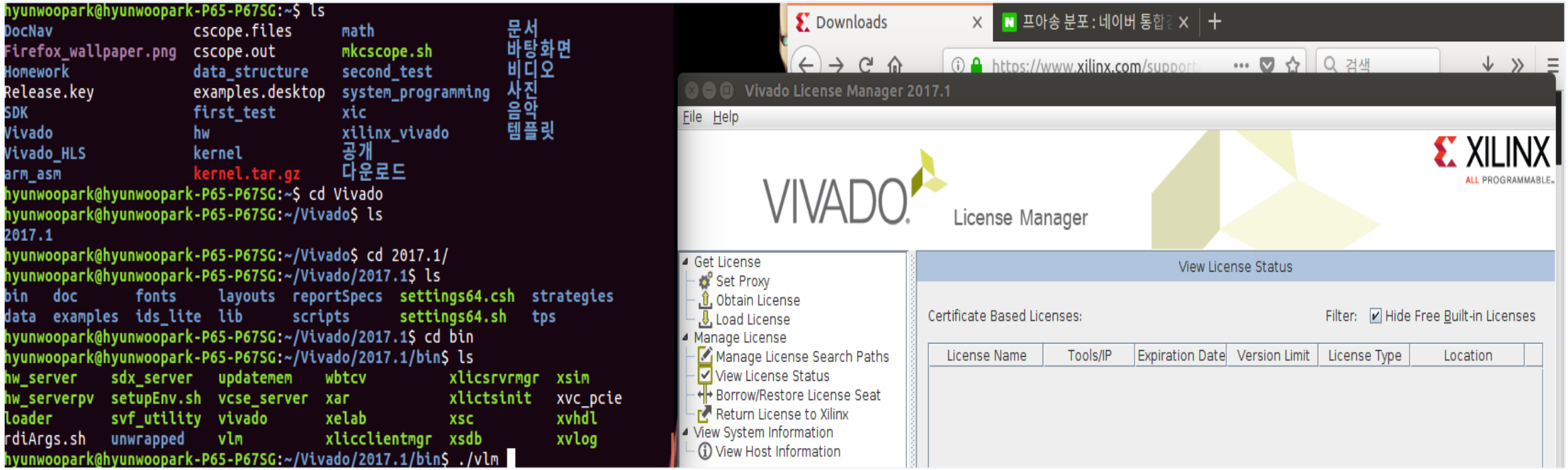




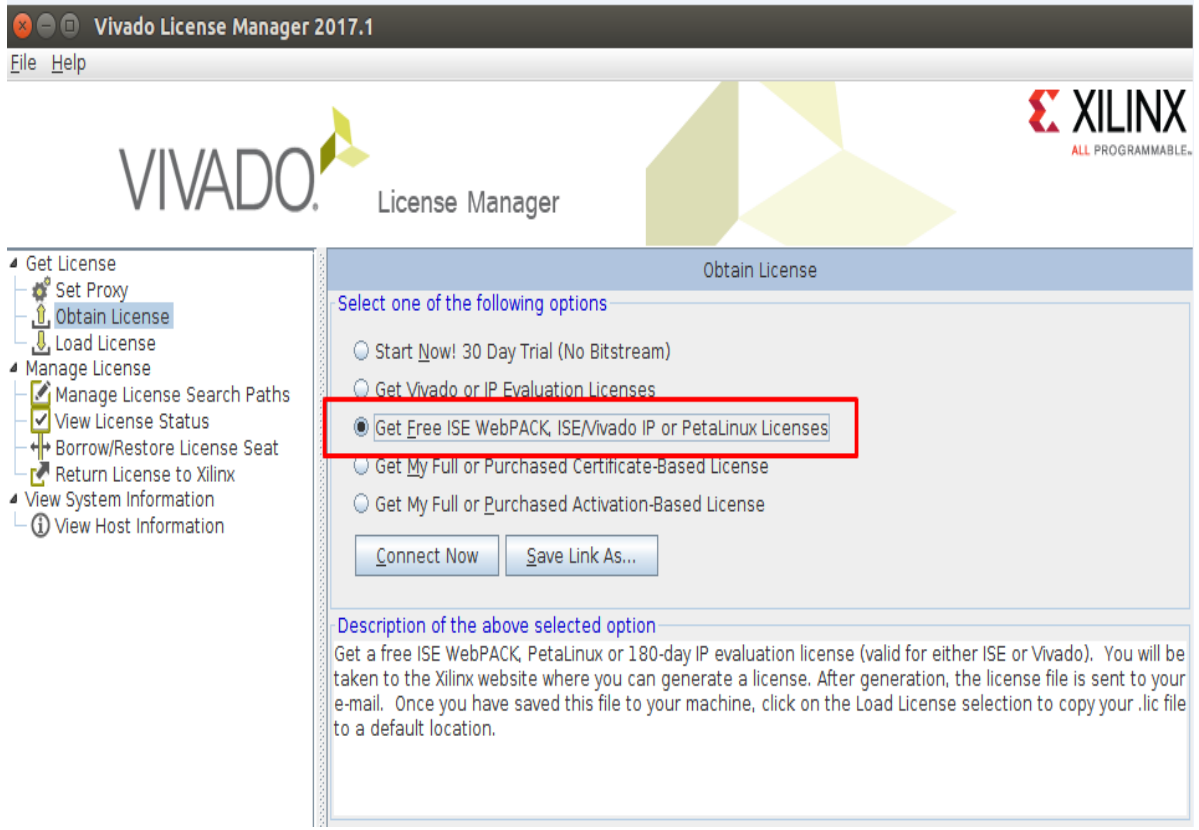
FPGA 환경설정 (Xilinx) 3

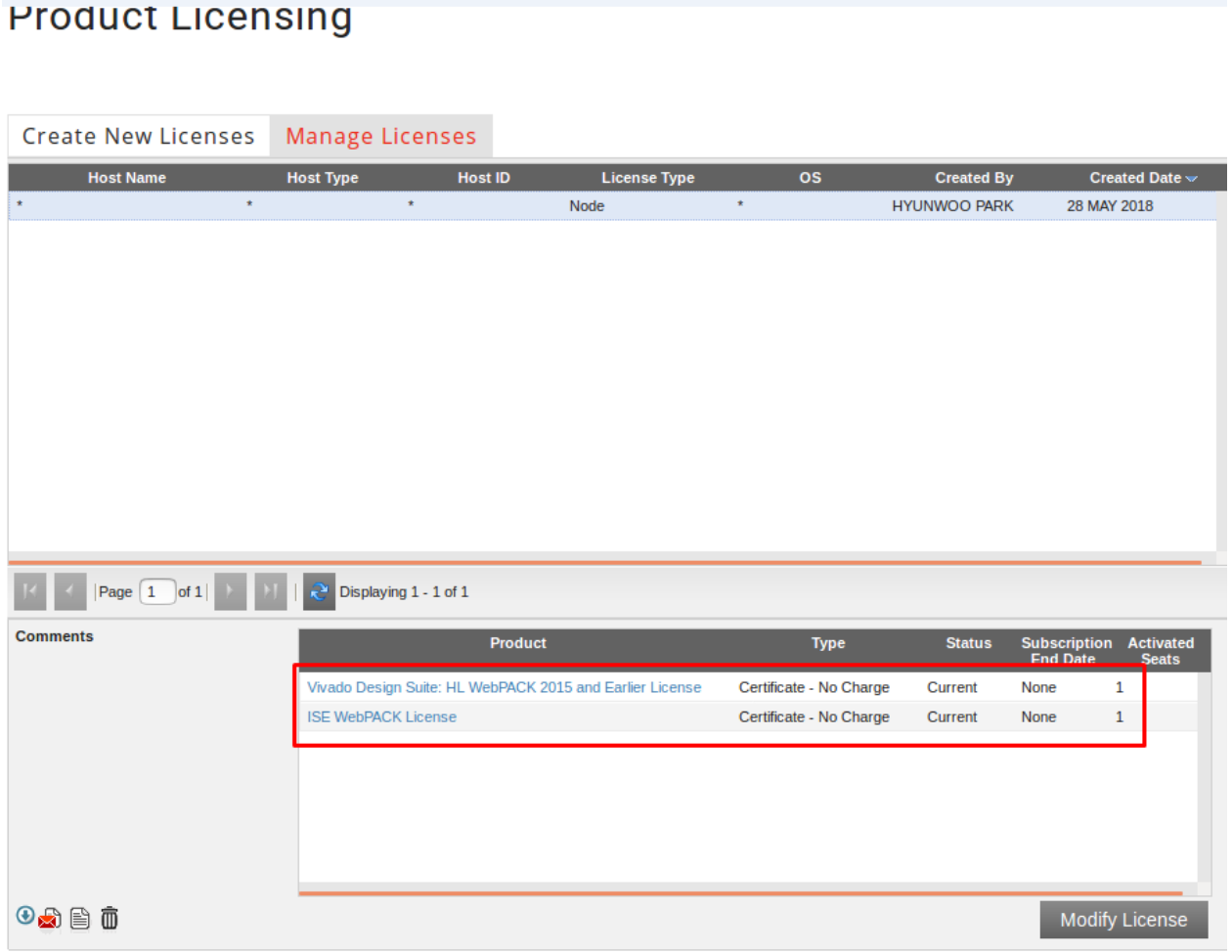


FPGA 환경설정 (Xilinx) 4

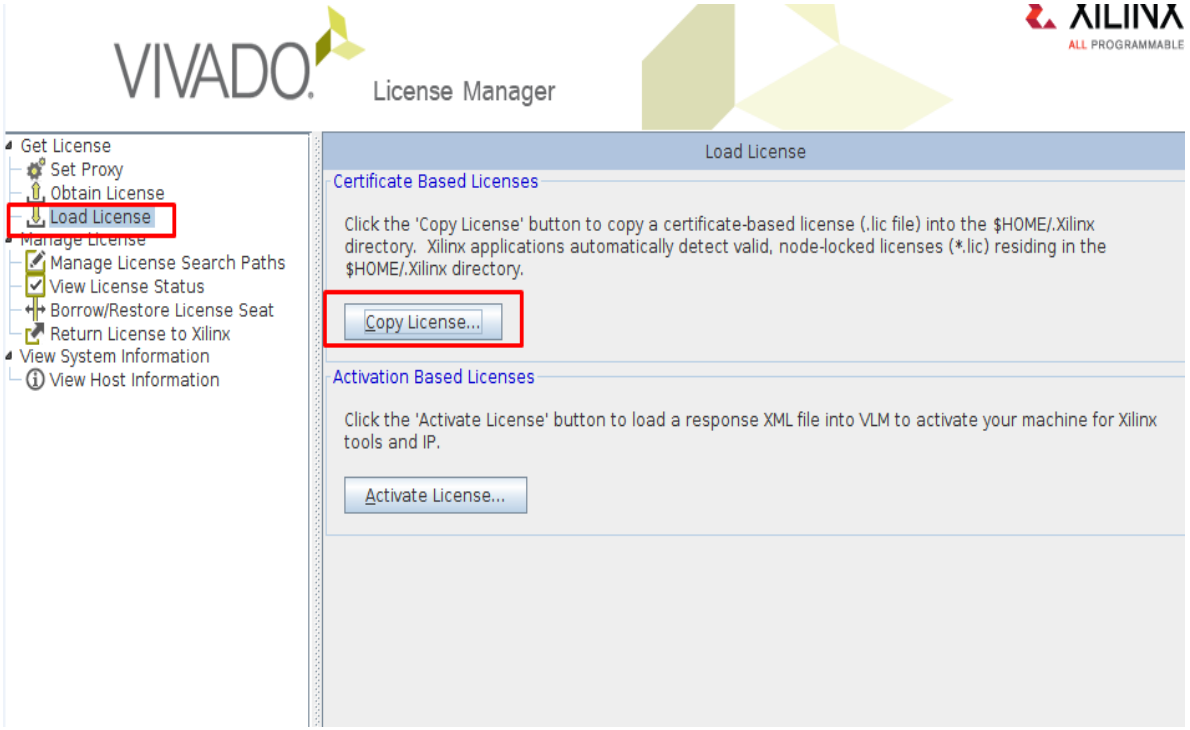


FPGA 환경설정 (Xilinx) 5





FPGA 환경설정 (Xilinx) 6



FPGA 환경설정 (Xilinx) 7