2025 USA-NA-AIO Round 1, Problem 1, Part 2

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Part 2 (10 points, non-coding task)

The recursive equation that defines the sequence in this problem can be written in a matrix form:

$$\begin{bmatrix} F_n \\ F_{n-1} \end{bmatrix} = \mathbf{A} \begin{bmatrix} F_{n-1} \\ F_{n-2} \end{bmatrix}, \ \forall \ n \geq 2,$$

where $\mathbf{A} \in \mathbb{R}^{2 \times 2}$.

Compute $\mathbf{A}$.

- Reasoning is not required.

- The value of each entry in $\mathbf{A}$ must be exact. For instance, the following values are exact: $\sqrt{3}, \frac{2}{\sqrt{7}}, \pi + \frac{3}{8}, e^2, \sin 40°, \log 18$. However, their float approximations are not exact.

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WRITE YOUR SOLUTION IN THIS TEXT CELL.

$$\mathbf{A} = \begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}.$$

"" END OF THIS PART ""

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