

# Asymptotics

## Section 3.2 of Rosen

Spring 2010

CSCE 235 Introduction to Discrete Structures

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# Outline

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- Introduction
- Asymptotic
  - Definitions (Big O, Omega, Theta), properties
- Proof techniques
  - 3 examples, trick for polynomials of degree 2,
  - Limit method (l'Hôpital Rule), 2 examples
- Limit Properties
- Efficiency classes
- Conclusions

# Introduction (1)

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- We are interested only in the Order of Growth of an algorithm's complexity
- How well does the algorithm perform as the size of the input grows:  $n \rightarrow \infty$
- We have seen how to mathematically evaluate the cost functions of algorithms with respect to
  - their input size  $n$  and
  - their elementary operations
- However, it suffices to simply measure a cost function's asymptotic behavior