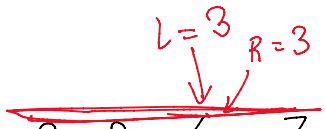
Class 08

Thursday, March 24, 2022 8:02 PM

lower/upper bound



sorted array → 1, 2, 2, 4, 7, 11, 11, 13

V=2

[2,9] → 5-1=4

lower_bound(arr, 2) → 1

upper_bound(arr, 9) → 5

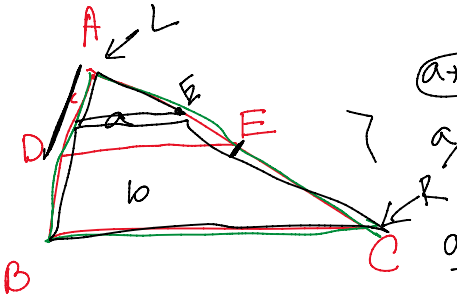
ub − lb = 0 ⇒ ub = lb

```
L=0
R=n
while(L<R)
{
    M = L + (R-L)/2
    if(arr[M] > V)
        R=M
    else
        L=M+1
}
return L
```

arr[M] > V → R=M

arr[M] == V → L=M+1

arr[M] < V → L=M+1



(a+b) = △ABC

a/b = D

$\frac{a+b}{b} = \frac{a}{b} + 1$

$\frac{\triangle ABC}{b} = D + 1$

DE ∥ BC

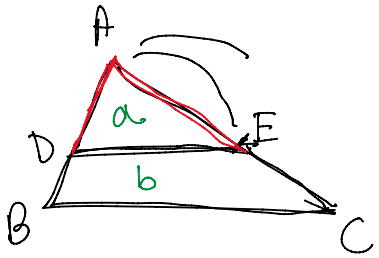
△ADE : □BDEC = D

△ADE

△ABC

$\frac{AD}{AB} = \frac{AE}{AC}$

L=0, R=AC $AD = \left(\frac{AB}{AC}\right) \times AE$



$\frac{AE}{AC} = \frac{AD}{AB}$

$\frac{AC}{AE} = \frac{AB}{AD}$

$\frac{a}{a+b}$

$\frac{\triangle ADE}{\triangle ABC} = \left(\frac{AD}{AB}\right)^2$

$\frac{a+b}{a} = \left(\frac{AB}{AD}\right)^2$

$\frac{b}{\quad} = \left(\frac{AC}{AE}\right) - 1$

```
L=0
R=AC
while (fabs(L-R)>1e-8)
{   M=(L+R)/2.0
    if (getRatio(M...)>D)
        R=M
```

$$\frac{a}{a} = \left(\frac{AD}{AD}\right)$$

$$\Rightarrow \frac{a}{a} + \frac{b}{a} = \left(\frac{AB}{AD}\right)^2$$

$$\Rightarrow 1 + \frac{b}{a} = \left(\frac{AB}{AD}\right)^2$$

$$\therefore \frac{b}{a} = \left(\frac{AC}{AE}\right)^2 - 1$$

$$\text{Let } D = \frac{b}{a}$$

$$\Rightarrow 1/D = \text{ratio}$$

R = M

else L = M

}