

Report Preparation

- Problem Summary : given a set of intervals (a, b) $1 \leq a \leq b \leq m$
Find the minimum length interval so all points $[1, m]$ are covered

- We can look at a different but similar problem. Given a set of intervals pick the smallest number of intervals to cover all of them

- The solution given a set of intervals

1. Sort intervals by increasing left border
2. assign $L, R \leftarrow$ First interval
3. For $i = 2 \dots N$
 if $L_i \leq R$
 $R = \max(R, R_i)$
 else
 $ans = ans + 1$
 $L, R = L_i, R_i$
 $ans = ans + 1$

- From this we are very close to the original problem. What we want to do is merge all interval such that there is no overlap

$[1, 2]$ $[7, 20]$ $[35, 35]$ No overlap

$[1, 2]$ $[7, 14]$ $[8, 20]$ Last two intervals overlap

- To merge all intervals instead of increasing the answer we just add that L, R to an interval array

- Now that we have all intervals sorted by left endpoint the answer can be computed

- There's a few cases. If we know the first missing number & last number in $[1, m]$ the answer is $last - first + 1$

i. If the first merged interval contains 1. Then the first missing is $right + 1$ otherwise it's 1

ii If the last interval contains m . Then last is $left - 1$ otherwise it is m

- Then just return $last - first + 1$ if $first \leq last$ otherwise it's 0