1068-05-172 **Gyula O.H. Katona*** (ohkatona@renyi.hu), Budapest, Hungary. *Finding at least one excellent element in two rounds.*

Some elements of the set $[n] = \{1, 2, \ldots, n\}$ are *excellent.* Their number and positions are unknown. Subsets of $[n]$ can be used for tests. If this test is $A \subset [n]$ then the result of the test is YES if at least one of the excellent elements is in A. Otherwise the answer is NO. The goal of the search is to find at least one of the excellent ones, or to claim that there is none. If the choice of the test can depend on the results of the previous ones (*adaptive search*) then the minimum number of tests is trivially $\lceil \log_2 n \rceil$. The situation is very different when the tests are chosen in advance (*non-adaptive search*). We prove that the number of tests is at least n in a non-adaptive search, that is there is no better method than testing all one-element sets. This is surprising, since in the case when the number of excellent elements is known to be 1 then best non-adaptive search has only $\lceil \log_2 n \rceil$ tests. The case of two rounds is also investigated. Then a family of subsets is used for tests in the first round and, depending on the sequence of answers, another family of subsets forms the second round. We prove that the number of tests in the worst case is at least $(2 + o(1))\sqrt{n}$, and this is sharp. (Received January 18, 2011)