

HOMEWORK 3

COMP3121 - ALGORITHM DESIGN

QUESTION 5

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SOLUTION

The ultimate goal for this solution is to order the chemical production such that the total amount of chemicals produced is minimised. To justify the ordering of chemical production we must see what the trend of evaporation looks like.

Since we know each chemical takes one day to be produced and that there are N chemicals to be delivered. We can deduce that we need N days in total to produce the full delivery.

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Day 1: C1 W1
Day 2: C2 W2
Day 3: C3 W3
.
.
.
Day N: CN WN
```

So for a weight $W1$ produced on Day 1, the magnitude of total loss would be DIRECTLY PROPORTIONAL to the magnitude of Weight of chemicals produced since the evaporation loss is in percentages.

So, for two given weights $W1$ and $W2$ where $W1 > W2$,

over N days, $W1$ would lose more weight than $W2$.

Hence, the total amount of extra weight we need to produce for $W1$ will be LARGER than $W2$.

According to Greedy Solution, for any given day we want to choose the chemical with the lowest weight to minimise the amount of weight produced for that day. Doing this for every single day will provide us with the optimal production plan.

To summarise, we apply the greedy solution by saying that we produce the chemicals starting from the lowest weight requirement to minimise the extra weight required for counteracting the chemical loss.