Tutorial 9

**Comment**

Tutorial exercises should be done without a computer

The following are questions from past exams on cohesion and coupling.

# 1 Coupling

- To what extent does this class depend on other classes?
- How many methods are called on how many other classes?
- Can another object influence the flow of control in this object?

Assume that the following four classes are all in separate files within the same package.
Do these classes exhibit high or low coupling? Provide a detailed justification for your answer.
Your answer should cover all aspects of the coupling in the code.

```
public class X {
    public int num = 5;
    protected Z z;

    public X(Z z) {
        this.z = z;
    }

    public void doThis() {
        sayHello();
    }

    public void sayHello() {
        System.out.println("Hello");
    }
}

public class Y extends X {
    public Y(Z z) {
        super(z);
    }

    public void doThat() {
        this.z.sayHello();
    }

    @Override
    public void sayHello() {
        super.sayHello();
```

```
    }

}

public class Z {
    private X x = new X();

    public void setNum(int num) {
        x.num = num;
    }

    public void sayHello() {
        System.out.println("Hello");
    }
}
```

## 2 Cohesion

- How well do the parts of the class (state and methods) fit together?
- Do they all contribute to a single, clear purpose?

Does the Customer class below exhibit high or low cohesion? Provide a detailed justification for your answer. Your answer should consider all parts of the class.

```
public class Customer {
    private String name;
    private String streetAddress;
    private String suburb;
    private String postCode;
    private List<Item> order; // the products that have been ordered

    public Customer(String name, String streetAddress,
                    String suburb, String postCode) {
        this.name = name;
        this.streetAddress = streetAddress;
        this.suburb = suburb;
        this.postCode = postCode;
        order = new ArrayList<>();
    }

    public String getName() {
        return name;
    }

    public String getMailingAddress() {
        return streetAddress + suburb + postCode;
    }

    public void addToOrder(Item item) {
        order.add(item);
    }

    public List<Item> getOrder() {
        return order;
    }
}
```

## Extra - Cohesion

Does the Employee class below exhibit high or low cohesion?

Provide a detailed justification for your answer. Your answer should consider all parts of the class

```
public class Employee {
    private String firstName;
    private String surname;
    private String homeAddress;
    private String suburb;
    private String postCode;
    private String currentRole;
    private int currentRoleSecurityLevel;
    private int hourlyWage;

    public Employee(String fName, String lName, String homeAddress,
                    String suburb, String postCode, int hourlyWage) {
        this.firstName = fName;
        this.surname = lName;
        this.homeAddress = homeAddress;
        this.suburb = suburb;
        this.postCode = postCode;
        this.hourlyWage = hourlyWage;
    }

    public String getName() {
        return surname + ", " + firstName;
    }

    public String getMailingAddress() {
        return String.format("%s%n%s%n%s",
            homeAddress, suburb, postCode);
    }

    public void setRole(String newRole, int securityLevel) {
        currentRole = newRole;
        currentRoleSecurityLevel = securityLevel;
    }

    public String getCurrentRole() {
        return currentRole;
    }

    public boolean accessAllowed(int requiredSecurityLevel) {
        return currentRoleSecurityLevel >= requiredSecurityLevel;
    }
```

```
    public int getPay(int hoursWorked) {
        return hourlyWage * hoursWorked;
    }

    public void setHourlyWage(int newWage) {
        hourlyWage = newWage;
    }
}
```