

3. Greedy Algorithms

Assume that $\{x_1, x_2, \dots, x_n\}$ is sorted in increasing order.

// unit length closed intervals have the same length

// create an empty set

$S[] = 0;$

for $i = 1$ to n {

 // create an interval starting from x_i to $x_i + \text{interval.size}$

 interval = $[x_i, x_i + \text{interval.size}]$;

 if $x_i \in \text{interval}$ // if x_i belongs to interval, add x_i to set

 { $S[i-1] = S[i-1] + x_i$; }

 else $i++$; // if no x_i 's belong to interval, then increment i

}

Upper bound of running time is $O(n)$ because the for loop goes through n number of elements.