Final Exam Review

Introduction to Computer Science Using C

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OUTLINE

- Big O Notation
- Organizing Large Software
- 3. C Programming
- 4. OOP
- 5. Coding



O1 Big O Notation

Definition

$$f,g:\mathbb{Z}^{\geq 0} \to \mathbb{R}$$

 $f:input\ size \to run\ time$

$$\exists c \in \mathbb{R}^{>0}, \exists n_0 \in \mathbb{Z}^{\geq 1} \ni : \forall n_{\in \mathbb{Z}} \geq n_0, f(n) \leq cg(n) \Rightarrow f(n) \in \mathcal{O}\big(g(n)\big)$$
$$\lim_{n \to \infty} \frac{f(n)}{g(n)} < \infty$$

$$1 < \log n < n < n \log n < n^2 < n^{k \in \mathbb{Z}^{\geq 3}} < a_{>1}^n < n! < n^n; \forall n \geq n_0$$

Ex.1: find Big-Oh of
$$f(n) = 3 + n \% 2$$
; $\forall n \in \mathbb{N}$





O2 Organizing Large Software

Software Design / API

Properties of Software

- Modularity
- Reusability
- Extendibility
- Maintainability
- Correctness
- Efficiency
- Openness
- Privacy and security

Principles of Good Programming

- Return value
- Parameter order
- Short parameter list

Properties of Good API For Clients

- Easy to learn and use
- Hard to misuse
- Easy to read and maintain code that uses it
- Appropriate to audience

For Developers

- Easy to extend
- Does one thing well
- Easy to explain in simple terms
- Implementation dependent
- Good naming and documentation, performance
- Maximize information hiding
- Small size



Compilation Process in C

- Preprocessor: (.c; .h) → .c
- Compiler: .c → .s
- Assembler: .s → .o
- Linker: (.o; ...; .o) → (.exe, .out)





OOP

Object Oriented Programming

Programming paradigm based on objects.

- Encapsulation
- Information hiding

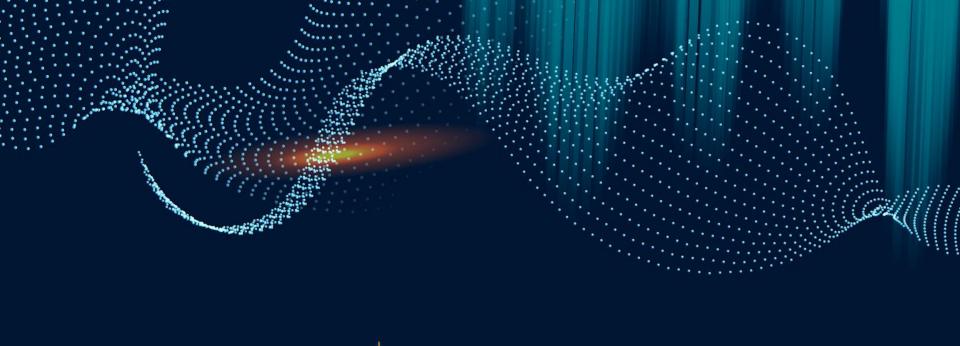
Class Components

- Member variables
- Member functions: (con/de)structor

OOP Concepts

- Inheritance and Polymorphism
- Interface and Implementation





05 Coding

THANKS!

Do you have any questions? addyouremail@freepik.com +91 620 421 838 yourcompany.com







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