中国人民大學

RENMIN UNIVERSITY OF CHINA

XXXX

XXXXX

学院 _____

专业 _____

学号 _____

姓名 _____

2025 年 8 月 24 日

摘　要

XXXXX

关键词：XXX

目录

XXX

1 goal

1.1 solve computational problems

解决计算问题

1.2 prove correctness

证明算法的正确性

1.3 argue efficiency

论证算法的效率 Don't measure time, measure the number of operations. Use asymptotic analysis(渐进分析), which $O(n)$ means the upper bounds, $\Omega(n)$ means the lower bounds, and $\Theta(n)$ for both. O Notation: Non-negative function(非负函数) $g(n)$is in $O(f(n))$ if and only if there exists a positive real number c and positive integer n_0 such that $g(n) \leq c \cdot f(n)$, for all $n > n_0$. Ω Notation: Non-negative function $g(n)$ is in $\Omega(f(n))$ if and only if there exists a positive real number c and positive integer n_0 such that

$$c \cdot f(n) \leq g(n) \quad \text{for all } n \geq n_0.$$

Θ Notation: Non-negative function $g(n)$ is in $\Theta(f(n))$ if and only if $g(n) \in O(f(n)) \cap \Omega(f(n))$.

2 What is a computational problem?

Some kind of predict, say that we can check. If given a input and output, we can check whether the output is correct for the input.

3 What is an algorithm?

some kind of functions that takes these inputs, maps(映射) it to a single output, and that output better be correct based on the problem.

4 RAM

Random access memory(RAM) means that we can randomly access different places in memory in constant time.(RAM 提供了常数时间的随机访问能力，使得我们可以直接跳到任意内存地址，而不需要顺序扫描)