Design and Analysis of Algorithms

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DESIGN AND ANALYSIS OF ALGORITHMS

Basic Efficiency Classes
Problems based on Asymptotic notations

Slides courtesy of **Anany Levitin**

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Basic Efficiency Classes

Class	Name	Example
1	constant	Best case for sequential search
log *n*	logarithmic	Binary Search
n	linear	Worst case for sequential search
n log *n*	*n*-log-*n*	Mergesort
n^2	quadratic	Bubble Sort
n^3	cubic	Matrix Multiplication
2^n	exponential	Subset generation
n!	factorial	TSP using exhaustive search

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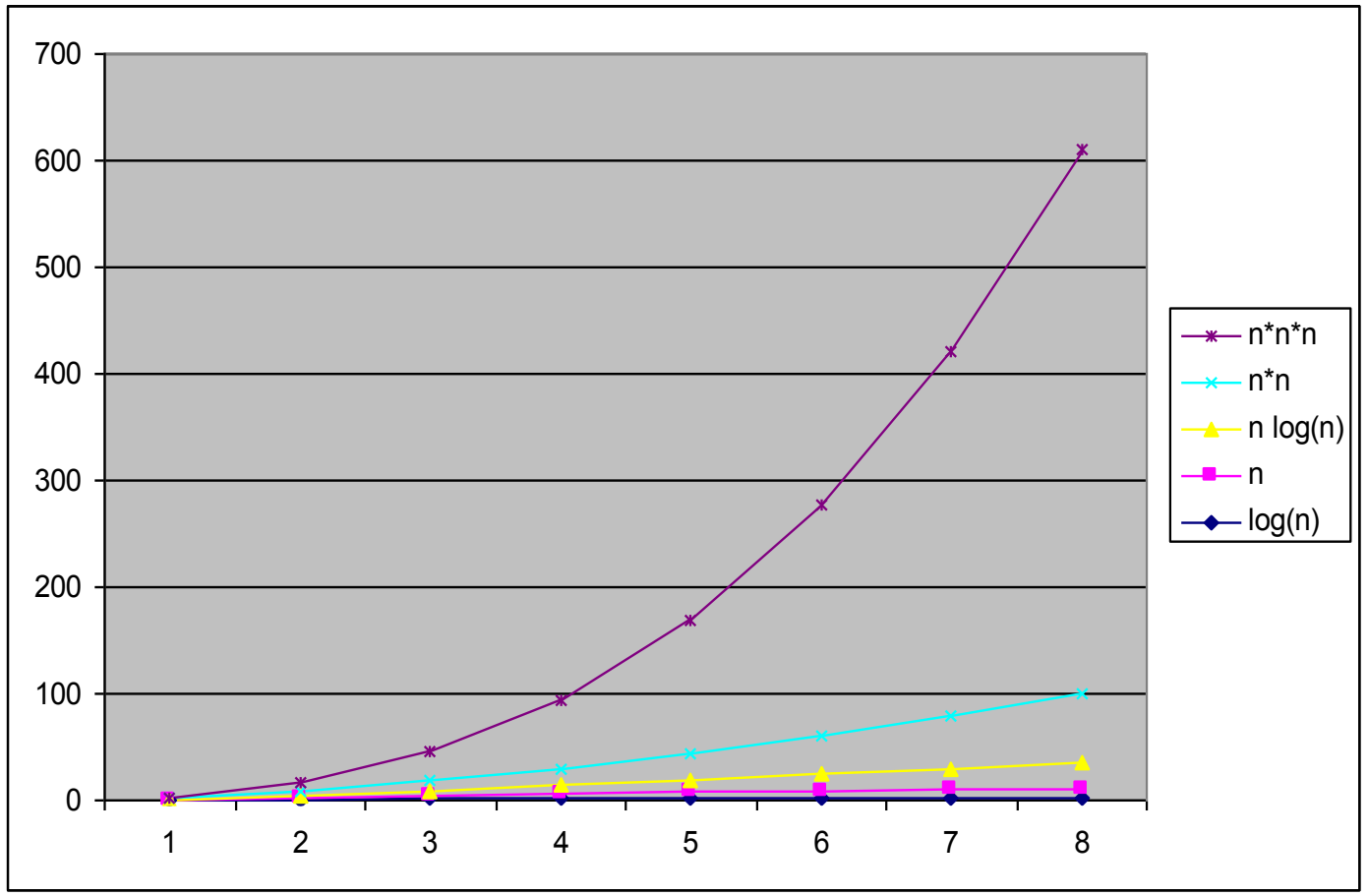
Basic Efficiency Classes



Basic Efficiency Classes

n	$\log_2 n$	n	$n \log_2 n$	n^2	n^3	2^n	$n!$
10	3.3	10^1	$3.3 \cdot 10^1$	10^2	10^3	10^3	$3.6 \cdot 10^6$
10^2	6.6	10^2	$6.6 \cdot 10^2$	10^4	10^6	$1.3 \cdot 10^{30}$	$9.3 \cdot 10^{157}$
10^3	10	10^3	$1.0 \cdot 10^4$	10^6	10^9		
10^4	13	10^4	$1.3 \cdot 10^5$	10^8	10^{12}		
10^5	17	10^5	$1.7 \cdot 10^6$	10^{10}	10^{15}		
10^6	20	10^6	$2.0 \cdot 10^7$	10^{12}	10^{18}		

Table 2.1 Values (some approximate) of several functions important for analysis of algorithms

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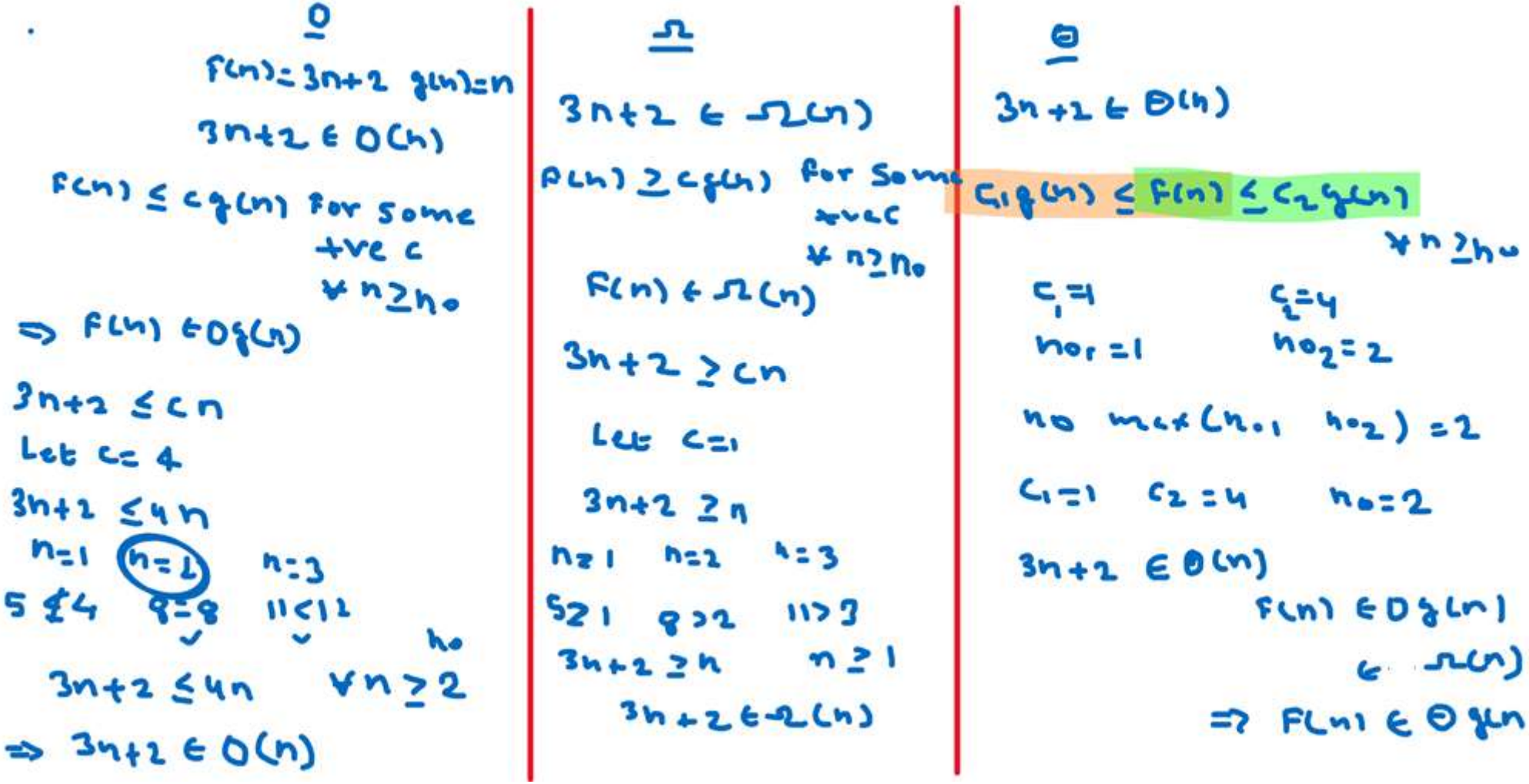
Asymptotic notations



THANK YOU

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