Advanced Embedded System Design using Vivado 2018.2

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Course Objectives

> **After completing this course, you will be able to:**

- Assemble an advanced embedded system and explore advanced techniques to improve system performance
- Take advantage of the various features of the Zynq SoC and Cortex™-A9 processor, including the AXI interconnect, and the various memory controllers
- Apply advanced debugging techniques, including the use of the Vivado Analyzer tool for debugging an embedded system
- Identify the steps involved in integrating a memory controller into an embedded system in Zynq SoC
- Integrate an interrupt controller and interrupt handler into an embedded design
- Design a flash memory-based system and boot load from off-chip QSPI Flash memory
- Configure and boot up system using SD card
- Profile a software application and observe the impact of porting a software function into a hardware accelerator

Course Outline
Day 1

The course consists of the following modules:

- Review of Embedded System Design in Zynq using Vivado
- Lab 1: Create a Complete Embedded System
- Advanced Zynq Architecture
- System Debugging using Vivado Logic Analyzer and SDK
- Lab 2: Debugging using Vivado Logic Analyzer
- Memory Interfacing
- Lab 3: Extending Memory Space with BRAM

Course Outline
Day 2

- Interrupts
- Low Latency High Bandwidth
- Lab 4: Direct Memory Access using CDMA
- Processor Configuration and Bootloader
- Lab 5: Configuration and Booting
- Profiling and Performance Improvement
- Lab 6: Profiling and Performance Tuning

Prerequisites

- **Familiarity with the Xilinx Embedded System Design Flow using Zynq**
- **Basic C programming**
- **Basic understanding of processor-based system**

Platform Support

- **Vivado Design Suite: System Edition 2018.2**
- **Xilinx University boards**
  - PYNQ-Z1, PYNQ-Z2
- **Supported Operating Systems**
  - Windows 7 SP1 Professional (64 Bit)
  - Windows 10 Professional (64 Bit)
  - Red Hat Enterprise Workstation Linux 6.6, 6.7, 6.8, and 6.9 (64 Bit)
  - Red Hat Enterprise Workstation/Server Linux 7.2 – 7.4 (64 Bit)
  - SUSE Linux Enterprise 11.4 and 12.3 (64 Bit)
  - Cent OS Linux 6.7, 6.8, and 6.9 (64 Bit)
  - Cent OS Linux 7.2, 7.3, and 7.4 (64 Bit)
  - Ubuntu Linux 16.04.3 LTS (64 Bit)

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