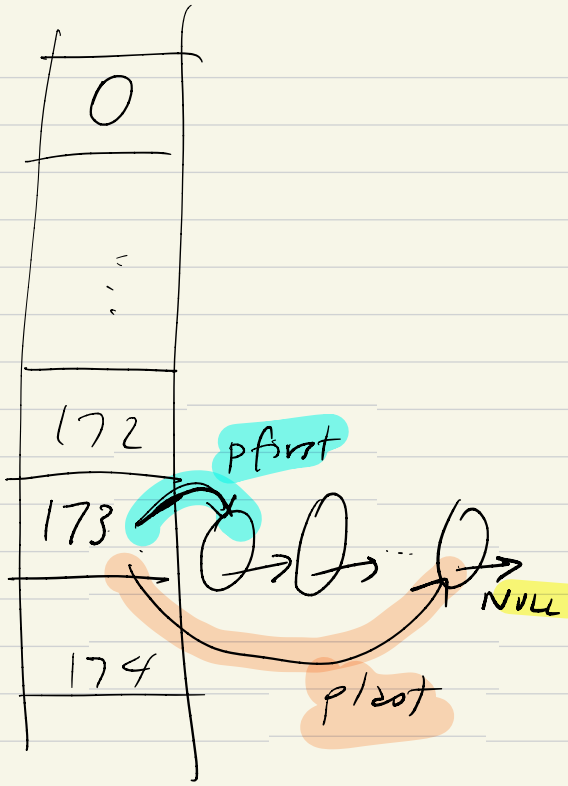
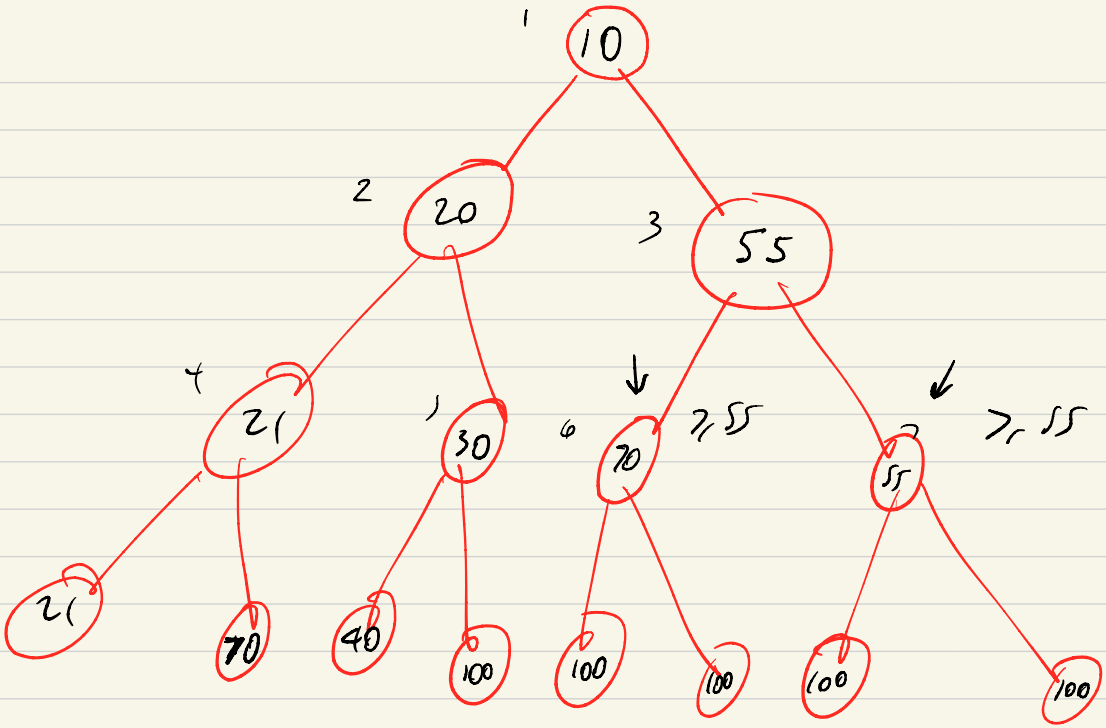
```
struct hashbag {
    char *pword;        actual word
    char len;           # characters
    int id;
    int freq;           freq. of word
    struct hashbag *pnext;
}
```

```
struct hashspine {
    hashbay *pfirst;
    hashbay *plast;
    int number;
}
```



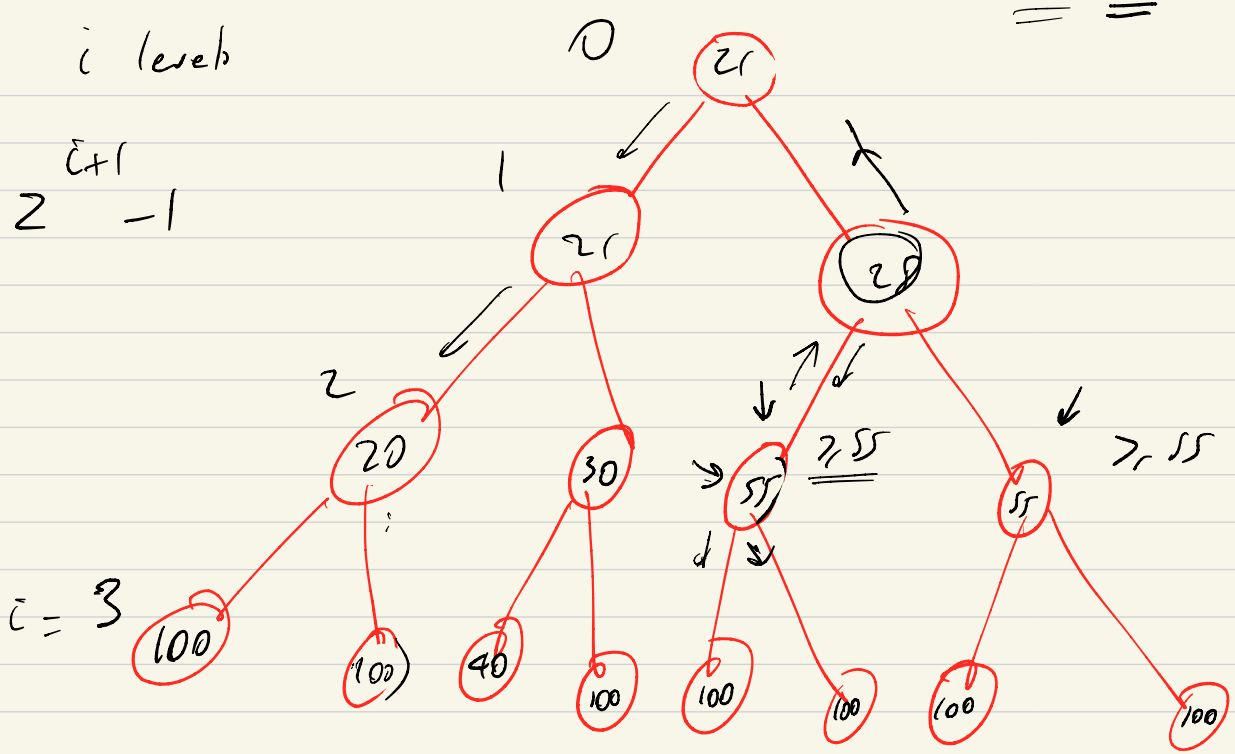


1+2
+4+8 =15

10 20

i level

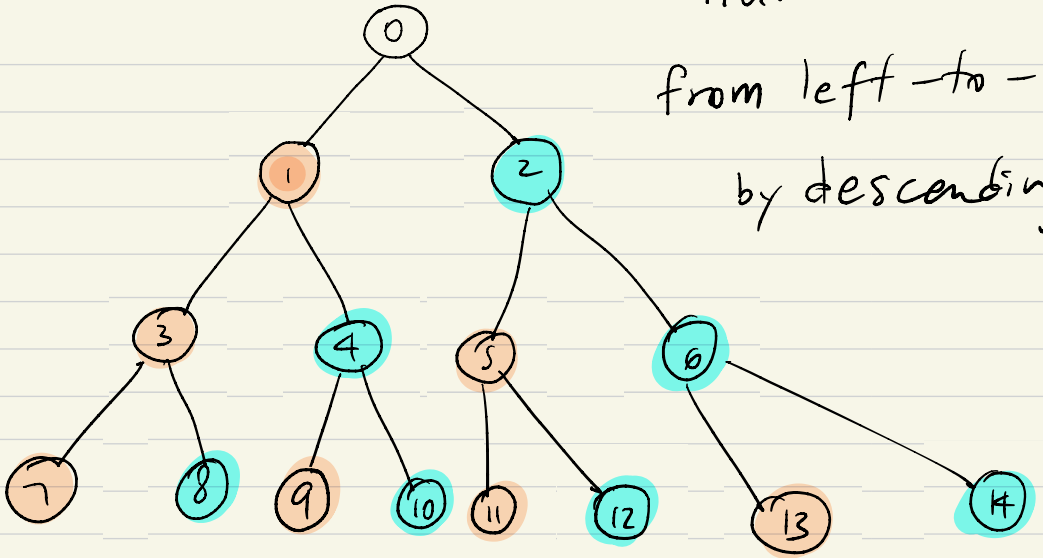
$2^{i+1} - 1$

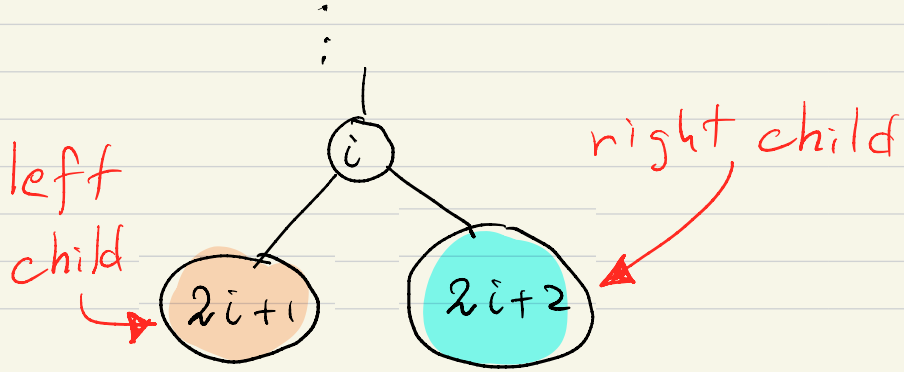


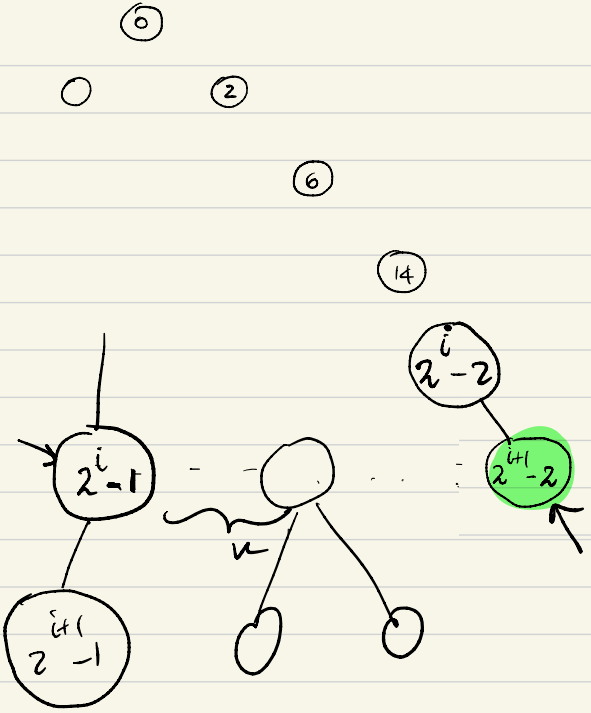
log n

n log n

number nodes from left-to-right by descending levels







level	# in level	total
0	1	1
1	2	3
2	4	7
3	8	15
i		

$$\sum_{j=1}^{i} 2^j = 2^{i+1} - 1$$

$i = 0 \rightarrow 1$

$i = 1 \rightarrow 3$

$i = 3 \rightarrow 15$