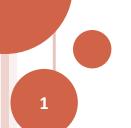
## CS F364 Design & Analysis of Algorithms

## **ALGORITHMS - COMPLEXITY**

**Complexity Classes** 

- P <sup>2</sup> NP



## COMPLEXITY CLASSES P = NP

- $o P \subseteq NP$ 
  - Why?
  - Is  $P \subset NP$  or is P = NP?
    - oThe question is often referred to as the  $P \stackrel{?}{=} NP$  problem

## COMPLEXITY CLASSES P = NP

- Arguments:
  - $\bullet$   $P \subset NP$ 
    - •There is a long list of problems known to be in NP (i.e. certificates can be verified in polynomial time)

but not known to be in  $\mathbb{P}$  (i.e. no one has found a polynomial time algorithm for solving them)

- Examples: ISO, KNAPSACK, TSP
- $\bullet$  P = NP
  - o No problem has been proved to be in  $\mathbb{NP} \mathbb{P}$