Problem 01: Bounds

Given an integer function f and a non-empty interval $[m, n]$, compute the minimal and maximal values and positions of f in the interval.

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\begin{array}{lcl}
A & = & \underset{m}{\mathbb{Z}} \times \underset{n}{\mathbb{Z}} \times \underset{u}{\mathbb{Z}} \times \underset{min}{\mathbb{Z}} \times \underset{v}{\mathbb{Z}} \times \underset{max}{\mathbb{Z}} \\
B & = & \underset{m'}{\mathbb{Z}} \times \underset{n'}{\mathbb{Z}} \\
Q & = & (m' = m) \wedge (n' = n) \wedge (m \leq n) \\
R & = & Q \wedge u, v \in [m, n] \wedge \forall k \in [m, n] : min \leq f(k) \leq max \wedge f(u) = min \wedge f(v) = max
\end{array}
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