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A unit x in a commutative ring R with identity is called *exceptional* if $1 - x$ is also a unit in R . For any integer $n \geq 2$, define $\phi_e(n)$ to be the number of exceptional units in the ring of integers modulo n . Following work of Shapiro, Mills, Catlin and Noe on iterations of Euler's ϕ -function, we develop analogous results on iterations of the function ϕ_e , when restricted to a particular subset of the positive integers. (Received September 08, 2008)