Diagonalising Matrices

Let $\mathbf{F} = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}$ [**F** is known as the **Fibonacci Matrix**]. Evaluate the matrices **P** , $\mathbf{P}^{-1}$ and **D** where **P** is an invertible matrix and $\mathbf{D} = \mathbf{P}^{-1}\mathbf{AP}$ is a diagonal matrix.