

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
 Department of Electrical Engineering and Computer Science
 6.001—Structure and Interpretation of Computer Programs
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Recitation 27
Garbage and Review

Garbage Collection

Mark & Sweep

1. Mark all cells reachable from the root. This uses a set of mark bits. Basic code:

```
(define (mark x)
  (if (pair? x)
      (begin (mark (car x)) (mark (cdr x)))
      'nothing-to-do))
```

2. Sweep all of memory, picking out the unmarked cells.

Stop & Copy

1. **Setup:**

- (a) Set the free pointer to the beginning of “new” memory bank.
- (b) Copy the root cell to the first element of the new memory bank.
- (c) Set the copy pointer to the first element of the new memory bank.

2. **Loop:**

- (a) Copy the cell pointed to by the copy pointer
- (b) Increment the copy pointer
- (c) Until the copy pointer points to the same cell as the free pointer.

3. **Copy:** The steps of copy are as follows:

- (a) Copy the car and the cdr of the cell in the old memory to the free pointer in new memory.
- (b) Change the car in the old memory to a broken heart
- (c) Change the cdr in the old memory to a pointer to the location the cell was moved to in new memory.
- (d) Increment the free pointer.

4. **Swap:** swap which area is which: the “new” becomes the “old” and vice versa.