AIE-DSP (v1.0)

Course Specification

Course Description

This course covers the AMD Versal™ AI Engine architecture and using the AI Engine DSP Library, system partitioning, rapid prototyping, and custom coding of AI Engine kernels. Developing AI Engine DSP designs using AMD Vitis™ Model Composer is also demonstrated.

The emphasis of this course is on:

- Providing an overview of the AI Engine architecture
- Utilizing the Vitis DSP library for AI Engines
- Performing system partitioning and planning
- Adding custom kernel code for designs
- Creating AI Engine DSP designs using Vitis Model Composer
- Analyzing reports using Vitis Analyzer

Level – ACAP 2
Course Details
- 1 day live instructor led training (online or in person)
- 7 lectures
- 5 labs

Price – $800 or 8 AMD Training Credits
Course Part Number – AIE-DSP
Who Should Attend? – DSP users, software and hardware developers, system architects, and anyone who needs to accelerate their software applications using our devices
Prerequisites
- Comfort with the C/C++ programming language
- Vitis tool for acceleration development flow
- Comfort with basic signal processing concepts
- Basic knowledge of Versal AI Engine architecture and programming

Software Tools
- Vitis Unified IDE 2024.1
- Vitis Model Composer 2024.1

Hardware
- Architecture: Versal adaptive SoCs

After completing this comprehensive training, you will have the necessary skills to:

- Describe the AMD Versal AI Engine architecture
- Utilize the AI Engine DSP library and create a filter design with the AMD Vitis Unified IDE
- Follow the system partitioning and system mapping methodology
- Add custom kernel code to a design
- Design a DSP function with the Vitis Model Composer AI Engine library
- Analyze AI Engine designs using the Vitis Analyzer utility

Course Outline

Day 1
- **AMD Versal AI Engine Architecture**
  Introduces the architecture of the AI Engine and its components. {Lecture}
- **Introduction to the AI Engine DSP Library**
  Provides an overview of the AI Engine DSP library, which enables faster development and comes with ready-to-use example design that help with using the library and tools. {Lecture, Labs}

- **System Partitioning Methodology**
  Covers the system design planning and partitioning methodology for mapping design requirements to the AI Engine. {Lecture, Lab}
- **Rapid Prototyping and Custom Coding of AI Engine Kernels**
  Describes the AI Engine programming flow with kernels and Adaptive Data Flow (ADF) graphs. Also outlines the kernel coding methodology for writing custom kernel code and rapid prototyping. {Lecture, Lab}
- **Overview of AI Engine Kernel Optimization**
  Highlights the various AI Engine kernel optimization techniques, such as compiler directives, software pipelining, coding for performance, and core utilization. {Lecture}
- **Analyzing AI Engine Designs Using the Vitis Analyzer**
  Covers the different reports generated by the Vitis Unified IDE and how to use these reports to optimize and debug AI Engine kernels. {Lecture}
- **AI Engine DSP Designs with Vitis Model Composer**
  Describes the Vitis Model Composer tool and how to use the libraries available with the tool for AI Engine DSP design development. {Lecture, Lab}

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- You must have your tuition payment information available when you enroll. We accept credit cards (Visa, MasterCard, or American Express) as well as purchase orders and Xilinx training credits.

Student Cancellation Policy

- Student cancellations received more than 7 days before the first day of class are entitled to a 100% refund. Refunds will be processed within 14 days.
- Student cancellations received less than 7 days before the first day of class are entitled to a 100% credit toward a future class.
- Student cancellations must be sent here.

Morgan A.P.S. Course Cancellation Policy

- We regret from time-to-time classes will need to be rescheduled or cancelled.
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- Morgan A.P.S. may cancel a class up to 7 days before the scheduled start date of the class; all students will be entitled to a 100% refund.
- Under no circumstances is Morgan A.P.S. responsible or liable for travel, lodging or other incidental costs. Please be aware of this cancellation policy when making your arrangements.
- For additional information or to schedule a private class contact us here.

Online or in person training with real hardware

- Morgan Advanced Programmable Systems, Inc. has set up a training VPN where engineer participants can take classes online using the same computers and devCards used during in-person training.

- Even better, and upon request, you can use these computers after hours on training days to experiment with labs.   This is not possible for in-person training.

- Additionally, just like in-person training, the laptops and devCards, tools, OS, and licensing are set up in advance.

- In some ways, live online-training is better than in-person…for example, you can grant the instructor permission to look at your Vivado, PetaLinux terminal, or Vitis for extended periods of time if your lab is not going exactly has planned to a missed step.

- This is often more comfortable than two engineers crowding around a laptop screen.

- Taking remote training also allows you to learn some tips and tricks for working remote.   Whether your devCard is in the lab down the hall, or across the world via VPN, you can control your Xilinx based device quickly and efficiently.