Arab Academy for Science &Technology and Maritime Transport (AASTMT)
College of Computing and Information Technology (CCIT)
Computing Alg. CS312 – Spring 2014
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Q1. Design a decrease-by-one algorithm for generating the power set of a set
of n elements. (The power set of a set S is the set of all the subsets of S, including the
empty set and S itself.)

Hint:

Use the fact that all the subsets of an n-element set $S = \{a_1, ..., a_n\}$ can be divided into
two groups: those that contain a_n and those that do not.

Q2. Consider the following version of insertion sort.

Algorithm InsertSort2 (A[0, ... n− 1])
for i ← 1 to n − 1 **do**
  j←i−1
  while j ≥ 0 and A[j] > A[j + 1] **do**
    swap(A[j], A[j + 1])
    j←j−1

What is its time efficiency? How is it compared to that of the version given in the text?

Hint:

Since the only difference between the two versions of the algorithm is in the inner loop's
operations, you should estimate the difference in the running times of one repetition of this
loop.