Technische Universität München
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Problem Sheet 2
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## Fundamental Algorithms

Deadline: Novemver 07, 2007

## Problem 1 (10 Points)

Consider the following reccurance relation:

$$
\begin{aligned}
& g_{1}=1 \\
& g_{2}=2 \\
& g_{n}=g_{n-1} \cdot g_{n-2} ; n \geq 3
\end{aligned}
$$

What is $g_{n}$ as a function of fibonacci number? Prove your claim.

## Problem 2 (10 Points)

Consider the following:

$$
\begin{aligned}
& g_{1}=1 \\
& g_{2}=1 \\
& g_{n}=(n-1) \cdot g_{n-1}+(n-2) \cdot g_{n-2}+\ldots+1 \cdot g_{1} ; n \geq 3
\end{aligned}
$$

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 $2^{n}$.

