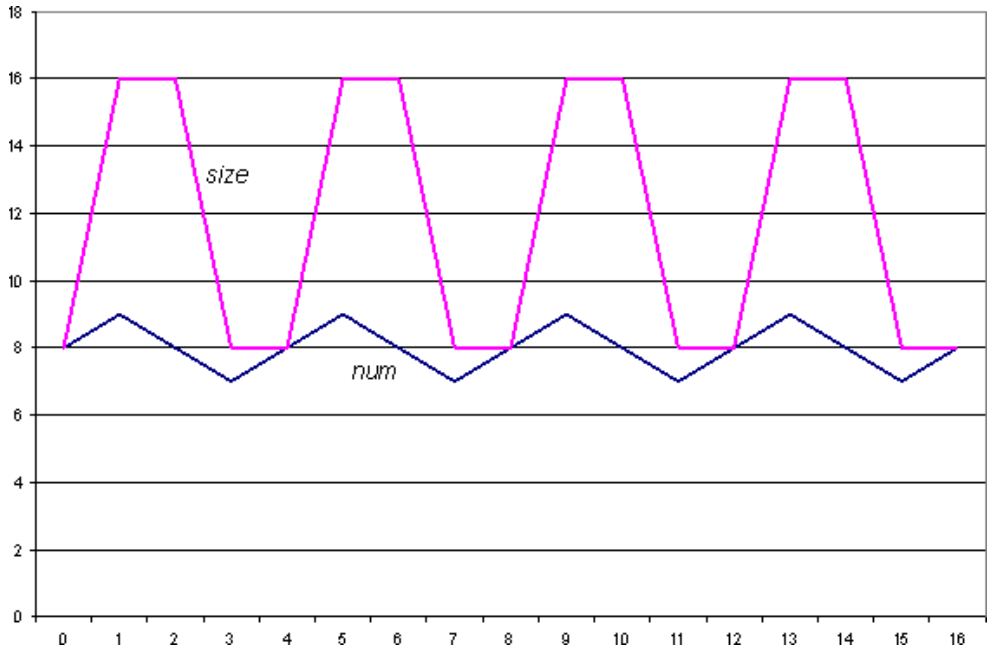
Table Expansion and Contraction

Let's try the following approach. Suppose we continue to double the size of the table whenever we attempt to insert an object into a full table. In addition, suppose we halve the size of the table whenever deletion results in the table having $\alpha(T) < 1/2$. At this point, the table readjusts and forces our table to have load factor no less than $1/2$, and this satisfies the first property.

Unfortunately, this reallocation scheme can be very expensive in that it has a bound of $\Theta(n^2)$. To illustrate, suppose we have the following sequence of operations (where "I" means insert and "D" means delete): I D D I I D D I I D D etc. In addition, suppose we encounter this sequence when $num[T] = size[T] = n/2$. This results in a thrashing situation where after every other operation, we either expand or contract the table. The following shows the changing size of the table relative to the change in numbers of objects:



As we see, every other operation results in an $O(n)$ reallocation, so over $O(n)$ of these operations, we get a total complexity of $\Theta(n^2)$.