Memory: ROM and RAM

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1 Administrivia

Announcements

Course evaluations end of class Monday.

Assignment

Read 6.2–4.

From Last Time
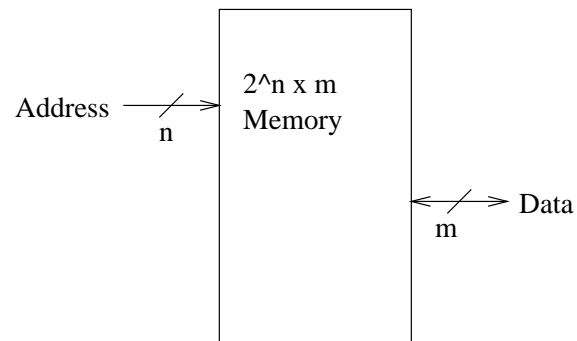
Counter project overview.

Outline

1. Introduction.

2. ROM.

3. RAM.

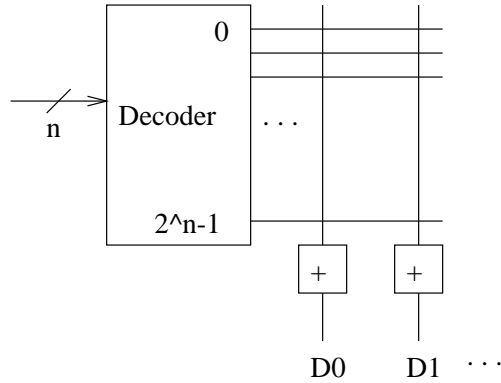**Coming Up**

Details on RAM.

2   Introduction

1. What is memory?

2. Volatile vs. non-volatile.

3. RAM characteristics: speed, density, power.

4. Memory hierarchy: registers, cache, main memory, etc.

5. General structure:

3   ROM

1. Technologies: PROM, EPROM (UV), EEPROM, EAPROM.

2. Where do you find ROM in a PC?

3. Structure of a ROM:

Minterms, fusible links.

4. Usage: program storage, generation of combinational functions.

   How do you use for combinational functions?

4 RAM

1. Additional inputs: !Enable, Read/!Write

2. Static RAM: latches, inverter pair.

   Used for caches. Fast. Not dense. High power.

3. Dynamic RAM: stored charge on a capacitor.

   (a) Leakage, refresh.

   (b) Used for main memory. Slow. Dense. Low power.

   (c) Sizes. I/O pin limitations. Solutions: one bit wide, address multiplexing. 2-D structure.

   (d) Additional inputs: RAS, CAS.

4. Read/Write sequences.

   Write strobe with respect to the clock signal. Importance of address bus settling before write asserts.