this is week 7

fall 2013

playlist50

Ya Hey (Vampire Weekend)

Mountain Sound (Of Monsters and Men)

Monster Mash (Bobby Pickett & The Crypt-Kickers)

agenda

resources

linked lists

hash tables

resources

lecture notes & source code

cs50.net/shorts

study.cs50.net

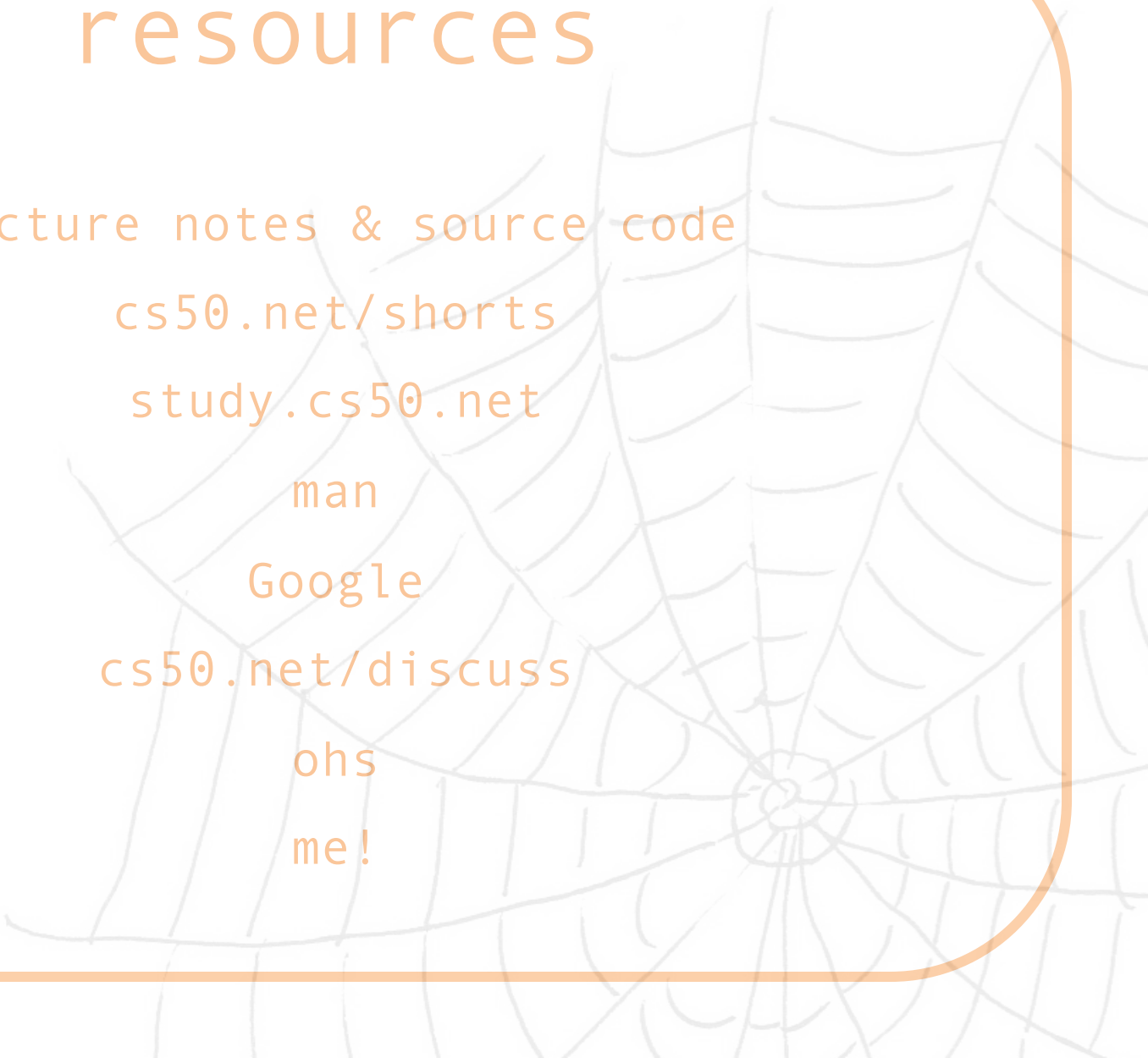
man

Google

cs50.net/discuss

ohs

me!

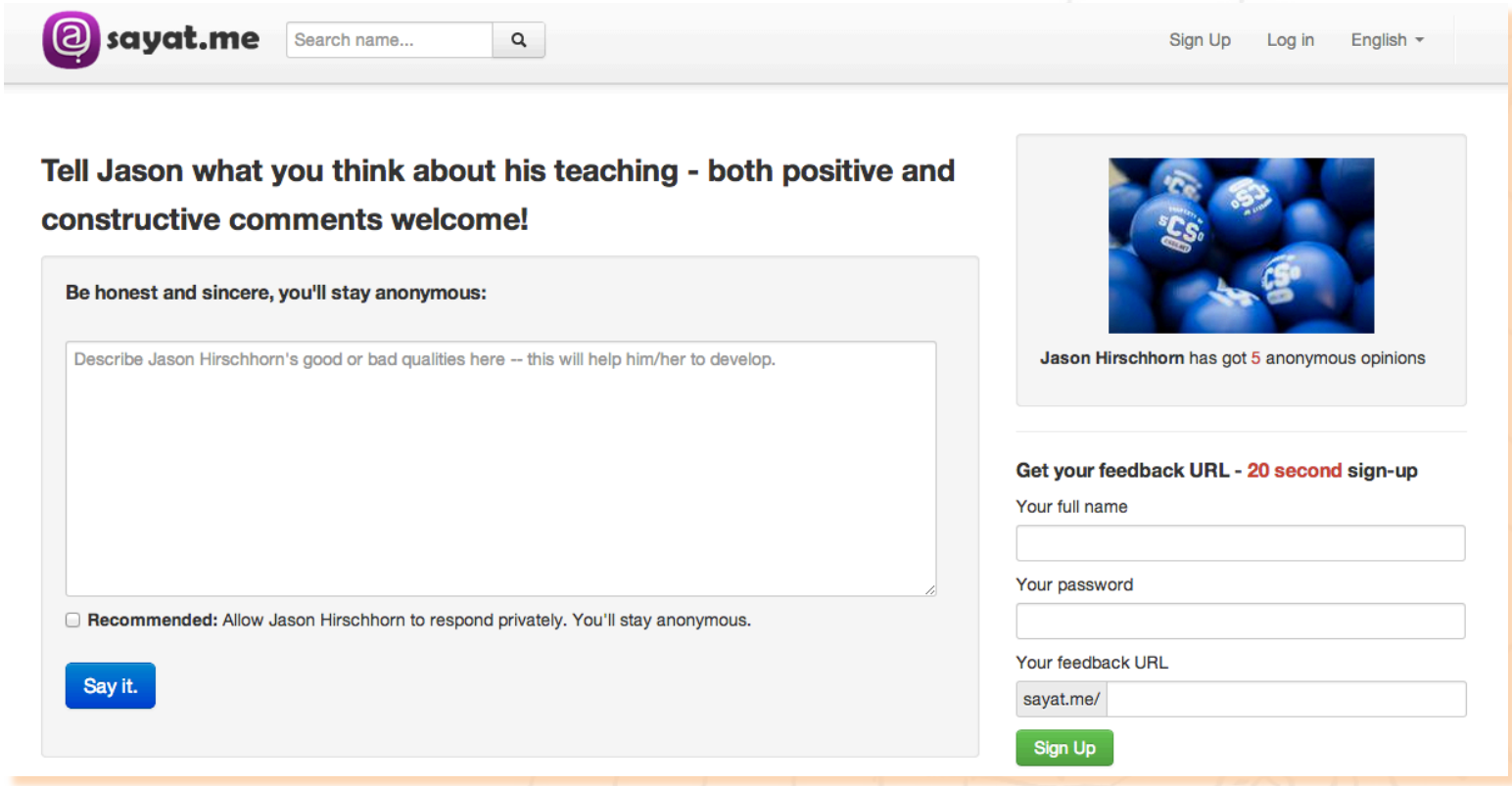


pset6

gdb

valgrind --leak-check=full

diff -y



http://sayat.me/cs50

linked lists

i.qkme.me/3toh4j.jpg

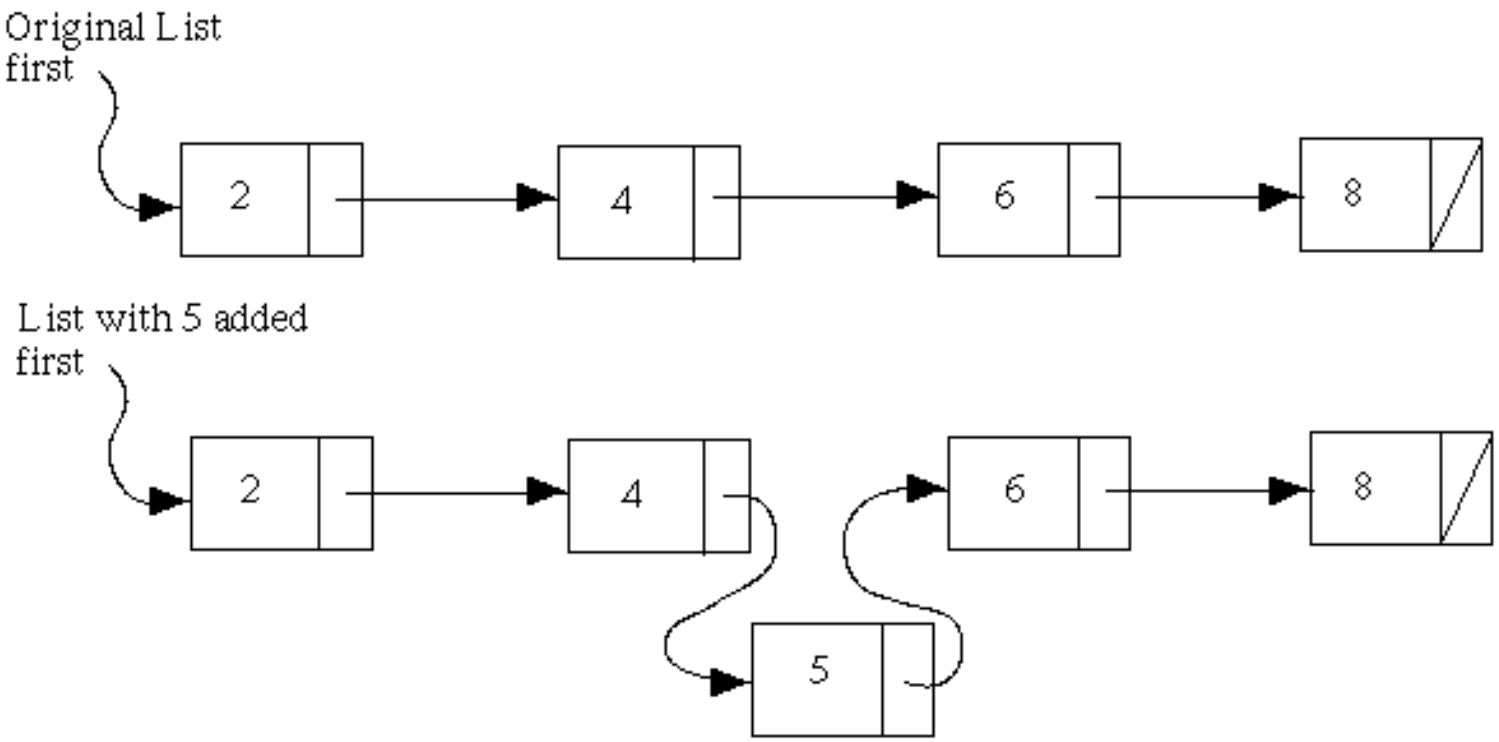
node

```
typedef struct node
{
    int n;
    struct node* next;
}
node;
```

node

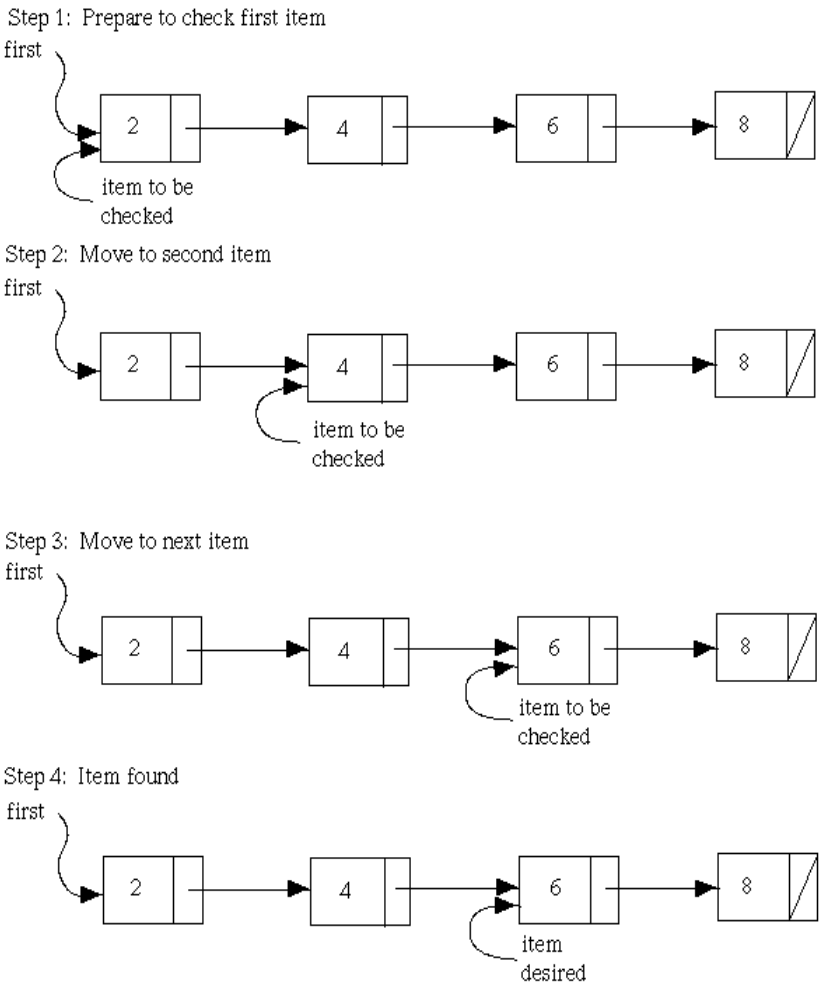
```
node new_node;
new_node.n = 1;
printf("%i\n", new_node.n);

node* ptr_node = &new_node;
printf("%i\n", (*ptr_node).n);
printf("%i\n", ptr_node->n);
```

insert



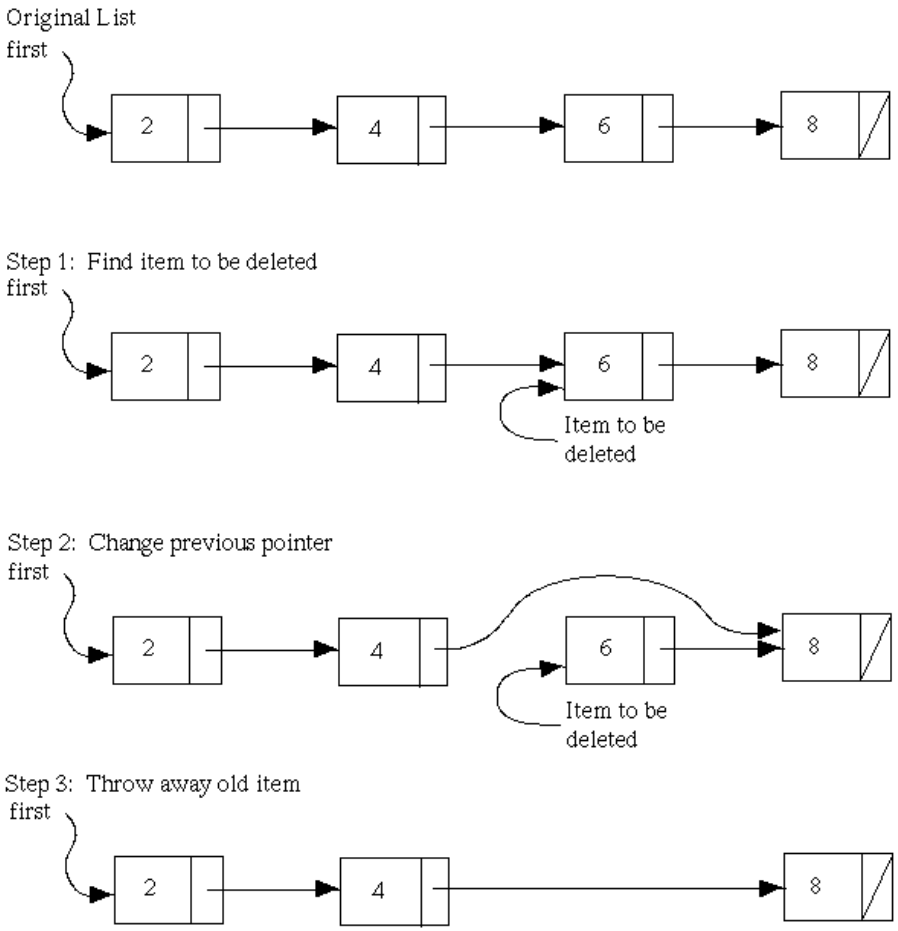
http://www.cs.grinnell.edu/~walker/courses/153.sp09/readings/reading-lists-c.shtml

find



http://www.cs.grinnell.edu/~walker/courses/153.sp09/readings/reading-lists-c.shtml

delete



http://www.cs.grinnell.edu/~walker/courses/153.sp09/readings/reading-lists-c.shtml

your turn: linked.c

Write a function that inserts an int into a linked list. Keep the list sorted from smallest to largest. Do not insert duplicates. Let the user know whether or not the insert was successful. Don't worry about freeing nodes at the end of the program.

```
bool insert_node(int value);
```

Skeleton code has been provided for you.

strategy

// logic

draw a picture

write some pseudocode

// syntax

map it onto C

code the program

your turn: linked.c

Write a function that prints out all of the ints in a linked list. Print out the number of each node (0-indexed) as well.

```
void print_nodes(node* list);
```

Skeleton code has been provided for you.

your turn: linked.c

Write a function that frees all of the nodes in a linked list before the program exits.

```
void free_nodes(node* list);
```

Skeleton code has been provided for you.

hash tables

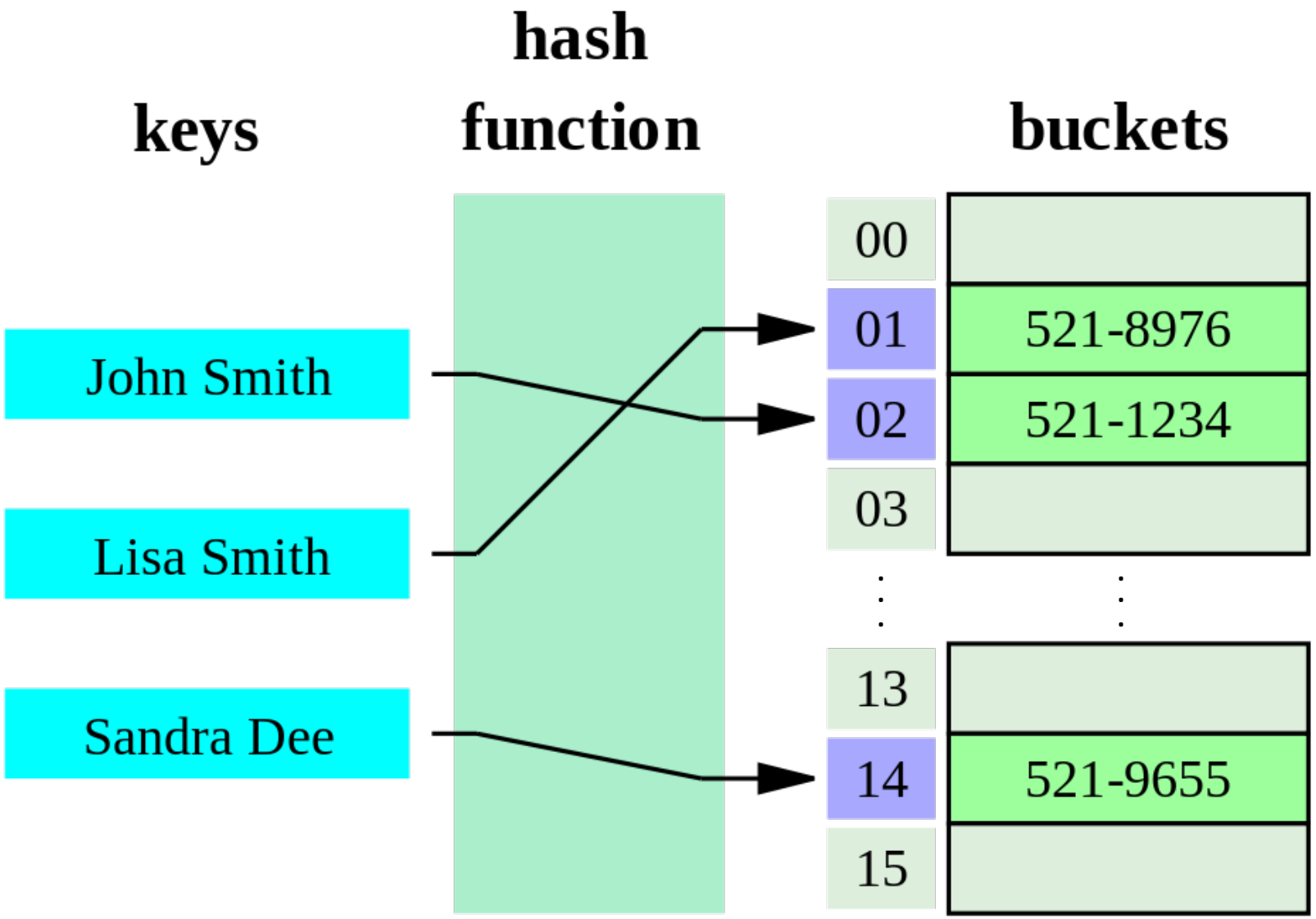
hash tables

array + hash function

0) key

1) value = hash_function(key)

2) array[value] = key



http://en.wikipedia.org/wiki/Hash_table

potential pitfalls

What make a good

hash function?

0) deterministic

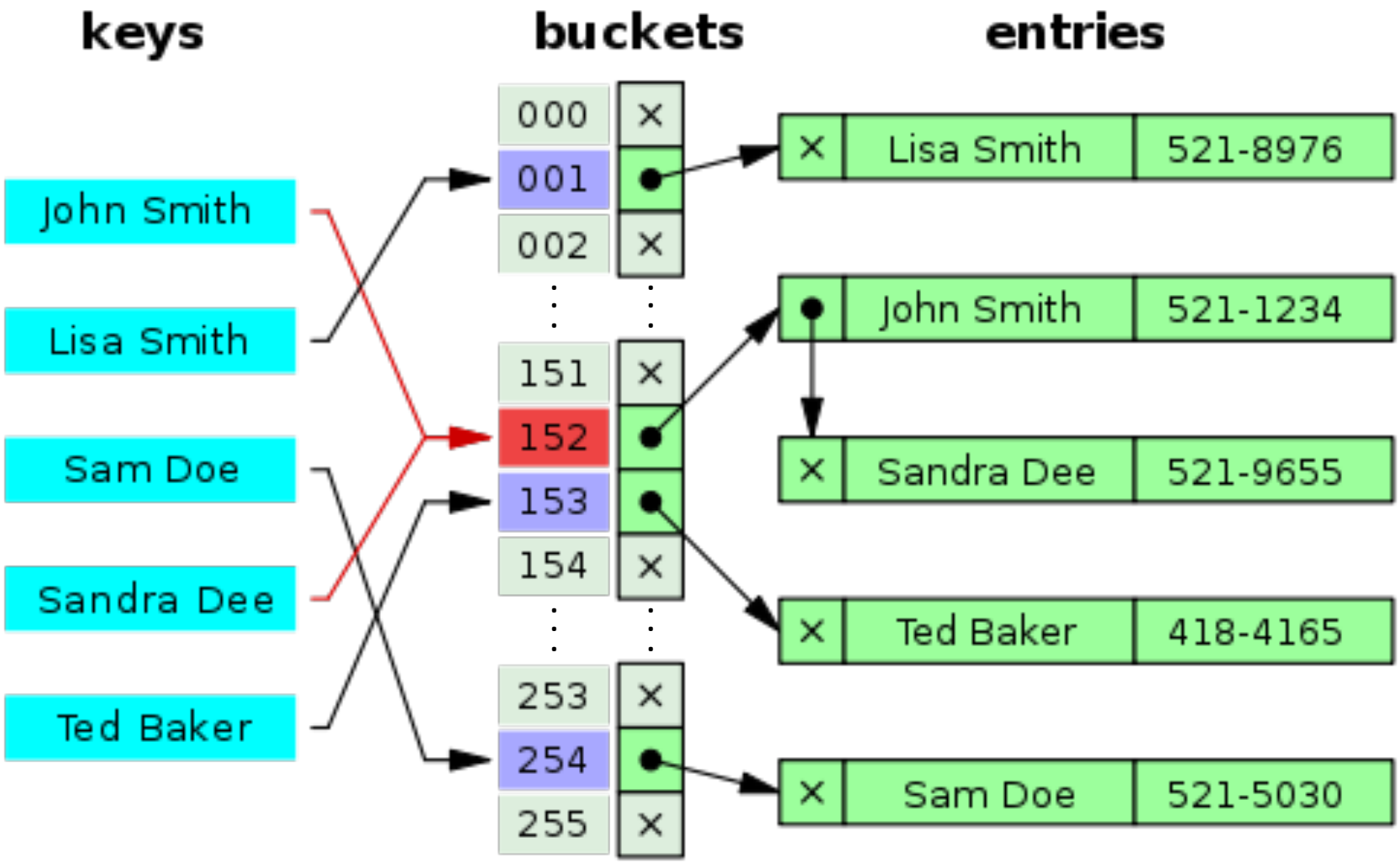
1) returns valid indices

potential pitfalls

What if two keys map to the same value?

0) linear probing

1) separate chaining



http://en.wikipedia.org/wiki/Hash_table