

Final 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



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?



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**



Section 4. Power Management

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



Section 5. Direct Memory Access

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



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**



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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Sec. 8. LCD Display

- **Freescale embedded GUI and TWR-LCD**
 - D4D, Driver for Display functions
 - Objects: Button, check box, Gauge, Icon, Label, Menu, Picture, Slider, Graph, etc.
 - Function bodies: Oninit, OnActivate, on Dactivate, OnMain, OnObjectMsg, etc
 - Multi layer development
 - User app
 - API
 - D4D level
 - LCD low level, managing comm with LCD and providing basic functions



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Sec. 9. Coding Concepts

- **Linear code**
 - Definition, theorems
 - Design a code for a given capability
 - CKT design
- **CRC code**
 - Definition, concepts
 - Error control capability
 - CKT design



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Sec 10: Advanced Topics: Disk I/O and RAID Architecture

- **Importance of data storage**
- **RAID Architecture**
 - Why RAID, What types of RAID, and How RAIDs work
 - AND-Gate Flash memory
 - Physical properties and design issues
 - FTL, Write amplification, Wear leveling, GC



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Final Lab Report

- **4 pages final report**
 - Introduction and Motivations
 - Design and implementations
 - Results and Analysis
 - Clearly state each partner's role, be specific
- **Email, thumb drive, or CD:**
 - Name your file using your last name
 - All soft ware, programs, and documentation
 - Slides and Posters in two formats: ppt/doc and printable



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