

Fibonacci, using a vector-matrix representation.

$$\begin{pmatrix} F_n \\ F_{n-1} \end{pmatrix} = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} F_{n-1} \\ F_{n-2} \end{pmatrix}, n > 2$$

From where we know that

$$\begin{pmatrix} F_n \\ F_{n-1} \end{pmatrix} = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}^{n-1} \begin{pmatrix} F_1 \\ F_0 \end{pmatrix}$$

Let's program fast matrix exponentiation and apply it to the matrix provided below. Represent the second-order matrix and vector using structures.

```
struct Matrix2x2
{
int _11, _12, _21, _22;
};
struct Vector2
{
int _1, _2;
};
```