C3

Hashing Applications

Java hashCode()

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Java hashCode()

Java provides a hash code for *every* object

- 32-bit signed integer
- Inherited from Object, but may be overwritten
- Objects for which equals() is **true** must also have the same hashCode().
- The hash need not be perfect (i.e. two different objects may share the same hash).

Uses of Hashing

- Hash table (a map from key to value)
- Pruning a search
  - Looking for duplicates
  - Looking for similar values
- Compression
  - A hash is typically much more compact than the key
- Correctness
  - Checksums can confirm inequality

Practical Examples…

Luhn Algorithm

Used to check for transcription errors in credit cards (last digit checksum).

Hamming Codes

Error correcting codes (as used in ECC memory)

Practical Examples…

rsync (Tridgell)

Synchronize files by (almost) only moving the parts that are different.

MD5 (Rivest)

Was used to encode passwords for a long time (but no longer).