University of Virginia 12 September 2011
cs1120: Introduction of Computing
Explorations in Language, Logic, and Machines

Class 9: Consistent Hashing

Assignments Due

- **By now you should have read the course book through Section 5.4.**
- **Wednesday, 14 September (beginning of class): Problem Set 2**
- **Friday, 16 September:** Read *The Information* Chapters 4 and 10.
- **Monday, 19 September:** Read course book through the end of Chapter 6.

Upcoming Help Schedule (all office hours are now in Rice Hall)

- Today: noon-1:30pm (Kristina, Rice 1st); 1:15-2pm (Dave, Rice 507)
- Tuesday: 11am-noon (Dave, Rice 507); 5-8pm (Valerie/Jonathan, Rice 507)

Notes and Questions

Define a procedure, **table-lookup**, that takes as inputs a table and a key. If the table contains an entry **(key . *value*)**, the output is ***value***. If there is no entry whose first part matches **key**, the output is false.

What is a hash table?

compute-hash: *Key, Size* → *Number*

Maps a key (which could be any value) and a table size to a number between 0 and *Size* – 1. This is the position in the table where the *Key* should be stored in the table.

string->list: *String* → *List of Characters*

Takes a string (e.g., "hello") as input, and outputs a list of the characters in that string (e.g., (list #\h #\e #\l #\l #\o)).

format: *String,* zero or more values → *String*

Takes a formatting string and zero or more values and outputs a string. The format string can include special formatting markers such as "~a" (which takes the next value in the inputs and formats it as a string) and "~n" (which creates a new line).

```
(define (compute-hash key size)
  (modulo (sum-chars (string->list (format "~a" key))) size))
```

Define a procedure, **sum-chars**, that takes as input a list of characters, and outputs the sum of all the character values (as converted by **char->integer**) in the list.