Lec-10

10/06/24 7:34 PM

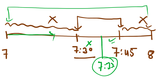
Binary Search

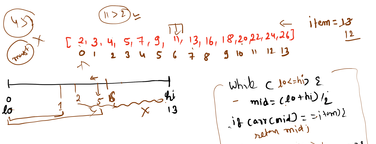
Linear Search

item = 13

[2, 3, 4, 5, 7, 9, 11, 13, 16, 18, 20, 22, 24, 26]

0 1 2 3 4 5 6 7 8 9 10 11 12 13





```
while ( lo<=hi ) {
    mid = (lo+hi)/2
    if (arr[mid] == item) {
        return mid
    }
    else if (arr[mid] > item) {
        hi = mid-1
    }
    else {
        lo = mid+1
    }
}
return -1
```

$\frac{0+13}{2} = \frac{lo+hi}{2} = 6$

$\frac{7+10}{2} = 10$

$\frac{7+9}{2} = 8$

smaller

$0 \to max \times inum$

$f(n) \Rightarrow [x^k <= N]$

$K = 3$

$N = 146$

$x = 1, 2, 3, 4, 5, 6$

```
while (n^k <= n) {
    x++
}
x - 1
```

$3^1 <= 146$

$3^2 <= 146$

$3^3 <= 146$

$3^4 <= 146$

$3^5 <= 146$

$3^{k} <= n$

$73^k <= n$

$98^k <= n$

$98^3 <= 146$

$73^3 <= 146$

$73^3 <= 140$

$73^2 <= 140$

$\frac{73+1}{2} = 37$

$\frac{37+1}{2} = 19$

$\frac{19+1}{2} = 10$

$\frac{10+1}{2} = 5$

$\frac{5+1}{2} = 3$

$\frac{3+1}{2} = 2$

$\frac{2+1}{2} = 1$

$\frac{1+1}{2} = 1$

$\frac{1+1}{2} = 1$

$\frac{1