Administrivia – Midterm

• **Who:** You
• **What:** Midterm Exam
• **When:** Wed Oct 19th 3:00pm - 4:20pm
• **Where:** DH A302
• **Why:** The last presidential debate is that night so you can relax after the exam.

**What to bring:**
- CMU ID
- Calculator
- One page of notes (double-sided)

**What not to bring:**
- Live animals

**Covers up to External Sorting** (inclusive).
- Closed book, one sheet of notes (double-sided)
- Please email Christos + Andy if you need special accommodations.

**http://cmudb.io/f16-midterm**
Extended Office Hours

• Christos:
  – Tuesday Oct 18th @ 1:00pm-3:00pm
• Andy:
  – Monday Oct 17th @ 10:30am-11:30am
  – Monday Oct 17th @ 1:00pm-2:00pm

Entity Relationships

• Cardinalities
• Total vs. Partial Participation
• Strong vs. Weak Entity Set
• Primary Key vs. Partial Key

Relational Model

• Integrity Constraints
• Relation Algebra
• Relational Calculus
  – Primitive Operators
  – Derived Operators

SQL

• Basic operations:
  – SELECT / INSERT / UPDATE / DELETE
  – WHERE predicates
  – Output control
• More complex operations:
  – Joins
  – Aggregates
  – Common Table Expressions
Storage

- Buffer Management Policies
  - LRU / MRU / CLOCK
- On-Disk File Organization
  - Heaps
  - Linked Lists
- Understand high-level trade-offs of different approaches.

Indexes

- B-Tree vs. B+Tree
- Basic Operations:
  - Insertions / Deletions
  - Splits / Merges

Hashing

- Extendible Hashing
  - Global Depth vs. Local Depth
  - Overflow Chains
- Linear Hashing
  - Insertion / Splitting
  - Overflow Chains
- Comparison with B+Trees

Sorting

- Two-way External Merge Sort
- General External Merge Sort
- Cost to sort different data sets with different number of buffers.