Technische Universität München Fakultät für Informatik Lehrstuhl für Effiziente Algorithmen Dmytro Chibisov Sandeep Sadanandan

Fundamental Algorithms

Deadline: Novemver 07, 2007

Problem 1 (10 Points)

Consider the following reccurance relation:

$$g_1 = 1$$

 $g_2 = 2$
 $g_n = g_{n-1} \cdot g_{n-2} ; n \ge 3$

What is g_n as a function of fibonacci number? Prove your claim.

Problem 2 (10 Points)

Consider the following:

$$g_1 = 1$$

$$g_2 = 1$$

$$g_n = (n-1) \cdot g_{n-1} + (n-2) \cdot g_{n-2} + \ldots + 1 \cdot g_1 ; n \ge 3$$

What is g_n as a function of n? Prove your claim.

(Extra: Prove: If $g_2 = 2$, then $g_n = \frac{n! \cdot 5}{3!}$)

Problem 3 (10 Points)

Give, in Landau notation, the relationships between every pair of the following functions. n, $\lg n$, n^2 , $n \lg n$ and 2^n .