Computer Science Department,
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CSC 311
The Second Semester, 2020/2021
Homework #2
Due on March 07, 2021.

Q1:
Consider the following recurrence relation:
$M(n) = M(\frac{n}{2}) + n.\ M(1) = 1.$

(a) Solve it using backward substitutions.

(b) If possible, use the master method to describe the order of growth for $M(n)$.

Q2:
A SKIP array $S[0..n-1]$ is an array of n integers, where $n > 1$, in which $S[0] = 0$ and $S[n-1] = n$. i is a SKIP index in a SKIP array S if $n > i > 0$ and $S[i] > S[i-1] + 1$.

(a) Explain why every SKIP array has at least one SKIP index.

(b) Give the pseudocode of a $O(\log n)$-time algorithm that takes as input a SKIP array and returns one of its SKIP indices.

Example: The SKIP array {0,**2**,3,0,**4**,**6**} has 3 SKIP indices: 1,4, and 5.