S.O.L.I.D.

Principle

Hina Arora

Single Responsibility Principle (SRP)

01

```python
#Single Responsibility Principle (SRP) by Hina Arora

# Bad example - this class has multiple responsibilities
class User:
    def __init__(self, name, email, password):
        self.name = name
        self.email = email
        self.password = password

    def login(self):
        # handle user authentication logic
        pass

    def get_profile(self):
        # handle user profile retrieval logic
        pass

# Good example - this class has a single responsibility
class User:
    def __init__(self, name, email, password):
        self.name = name
        self.email = email
        self.password = password

class Authentication:
    def authenticate(self, email, password):
        # handle user authentication logic
        pass

class UserProfile:
    def get_profile(self, user):
        # handle user profile retrieval logic
        pass

```

Hina Arora

Open-Closed Principle (OCP)

02

```python
#Open-Closed Principle (OCP) by Hina Arora

# Bad example - this class is not open for extension
class Shape:
    def __init__(self, type):
        self.type = type

    def area(self):
        if self.type == "rectangle":
            return self.width * self.height
        elif self.type == "circle":
            return 3.14 * (self.radius ** 2)

# Good example - this class is open for extension
class Shape:
    def area(self):
        pass

class Rectangle(Shape):
    def __init__(self, width, height):
        self.width = width
        self.height = height

    def area(self):
        return self.width * self.height

class Circle(Shape):
    def __init__(self, radius):
        self.radius = radius

    def area(self):
        return 3.14 * (self.radius ** 2)

```

Hina Arora

Liskov Substitution Principle (LSP)

03

```python
#Liskov Substitution Principle (LSP) by Hina Arora

# Bad example - this class violates the LSP
class Bird:
    def fly(self):
        pass

class Penguin(Bird):
    def fly(self):
        raise Exception("I can't fly")

# Good example - this class follows the LSP
class Bird:
    def fly(self):
        pass

class Penguin(Bird):
    def swim(self):
        pass

```

Hina Arora

Interface Segregation Principle (ISP)

04

```python
#Interface Segregation Principle (ISP) by Hina Arora

# Bad example - this class violates the ISP
class Vehicle:
    def start_engine(self):
        pass

    def fly(self):
        pass

# Good example - this class follows the ISP
class GroundVehicle:
    def start_engine(self):
        pass

class Airplane:
    def start_engine(self):
        pass

    def fly(self):
        pass

```

Hina Arora

Dependency Inversion Principle (DIP)

05

```python
#Dependency Inversion Principle (DIP) by Hina Arora

# Bad example - this class violates the DIP
class ProductService:
    def __init__(self):
        self.db = MongoDB()

    def get_products(self):
        return self.db.get_all()

class MongoDB:
    def get_all(self):
        pass

# Good example - this class follows the DIP
class ProductService:
    def __init__(self, db):
        self.db = db

    def get_products(self):
        return self.db.get_all()

class DB:
    def get_all(self):
        pass

class MongoDB(DB):
    def get_all(self):
        pass
```

Hina Arora

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Hina Arora