Midterm Review

Section 1: Introduction and Overview

- Brief overview of the ARM processor
  - Register organization
  - ARM Core,
  - pipelining,
  - modules, and registers
- Working with the Tower and tools
  - Flexible development environment
  - Powerful programming tool set

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Section 2. Memory System Architecture

1. **Concepts of memory hierarchy**
   - Quantitative principles of computer design
   - Speed gap
2. **Cache memory design**
   - Placement, replacement, write back
3. **Cache organization of ARM Processor**
4. **SRAM**
   - Programmable high speed on-chip RAM to store critical data and program
   - Difference between SRAM and Cache?

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Section 3. Exception Processing

1. **General Exception Steps**
2. **Interrupt priority, interrupt vector, vector table**
3. **Interrupt Controller Module**
   - **A set of programmable registers**
   - **Mask, force, level, and vectors**
4. **Peripheral modules using IRQ**

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Section 4. Power Management

- **Power Management Module**
- **Procedure to enter a low power mode**
- **Most peripheral devices can be individually controlled**

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Section 5. Direct Memory Access

- **DMA controller**
- **3 ways to activate a channel**
- **Control registers and transfer control descriptor**
- **Configure and start DMA operations**

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Section 6. Serial Interface and Communications

- **UART**
  - **Transmitter, receiver, shift register,**
  - **baud rate, frame format, parity**
  - **Interrupt driven**
- **Configure and start serial communication**
- **Basic logic of serial interface**
  - **Interrupt or DMA**

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Section 7. Wireless Communication and ZigBee Protocol

- **Why ZigBee?**
  - Low cost and low power consumption
  - PAN and HAN applications
- **What is ZigBee?**
  - IEEE 802.15.4 standard at 24GHz band
  - 250Kbps, MAC and Physical layer standards
- **How to Work with ZigBee:**
  - Programming ZigBee using interfaces
  - Write simple applications

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