

# Lecture notes for Week 6: Hashing

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## 1. Topics

1:  
3:

### 1.1. Textbook portions covered

**Introduction to Algorithms (Cormen et al.)**

Chapter 11

**Engineering Algorithms...(Clowes "online book")**

Chapter 9

## 2. Lecture 17 (Friday, 11 February 2005)

### 2.1. Announcements

- 

### 2.2.

1:

## 3. Lecture 17/18 (Tuesday, 15 February 2005)

### 3.1. Announcements

- 

#### 3.1.1. Hash functions

1. Division method:  $h(k) = k \bmod m$
2. Multiplication method:  $h(k) = m \text{fractional}(kA)$

#### 3.1.2. Example (java Hashtable)

```
public synchronized boolean contains(Object value) {
    if (value == null) {
        throw new NullPointerException();
    }

    Entry tab[] = table;
    for (int i = tab.length ; i-- > 0 ;) {
        for (Entry<K,V> e = tab[i] ; e != null ; e = e.next) {
            if (e.value.equals(value)) {
                return true;
            }
        }
    }
}
```

```
    return false;
}
```

### 3.1.3. Example Java String hashCode()

```
    */
    public int hashCode() {
        int h = hash;
        if (h == 0) {
            int off = offset;
            char val[] = value;
            int len = count;

            for (int i = 0; i < len; i++) {
                h = 31*h + val[off++];
            }
            hash = h;
        }
        return h;
    }
}
```

## 4. Suggested Problems

### ***Introduction to Algorithms (Cormen et al.)***

- Exercise 11.1-1
- Exercise 11.1-2
- Exercise 11.1-3
- Exercise 11.2-2
- Exercise 11.2-3
- Exercise 11.4-1
- Exercise 11.4-2

### ***Engineering Algorithms...(Clowes "online book")***

- 9.1