

Recursion

└ Power of an Element

BigInteger

$$2^{64} = 0$$

Why??

$$2^{64} = 2^{32} \cdot 2^{32}$$

$$2^{64}$$

$$2^{32}$$

$$2^{32}$$

$$256 * 256$$

$$2^{16}$$

$$2^{16}$$

$$16 * 16$$

$$2^8$$

$$2^8$$

$$4 * 4$$

$$2^4$$

$$2^4$$

$$2^2$$

$$2^2$$

$$2^{65}$$

$$2 * 2^{64}$$

$$a * 2^{64}$$

2' 2'
2x2

$$a' = a$$

Base case

$$n == 1$$

return a

Binary Search

0	1	2	3	4	5
2	4	6	8	10	12

low = 0, high = 5, target = 10

binarySearch(arr, low, high,
target)

$$\text{mid} = 2$$

$$\text{mid} = \text{low} + (\text{high} - \text{low}) / 2$$

if (arr[mid] == target)

cond 1

return mid;

else if (arr[mid] <

target)

Recursion

cond 2 binarySearch(arr, mid + 1,
high, target)

else α

binarySearch(arr, low,

cond3 mid-1, target)

low = 3, high = 5

target = 10

mid = 4

0	1	2	3	4	5
2	4	6	8	10	12

-target = 9

low = 0, high = 5

mid = 2

\Rightarrow `binarySearch(arr, low,`
`mid - 1, -target)`

$$low = 0$$

$$high = 1$$

$$mid = 1$$

$$\underline{low = 0 \quad high = 0}$$

$$mid = 0$$

\rightarrow mid