

# CS367 Lecture 23

Thursday 24 July 2014

Announcements/Reminders:

Last class:

- RBT example
- Hashing (intro)

Today:

- Hashing (cont'd)
  - Examples of hash functions
  - Non-Integer Keys
  - Advanced Collision Handling

# Hashing

What problem are we solving?

Idea:

Terminology:

- Key
- Hash table
- Table Size (TS)
- Load Factor (LF)
- Hash function
- Collision
- Ideal hashing

## Choosing a good hash function

Properties:

Two-step process:

## Some Hashing Techniques

% tablesize

Extraction

Folding

Mid-square

Multiplication

Rotation/Weighting/Use-your-imagination/...

**What if the keys are not integers?**

Java's built-in hash function for Strings:

## Collision Handling: Buckets

## Collision Handling (advanced): Open Addressing

Linear probing

Quadratic probing

Double Hashing

## Hashing in Java

`hashCode()` method:

- All Objects have it
- returns an int
- default is computed from memory address (NOT good!)

Overriding `hashCode()`: