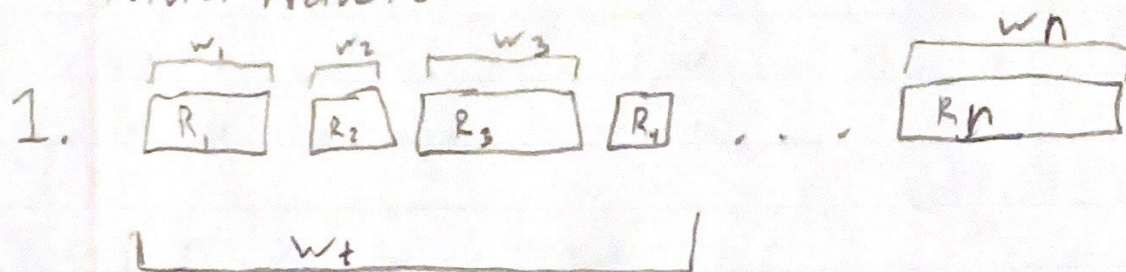


Quiz #3

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we need to find a permutation of rocks (array/set) to fill the rover with $\leq w_t$ weight.

The objective function measures the total weight of rocks collected. A feasible solution consists of any selection of rocks with less than w_t weight.. The more rocks the better.

2. $w_1 + w_2 + w_3 \dots w_n$ ← weights of rocks.
if $w_{i+1} < w_i$ swap rock order

$w_1 + w_2 \dots + w_{i+1} + w_i + \dots w_n$

Swap until the lightest rock is first, and all rocks are sorted by weight. Then collect rocks until $\text{sum}(w_1, \dots, w_x)$ is as close to w_t as possible. That is, $\text{sum}(w_1, \dots, w_x) \leq w_t$, and $\text{sum}(w_1, \dots, w_{x+1}) > w_t$

3. Swapping rocks is still a permutation of the original rock choice order.

4. before $w_1 + w_2 + w_3 \dots w_x$ weight of set
 $w_1 + w_2 \dots w_x + w_{x+1}$ weight of set+1
 after

$w_1 + w_2 + w_3 \dots w_{x+1} + w_x$ weight of set+1
 $w_1 + w_2 + w_3 \dots w_{x+1}$ weight of set

$$\text{After} - \text{before} = w_{x+1} - w_x < 0$$

since we only swap when $w_{x+1} < w_x$
 equal number of rocks in pick up set
 but with less weight,

#5 bubble sort our rock weights by
 swapping light to front
 $w_{\text{lightest}} \dots w_{\text{heaviest}}$

take set of lightest rocks where $\text{set}_w < w_+$

$$w(\text{set}^{\text{sorted}}) = w(\text{set}^{\text{greedy}}) < \text{swap}_{10} < \text{swap}_{pq} < \dots \\ \dots w(\text{original set}).$$

By greedily selecting rocks by lightest first, we should take as many rocks as possible to fit into w_+ . If we didn't make the greedy choice, we could have and it would not ever hurt optimality.