Provide a clear and organized presentation.

1. Let n be an even natural number and A an $n \times n$ matrix. Prove that if the matrix B is obtained by multiplying every column of the matrix A whose position is even by the scalar k, then $\det(B) = k^{\frac{n}{2}} \det(A)$.

2. Use *mathematical induction* to prove that: $\begin{bmatrix} 1 & 1 \\ 1 & 0 \end{bmatrix}^n = \begin{bmatrix} f_{n+1} & f_n \\ f_n & f_{n-1} \end{bmatrix} \quad \forall n \in \mathbb{N}$

   where f_n is the n$^{\text{th}}$ Fibonacci number (Define $f_0 = 0$).