Solution Outline for Lab 8

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Jet Bridge Allocation

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Allocate n jet bridges between the domestic and international sections to maximize the number of aircraft docking at jet bridges, following the "first come, first served" principle. Domestic flights must use domestic jet bridges, and international flights must use international ones, with remote stands used when jet bridges are unavailable.

$1 \leq n \leq 10^5$, $m_1 + m_2 \leq 10^5$

Jet Bridge Allocation (cont'd)

Hint 1

Assume that for any number k, jet bridges with numbers greater than k can be treated as remote stands, which simplifies the problem by ignoring the limit on the number of jet bridges.

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Hint 2

For domestic flights, calculate how many flights can be served using k jet bridges. Specifically, use a min-heap to maintain the smallest numbered available jet bridge, and assign the arriving flight to this available bridge. Use a bucket array $\text{buc}[\cdot]$ to record how many planes each jet bridge has served, e.g., when a plane arrives at the j-th jet bridge, set $\text{buc}[j] \leftarrow \text{buc}[j] + 1$.

Jet Bridge Allocation (cont'd)

Hint 3

Let $f_k = \sum_{j=1}^{k} \mathrm{buc}[j]$, then f_k represents the maximum number of domestic flights that can be served using k jet bridges. Similarly, we can calculate g_k for international flights. The final answer is $\max\{f_k + g_{n-k}\}$.

THANK YOU!