

Binary Search.

DATE

PAGE

int Binary-search (A[], key, low, high)

{ int mid;
if (low > high)
return (-1);

mid = (low + high) / 2.

if (key < A[mid])
return (Binary-search (A, key, low, mid-1))
else if (key > A[mid])
return (Binary-search (A, key, mid+1, high))
else
return (mid)

}

$$\begin{aligned} T(n) &= T(n/2) + C \\ &= (T(n/2) + C) + C \\ &= T(n/2) + 2 \cdot C \\ &= (T(n/2) + C) + 2 \cdot C \\ &= T(n/2) + 3 \cdot C \\ &= \vdots \\ &= T(n/2^k) + k \cdot C \\ &= T(1) + \log(n) \cdot C \\ &= O(\log n). \end{aligned}$$