Solution (#240) Note that $F_0 = 2^1 + 1 = 3$ and $F_1 = 2^2 + 1 = 5$ so that the claim is true when $n = 1$. Suppose now that

$$F_0 F_1 F_2 F_3 \cdots F_{n-1} = F_n - 2.$$

Then

$$\begin{aligned}
F_0 F_1 F_2 F_3 \cdots F_n &= F_0 F_1 F_2 F_3 \cdots F_{n-1} \times F_n \\
&= (F_n - 2) F_n \qquad \text{[by hypothesis]} \\
&= (2^{2^n} - 1)(2^{2^n} + 1) \\
&= \left(2^{2^n}\right)^2 - 1 \\
&= 2^{2^{n+1}} - 1 \\
&= (2^{2^{n+1}} + 1) - 2 \\
&= F_{n+1} - 2.
\end{aligned}$$

The result follows by induction.