Z5188675 Zijian Yue

Q2.

1. For every entry level job, store its and i of job i of the form (,i) in array PA.
2. For every senior level job, store its and i of job i of the form (,i) in array QA.
3. For every worker, store its and i of worker i of the form (,i) in array XA.
4. Use nlogn sorting algorithms (e.g. mergesort) to sort array PA by increasing order of .
5. Use nlogn sorting algorithms (e.g. mergesort) to sort array QA by increasing order of .
6. Use nlogn sorting algorithms (e.g. mergesort) to sort array XA by increasing order of .
7. Assume all the arrays start with index 1
8. The number of entry jobs is P, the number of senior jobs is Q, the number of workers is N.
9. Let current selected PA index PI = 0, Let current selected QA index QI = 0, Let current selected XA index XI = 0.
10. The result is stored in variable result.
11. Having N iterations

11.1. Let current\_worker = XA[XI], current\_P = XA[PI], current\_Q = QA

11.2.If of the current worker is greater than of current\_P and of the current worker is less than of the current\_Q, then it means, current\_worker can’t be assigned to neither of current\_P(entry level job) and current\_Q(senior level job).

XI remains the same

PI += 1

QI += 1

result remains the same

11.3. Else If of the current worker is greater than or equals to of current\_Q and of the current worker is less than or equals to of the current\_P, then it means, current\_worker can be assigned to both of current\_P(entry level job) and current\_Q(senior level job).

XI += 1

PI += 1

QI remains the same

result += 1

explanation: when satisfies both P and Q, the job from P(junior) will be selected, this is because if is greater than or equals to , then will also be greater than or equals to (array X is sorted in increasing order), however if is smaller than or equals to , it is not guaranteed that will also be smaller than or equals to . Thus, we have a conclusion that Q is more flexible than P, therefore when satisfies both P and Q, the less flexible job P needs to be chosen.

11.4 Else If of the current worker is greater than or equals to of current\_Q and of the current worker is greater of the current\_P, then it means, current\_worker can be only assigned to current\_Q(senior level job).

XI += 1

PI remains the same

QI += 1

result += 1

11.5 (Vice of 11.4)Else If of the current worker less than of current\_Q and of the current worker is less than or equals to the current\_P, then it means, current\_worker can be only assigned to current\_P(entry level job).

XI += 1

PI +=1

QI remains the same

result += 1

12.The value of result is the final answer

Time complexity: N\*log(N){sort the worker array} + P\*log(P){sort the entry job array} + Q\*log(Q){sort the senior job array} + N(N iterations,step 11), this Time complex is O(N\*log(N) + P\*log(P) + Q\*log(Q))