Since s $\in$ NP-hard, and s $\leq_k$ t, then, for any problem p, such that p $\in$ NP, we can have that p $\leq_k$ s. Now, by the transitivity property, since p $\leq_k$ s and s $\leq_k$ t, we can say that p $\leq_k$ t. Now, by the definition of NP-hard, a problem p in NP-hard if for all q $\in$ NP, q $\leq_k$ p. Since for all problems p $\in$ NP, we can have that p $\leq_k$ t, it means that the problem t is also NP-hard.