

# Problem for 1999 April

Communicated by Dan Jurca

Suppose  $2 \leq n$ ; find the inverse of the following  $n \times n$  matrix.

$$\begin{bmatrix} 0 & 1 & 1 & \dots & 1 \\ 1 & 0 & 1 & \dots & 1 \\ 1 & 1 & 0 & \dots & 1 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & 1 & 1 & \dots & 0 \end{bmatrix}$$

Solution by Dan Jurca

The inverse matrix is as follows.

$$\begin{bmatrix} -\frac{n-2}{n-1} & \frac{1}{n-1} & \frac{1}{n-1} & \dots & \frac{1}{n-1} \\ \frac{1}{n-1} & -\frac{n-2}{n-1} & \frac{1}{n-1} & \dots & \frac{1}{n-1} \\ \frac{1}{n-1} & \frac{1}{n-1} & -\frac{n-2}{n-1} & \dots & \frac{1}{n-1} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \frac{1}{n-1} & \frac{1}{n-1} & \frac{1}{n-1} & \dots & -\frac{n-2}{n-1} \end{bmatrix}$$

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