Math 601 Note about cyclic codes, permutations, cycles and orbits.  
(Read if you know what all those words mean.)

The function $\pi : K^n \to K^n$ defined by $\pi(v_0v_1 \ldots v_{n-1}) = v_{n-1}v_0 \ldots v_{n-2}$ is a permutation of $K^n$. For each $v \in K^n$, $(v, \pi(v), \ldots, \pi^{n-1}(v))$ is a cycle of that permutation. An orbit is just the set of elements in a cycle: \{v, \pi(v), \ldots, \pi^{n-1}(v)\}, that is, the orbit ignores the order. A particular cyclic code $C$ in $K^n$, as a set, is a union of orbits of $\pi$. The permutation $\pi$ of $K^n$ can also be considered a permutation of $C$ by restriction: $\pi|_C : C \to C$. If $C$ is a code that is not cyclic, then $\pi$ does not restrict to $C$ in the sense that the range of $\pi|_C$ would not be $C$. 