

# OOP HW18 Software Engineering Principles

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## OVERVIEW OF THE SOLID PRINCIPLES SOLID

is a mnemonic acronym for five principles

Single Responsibility Principle

Open/Closed Principle

Liskov Substitution Principle

Interface Segregation Principle

Dependency Inversion Principle

Some argue that these are the "first five" principles

That claim has not been justified or widely accepted

However, whether they are the "first five" principles is not very important

Following these principles can help ensure quality software, primarily from a developers' perspective

## SINGLE RESPONSIBILITY PRINCIPLE

Core ideas:

Every class should be responsible for a single part of the system's functionality

A class's responsibility should be entirely encapsulated by the class

A class's properties should be narrowly aligned with that responsibility

"A class should have only one reason to change.", Robert C. Martin

- OPEN/CLOSED PRINCIPLE
- INTERFACES, ABSTRACT CLASSES, PURE VIRTUAL CLASSES
- OPEN/CLOSED PRINCIPLE

- LISKOV SUBSTITUTION PRINCIPLE
- FOLLOWING THE LISKOV SUBSTITUTION PRINCIPLE
- INTERFACE SEGREGATION PRINCIPLE
- DEPENDENCY INVERSION PRINCIPLE

## **SOFTWARE ENGINEERING GOALS**

- Software engineers aim to build quality products on time and within Budget

## **THREE CORE PRINCIPLES**

Modularity

Abstraction

Encapsulation

## **COMMON PARADIGMS**

- Object orientation (OO)
- Aspect orientation (AO)
- Functional programming (FP)
- Logic programming (LP)
- Genetic programming (GP)
- Structured program (SP)

## **SOFTWARE ENGINEERING PRINCIPLES**

- In other words, a principle is a foundational concept (truth, proposition, rule, etc.) that leads to and supports reasoning about desirable characteristics, such as maintainability, efficiency, openness, reusability, etc

## **OBSERVATIONS RELATIVE TO ABSTRACTION**

- From a process perspective, abstraction is the act of bringing certain details to the forefront while suppressing all others.
- John Guttag said that “the essence of abstractions is preserving information that is relevant in a given context, and forgetting information that is irrelevant in that context”