1 Diagonalization Part II

First complete the problem *Diagonalization*. In that notation:

(a) Find the matrix S whose columns are $|\alpha\rangle$ and $|\beta\rangle$. Show that $S^\dagger = S^{-1}$ by calculating $S^\dagger$ and multiplying it by S. (Does the order of multiplication matter?)

(b) Calculate $B = S^{-1}CS$. How is the matrix E related to B and C? The transformation that you have just done is an example of a "change of basis", sometimes called a "similarity transformation." When the result of a change of basis is a diagonal matrix, the process is called diagonalization.