$$F_4 = \begin{pmatrix} e^{2\pi i/4 \cdot 1 \cdot 1} & e^{2\pi \frac{i}{4} \cdot 2 \cdot 1} \cdots \\ e^{2i\frac{\pi}{4} \cdot 2 \cdot 1} & \ddots \\ \vdots & & e^{2\pi \frac{i}{4} 4 \cdot 4} \end{pmatrix}$$

$$e^{i2\pi} = e^0 = 1$$

$$e^{i\frac{\pi}{2}} = i$$

$$e^{i\pi} = -1$$

$$e^{\frac{3}{2}i\pi} = -i$$