Step-1

Given

The matrix B_n is the $-1,2,-1$ matrix A_n except that $b_{11}=1$ instead of $a_{11}=2$

So that

$$B_2=\begin{bmatrix}1 & -1\\ -1 & 2\end{bmatrix},\ B_3=\begin{bmatrix}1 & -1 & 0\\ -1 & 2 & -1\\ 0 & -1 & 2\end{bmatrix}$$

$$B_4=\begin{bmatrix}1 & -1 & 0 & 0\\ -1 & 2 & -1 & 0\\ 0 & -1 & 2 & -1\\ 0 & 0 & -1 & 2\end{bmatrix}$$

Step-2

Then

$$\det(B_2)=2-1$$
$$=2$$

$$\det(B_3)=(4-1)+(-2)=2\det(B_2)+\begin{vmatrix}1 & 0\\ -1 & -1\end{vmatrix}$$

$=2\det(B_3)-\det(B_2)$ (Expanding determinant by least columns)

$$=3-2$$
$$=1$$

Step-3

Expanding any B_n by last column use get

$$\det(B_n)=\begin{bmatrix}1 & -1 & 0 & 0..........0\\ -1 & 2 & -1 & 0...........\\ 0 & -1 & 2 & -1..........\\ 0 & 0 & 0 & ....-1\end{bmatrix}+2\det(B_{n-1})$$

$$=-\det(B_{n-2})+2\det(B_{n-1})$$

(expanding the earlier determinant. 1 term in R.H.S by last column)

Step-4

So, the recursion formula is as of A_n's

Here we have

$|B_1| = |B_2| = |B_3| = 1$

And we notice that all pivots are equal to 1