Let $f = \mu g$ where $g : \mathbb{N}^2 \to \mathbb{N}$ is defined by

$$g(n,i) = \begin{cases} 4-n & \text{if } i=0 \\ \mu j\,(n-j=0) & \text{if } i=1 \\ n-4 & \text{if } i \geq 2 \end{cases}$$

$$f(n) = \mu i\,(g(n,i)=0) = \begin{cases} i_0 & \text{if } g(n,i_0)=0 \text{ and forall } j \text{ with } 0 \leq j < i_0 \text{ we have: 1) } g(n,j) \text{ is defined, 2) } g(n,j) \neq 0 \\ \text{undefined} & \text{otherwise.} \end{cases}$$

We distinguish the following cases:

<u>Case 1</u> : $n \geq 4$.

Then $g(n,0) = 4-n = 0$, hence $\mu i\,(g(n,i)=0) = 0$.
Therefore, in this case $\underline{f(n) = 0}$.

<u>Case 2</u> : $n < 4$.

Then $g(n,0) = 4-n \neq 0$.

We compute $g(n,1) = \mu j\,(n-j=0)$.

Note that $n-j=0 \Leftrightarrow n \leq j$. Hence, the smallest j with $n-j=0$ is $\underline{j=n}$.

$\Rightarrow g(n,1) = \mu j.(n-j=0) = n$.

<u>Case 2.a</u> $n=0$.
Then $g(n,1)=0$. In this case 1 is the smallest number $i_0 \in \mathbb{N}$ with $g(n,i_0)=0$; $g(n,0)$ is defined and is $\neq 0$.

Therefore, in this case $\underline{f(n) = 1}$.

<u>Case 2.b</u> $n \in \{1,2,3\}$
Then $g(n,1) = n \neq 0$. (but $g(n,1)$ is defined, so is $g(n,0)$)

$g(n,2) = n-4 = 0$.
Therefore, in this case the smallest $i_0 \in \mathbb{N}$ with $g(n,i_0)=0$ such that $\forall j \leq i_0 - 1$ $g(n,j)$ defined and $\neq 0$ is $\underline{i_0 = 2}$; so $\underline{f(n) = 2}$

<u>Thus:</u> $$f(n) = \begin{cases} 0 & \text{if } n \geq 4 \\ 2 & \text{if } n \in \{1,2,3\} \\ 1 & \text{if } n = 0. \end{cases}$$