【DS】Day14

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【Week 4】Priority Queue
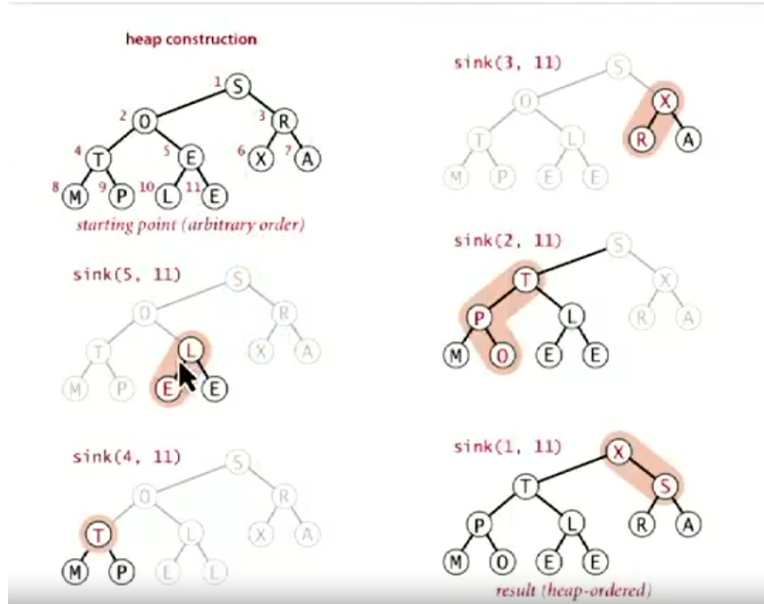
4.3 Heapsort

Basic plan for in-place sort

- Create max-heap with all N keys

- Repeatedly remove the maximum key.

Heap construction: Build max heap using bottom-up method.

Sortdown: Repeatedly delete the largest remaining item.

Build heap using bottom-up method.

```
for (int k = N / 2; k >= 1; k--) {
  sink(arr, k, N);
}
```

heap construction

- Remove the maximum, one at a time

- Leave in array, instead of nulling out

```
while (N > 1) {
   exch(arr, 1, N--);
   sink(arr, 1, N);
}
```

Heapsort is optimal for both time and space, but:

- Inner loop longer than quicksort(compares of the children nodes)

- Makes poor use of cache memory

- Not stable.