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SOLID PRINCIPLES

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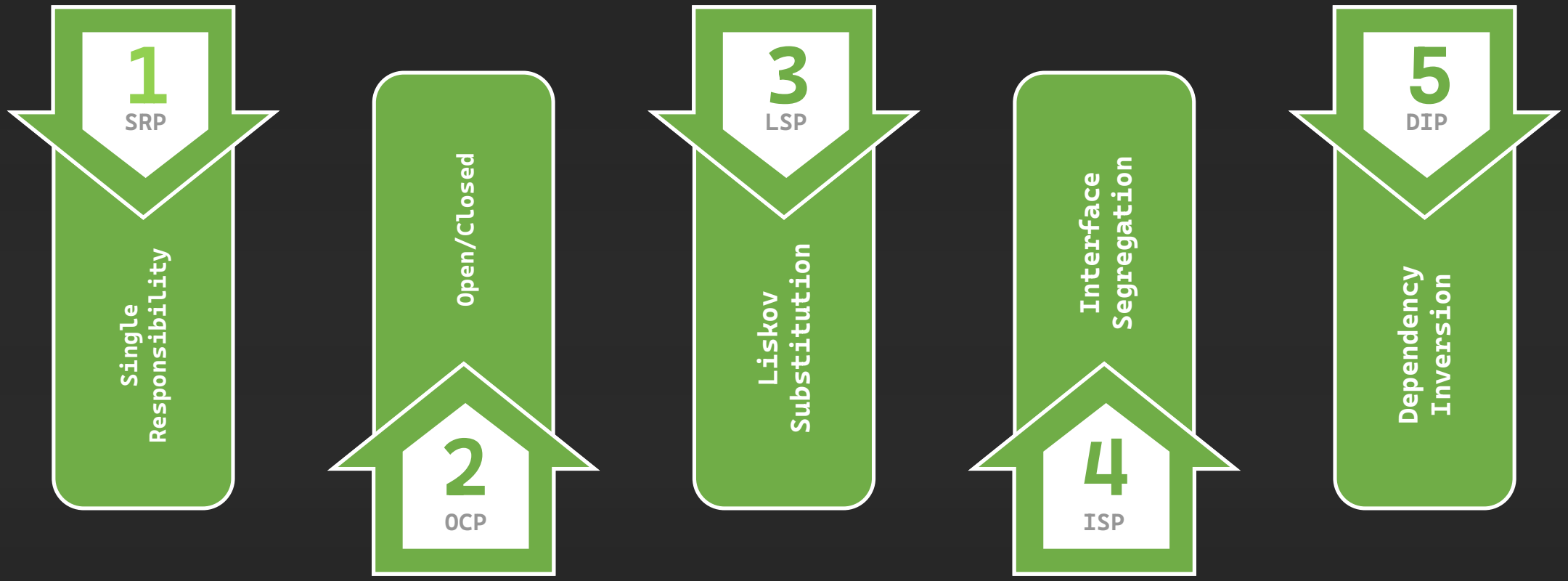
# Dependency Inversion Principle (DIP)

# 5 Solid Principles

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# SOLID PRINCIPLES

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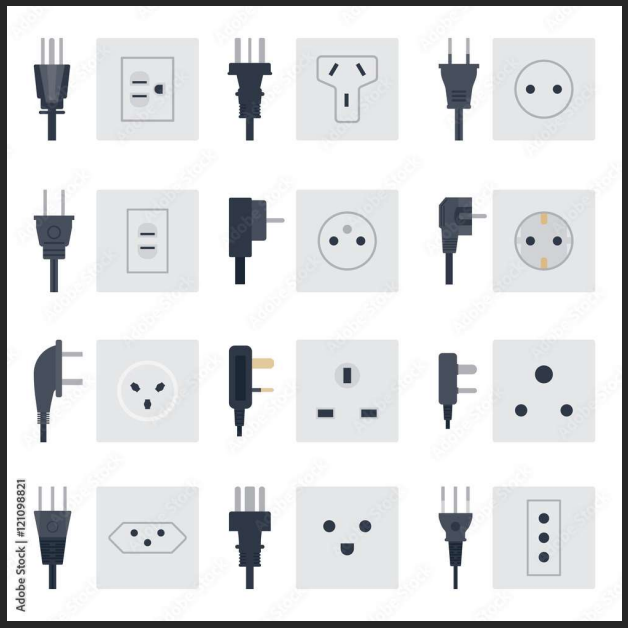
## Analogies

# Analogy 1: Electrical Outlet.

Tightly Coupled




Tightly Coupled (Concrete)

High Level Module

Low Level Module

Think of the electrical outlets in your home. These outlets are designed to provide power to any appliance whether it's a toaster, a TV, or a computer. The outlet doesn't need to be modified for each appliance.





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DBA,MBA, PMOC, PgMPD, PMPD, PMI-RMPD, CM, ITILF, MCPD, MCSD
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# Now Imagin:


The outlet doesn’t need to be modified for each appliance; it simply provides electricity through a standard plug interface.

In this case, the electrical outlet is the high-level module, and the appliances are the low-level modules. The outlet doesn't need to know the specifics of the appliances (what they do or how they work), just that they follow the standard plug interface.





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DBA,MBA, PMOC, PgMPD, PMPD, PMI-RMPD, CM, ITILF, MCPD, MCSD
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# Dependency Inversion Principle (DIP)

In DIP terms: The outlet (high-level) doesn't depend on specific appliances (low-level), and both rely on the abstraction of a standard plug.





Dr. Mohammed Abu-Hadhoud
DBA,MBA, PMOC, PgMP□, PMP□, PMI-RMP□, CM, ITILF, MCPD, MCSD
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# Analogy 2: Device Charger.


Imagine if every phone/device had a unique charging port, and you needed a different charger for each device. That would be inconvenient.





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DBA,MBA, PMOC, PgMPD, PMPD, PMI-RMPD, CM, ITILF, MCPD, MCSD
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# Now Imagin:

High Level Module

Low Level Module

Device : Phone, Laptop, Headphone ..etc

Now think of how USB chargers work they create a standard, and any phone with a USB port can use the same charger, regardless of the brand. The charger and phone depend on the same abstraction (the USB standard) rather than on each other's specifics.





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# Dependency Inversion Principle (DIP)

DIP promotes this kind of flexibility, where classes rely on abstract concepts (interfaces) instead of concrete details, making your code adaptable to different implementations.





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# Analogy 3: Electrical Adapter.

Imagine you are traveling to a foreign country where the wall sockets are different. You need to buy new appliances!





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DBA,MBA, PMOC, PgMP□, PMP□, PMI-RMP□, CM, ITILF, MCPD, MCSD
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# Now Imagin:


Instead of buying new appliances, you get a universal adapter that works with any socket, regardless of the type. The adapter creates an abstraction, allowing your devices to work anywhere without being tightly coupled to the specifics of one country’s electrical system.





Dr. Mohammed Abu-Hadhoud
DBA,MBA, PMOC, PgMPD, PMPD, PMI-RMPD, CM, ITILF, MCPD, MCSD
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# Dependency Inversion Principle (DIP)

In software, DIP works similarly. Instead of tightly coupling your high-level code to specific implementations (like only supporting one kind of socket), you depend on abstractions (like the adapter), which makes the system more flexible and adaptable to changes.





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# What is DIP?

- High-level modules should not depend on low-level modules. Both should depend on abstractions (e.g., interfaces or abstract classes).

- DIP encourages the decoupling of software modules by ensuring that both high-level and low-level modules depend on abstractions, making your code more flexible and easier to maintain.





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