INFOSOFT IT SOLUTIONS

Training | Projects | Placements

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FPGA Design

Introduction to FPGA Technology

1. Overview of FPGA Architecture and Components
2. Advantages of FPGA over ASICs and CPUs
3. FPGA Market Trends and Applications

FPGA Design Flow

1. Introduction to FPGA Design Methodology
2. Overview of Hardware Description Languages (HDLs) - Verilog and VHDL
3. Introduction to FPGA Design Tools (Xilinx Vivado, Intel Quartus Prime)
4. Hands-on: Setting up FPGA Design Environment

Basic FPGA Concepts

1. Basic Logic Design with Verilog/VHDL
2. Combinational and Sequential Logic
3. Clocking and Timing Constraints
4. Simulation Techniques (ModelSim, QuestaSim)

FPGA Architectures and Resources

1. FPGA Routing Architecture
2. FPGA Configurable Logic Blocks (CLBs)
3. Block RAM and Distributed RAM

4. Clock Management Resources (PLLs, Clock Buffers)

Advanced FPGA Design Techniques

1. Pipelining and Parallelism
2. Finite State Machines (FSMs)
3. High-Speed Serial IO (SERDES)
4. Implementing DSP Functions on FPGAs

FPGA Design for Embedded Systems

1. Overview of Embedded Processor Cores in FPGAs (ARM Cortex-A9, MicroBlaze)
2. Integrating IP Cores and Peripherals
3. AXI Interconnect and Memory Mapping
4. Hands-on: Building an Embedded System on FPGA

FPGA Implementation and Optimization

1. Design Constraints and Timing Closure
2. Power Optimization Techniques
3. Design for Testability (DFT) and FPGA Testing Strategies
4. FPGA Place and Route Algorithms

FPGA Communication Interfaces

1. Introduction to Communication Protocols (UART, SPI, I2C)
2. Implementing Communication Interfaces on FPGA
3. PCIe Interface Design
4. Ethernet Interface Design

High-Level Synthesis (HLS) for FPGAs

1. Introduction to HLS and its Benefits
2. HLS Design Flow and Tools (Vivado HLS, Intel HLS Compiler)
3. Converting C/C++ Code to RTL

FPGA Security and Reliability

1. FPGA Security Threats and Vulnerabilities
2. Design Techniques for FPGA Security
3. FPGA Reliability and Fault-Tolerant Design

FPGA Project Management

1. Project Planning and Documentation
2. Version Control and Collaboration Tools (Git, SVN)
3. Design Reviews and Verification Strategies

Case Studies and Real-world Applications

1. Case Studies of FPGA Applications in Various Industries (Telecommunications, Aerospace, Automotive)
2. Lessons Learned and Best Practices
3. Future Trends in FPGA Technology

FPGA Design Lab Sessions

1. Hands-on Labs Covering Various FPGA Design Techniques
2. Project-Based Assignments
3. Troubleshooting and Debugging FPGA Designs