The Theory of Computation

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Solution Manual
Chapter 5, Problem 5.14

We do not give any solution here, since the choice of language and environment so strongly affects the outcome. We simply point out that it is crucial to consider the range of integers supported by the type used in the functions, since otherwise overflow is sure to occur very early on. The alternate definition of Ackerman's function given on p. 132 (using double recursion) can also be used, although using the completion version is better preparation for the second part of the problem. We also point out that a functional language (Lisp, Scheme, etc.) is particularly well-suited to the task, since the definition of a function sitting much higher in the hierarchy (say the completion of the second level) requires a highly recursive definition in which arguments of the recursive definition are themselves functions.