

J: Jaded Journey

Problem author: Yidi Zang

Problem

- Minimize the cost to travel n distance units by ship.
- Rowing cost x per distance unit.
- Repairing sail cost r but will break again after d distance units.
- Wind is required to use sail.

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Solution

- We can model it as dp, where $dp[i]$ represents minimum cost to get to i with a broken sail.
- There are 2 transitions, rowing one unit and repairing sail.
- Rowing from $i \rightarrow i + 1$: costs x .
- Repairing sail $i \rightarrow i + d$: costs $r + (\# \text{ of units without wind}) \cdot x$.

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- Efficiently calculate ($\#$ of units without wind) using prefix sums or sliding window.
- Total Runtime: $\mathcal{O}(n)$.