VHDL Basics

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Grading System

- Work Packages - 10%
- Midterm - 30%
- Final Exam - 60%

Introduction

- VHDL is a language used to describe digital circuits.
- VHDL stands for: Very High Speed Integrated Circuit Hardware Description Language
- Designs described in VHDL can be compiled, simulated and translated to a format suitable for hardware implementation.

Introduction (cont.)

- VHDL History:
  - Developed in the late 70s - early 80s by the U.S. Department of Defence
  - 1986: proposed as an IEEE standard
  - 1987: first VHDL standard adopted
  - 1993: revised VHDL standard adopted
  - 2002: current VHDL standard adopted

Terminology

- Simulation
- Synthesis
- Field Programmable Gate Arrays (FPGAs)
- Application Specific Integrated Circuits (ASICs)

Terminology (cont.)

- Simulation
  - Predict the behavior of a design
  - Functional Simulation
    - Approximate behavior
  - Timing Simulation
    - Exact behavior

Terminology (cont.)

- Synthesis
  - Generation of a netlist file that describes the structure of a digital design.
    - VHDL is used at a previous state of the overall design flow
    - Not all VDHL statements are synthesizable.

Terminology (cont.)

- Field Programmable Gate Arrays (FPGAs)
  - Programmable devices
  - Rapid prototyping for almost any digital design
  - Creation of designs whose purpose is the generation of an input bitstream file that configures other devices

Terminology (cont.)

- Application Specific Integrated Circuits (ASICs)
  - Custom designs that implement a specific application
  - Custom capability
  - Lower unit cost
  - Smaller size