Consider the function, \texttt{useless}:

1. function \texttt{useless}(n)
2. if \( n = 1 \) then
3. \hspace{1em} return 1
4. else
5. \hspace{1em} return \texttt{useless}(\texttt{random}(1, n))
6. end if
7. endfunction

where \texttt{random}(1, n) returns a uniformly distributed random integer in the range 1 \ldots n.

Assume an initial call \texttt{useless}(m).

1. What value is returned? Prove your answer formally.

2. Calculate exactly the expected number of calls to \texttt{random} in line 5.

3. In the worst case, what is the number of calls to \texttt{random} in line 5?
The TAs will not give any assistance on this HW. If you cannot solve this problem with relative ease you do not belong in CS 535!