A grayscale photograph of a person with dark hair wearing large headphones, looking intently at a laptop screen. Their hands are clasped near their chin in a thoughtful pose. The background is blurred, showing what appears to be a desk or office environment. Overlaid on the image is a white rectangular border containing the title text.

LSKOV SUBSTITUTE PRINCIPLE

Java Clean code

Outline

Lesson 6.

The Single Responsibility
Principle

Lesson 7.

The Open Closed Principle

Lesson 8.

The Liskov Substitution Principle

Lesson 9.

The Interface Segregation
Principle

Lesson 10.

The Dependency Inversion
Principle

*Any fool can write code that
a computer can understand.
Good programmers write code that
humans can understand.*

Martin Fowler



LSP written by Barbara Liskov 1988

in a computer program, if S is a subtype of T , then objects of type T may be replaced with objects of type S (i.e., objects of type S may substitute objects of type T) without altering any of the desirable properties of that program (correctness, task performed, etc.)



LSP

- Subclass objects can replace superclass objects
- Methods should have same arguments
- Same return type
- Subclass can never do less than the parent class but can do more.



Scope

Variable scope length and name length should be proportional

- The longer the scope the longer the length
- Opposite with methods and classes
- Private methods tend to be longer and more descriptive



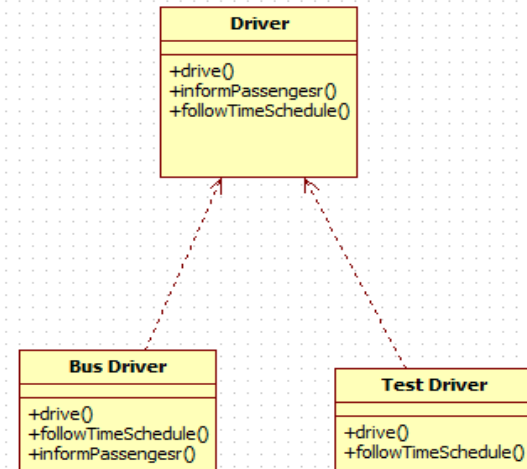
Check List

- No new exception should be thrown in derived class
- Pre-conditions cannot be strengthened
- Post-conditions cannot be weakened
- Invariants must be preserved
- History constraint



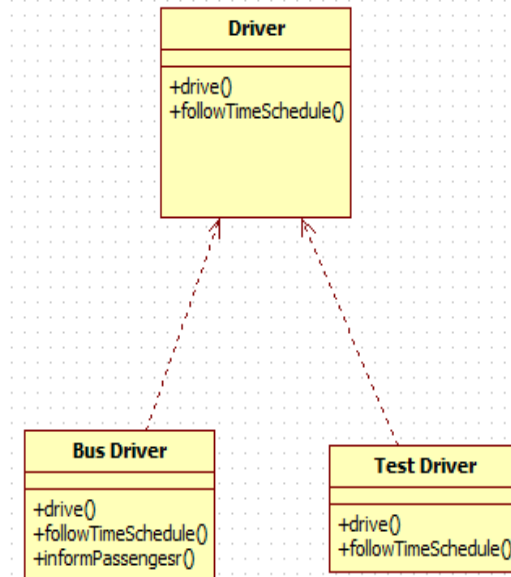


Example





Example



```
1 interface Database
2 {
3     public function selectQuery(string $sql): array;
4 }
5
6 class SQLiteDatabase implements Database
7 {
8     public function selectQuery(string $sql): array
9     {
10         // sqlite specific code
11
12         return $result;
13     }
14 }
15
16 class MySQLDatabase implements Database
17 {
18     public function selectQuery(string $sql): array
19     {
20         // mysql specific code
21
22         return $result;
23     }
24 }
```


Real world example

Behavior remains unchanged
regardless of the implementation
we choose to use.

```
1 interface Database
2 {
3     public function selectQuery(string $sql, int number): array; // This violates LSP !
4 }
5
6 class SQLiteDatabase implements Database
7 {
8     public function selectQuery(string $sql, int number): array
9     {
10         // sqlite specific code
11
12         return $result;
13     }
14 }
15
16 class MySQLDatabase implements Database
17 {
18     public function selectQuery(string $sql): array
19     {
20         // mysql specific code
21
22         return $result;
23     }
24 }
```

Good example gone bad

Now the subtypes cannot be used the same way since they don't produce the same result anymore.

A black and white photograph of three people in a classroom or meeting room. Two men and one woman are gathered around a small table. One man is sitting on a stool, leaning over the table, pointing at a laptop. The other man is standing behind him, also looking at the laptop. The woman is standing to the right, looking at the laptop. They appear to be in a collaborative learning or work environment.

Liskov substitute Principle Summary

- Subclass objects can replace superclass objects
- Arguments && return type
- Subclass can never do less than the parent class but can do more.

Course Progress

Lesson 6

The Single
Responsibility
Principle

Lesson 7

The Open
Closed Principle

Lesson 8

The Liskov
Substitution
Principle

Lesson 9

The Interface
Segregation
Principle

Lesson 10

The Dependency
Inversion
Principle

A sepia-toned photograph of a person clapping their hands. In the foreground, a laptop and an open notebook are visible on a desk. A dark rectangular box with a thin white border is overlaid on the left side of the image, containing the text 'THANK YOU!' and a Google Drive link.

THANK YOU!

- <https://drive.google.com/file/d/0BwhCYaYDn8EgNzAzZjA5ZmItNjU3NS00MzQ5LTkwYjMtMDJhNDU5ZTM0MTlh/view>