Java Program: Course 3: Plan

STACK ROUTE

Program	Courses	Learning Sprints	Schedule
Build job-ready skills	**Build competencies**	**Perform specific tasks**	

Program
Build job-ready skills

Java Foundation Program

Courses
Build competencies

- Problem Solving and Computational Thinking using Java
- Introduction to Programming in Java
- **Object Oriented Programming in Java**
- Data Structures and Algorithms in Java
- Advanced Programming in Java
- Relational Database Management Systems (RDBMS) Concepts and SQL
- Java Programming Project

Learning Sprints
Perform specific tasks

- Think and model real world as Objects
- Introduction to Encapsulation and Data Abstraction
- **Implement Encapsulation and Data Abstraction in your Java program**
- Create new class that inherits from parent class
- Introduction to polymorphism
- Implement Inheritance and Polymorphism using Abstract class and Interface
- Implementing Wrapper Class and Inner Class
- Consolidate OO programming in Java and Write Clean Code

Schedule

- Day 1
- **Day 2**
- Day 3
- Day 4
- Day 5
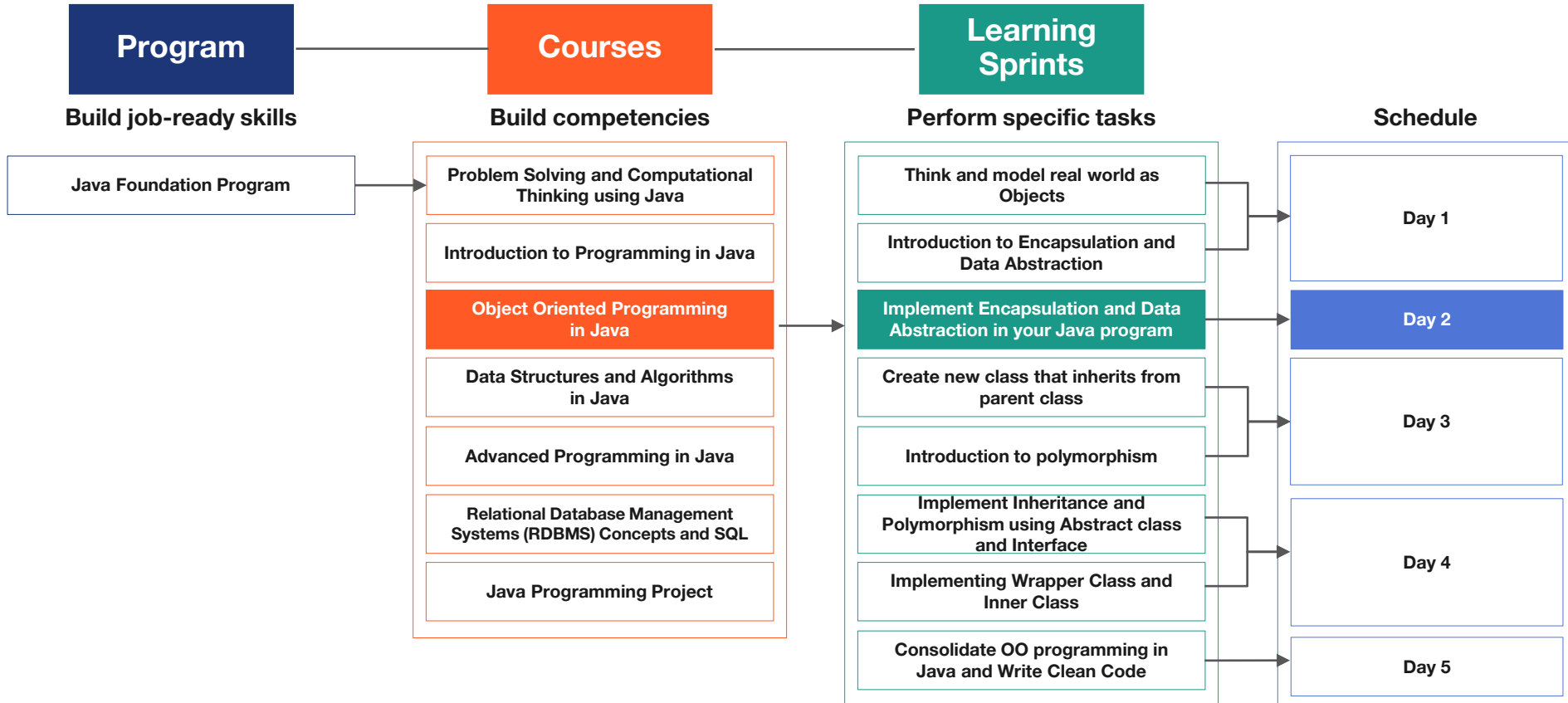
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Think and Tell

A startup company wants to manage its HR operations. As a software programmer, you need to design a payroll module that manages the salary details of its employees.

Who do you think has access to an employee's salary details?

Who do you think should know the details of the salary?

- Only the employee

- All the members of the firm

- The employee and a few others employees of the firm

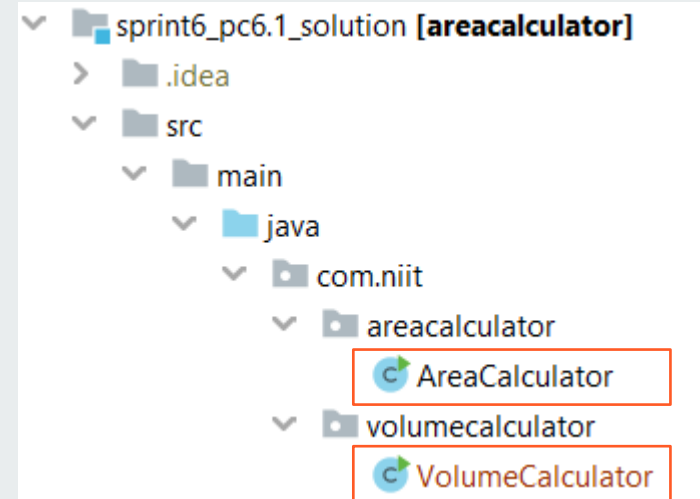Which is the correct answer according to you?

Implement Encapsulation and Data Abstraction in Java

Learning Objectives

- Organize Java code using packages

- Provide appropriate access specification

- Define accessor and mutator methods

- Implement encapsulation through accessor and mutator methods

What Is a Package?

A package is a namespace that

organizes a set of related classes

sprint6_pc6.1_solution **[areacalculator]**
- .idea
- src
  - main
    - java
      - com.niit
        - areacalculator
          - AreaCalculator
        - volumecalculator
          - VolumeCalculator

All classes are organized
under **com -> niit**

Access Specifiers

- Access specifiers are keywords in object-oriented languages. They set the accessibility of classes, methods, and other members

	Default	Private	Protected	Public
Same Class	Yes	Yes	Yes	Yes
Same package subclass	Yes	No	Yes	Yes
Same package non-subclass	Yes	No	Yes	Yes
Different package subclass	No	No	Yes	Yes
Different package non-subclass	No	No	No	Yes

Implementing Encapsulation

The binding of data and the code that works on the data is called encapsulation.

```java
class Employee{
    int empId;
    String name;
    double salary;
    Address address;

    Employee(int empId, String name, double salary, Address address) {
        this.empId = empId;
        this.name = name;
        this.salary = salary;
        this.address = address;
    }
    double calculateSalaryHike(float hikePercentage)
    {
        return salary * hikePercentage/100;
    }
}
```

Let Us Discuss

Salary attribute of a class employee:

```
class Employee
{
    int empId;
    String name;
    double salary;
    Address address;
}
```

The salary attribute is defined as above in the `class Employee`

Do you think this is a safe?
Does it ensure that not all employees have access to another employee's salary structure?

How Do We Implement Encapsulation?

```java
class Employee{
    private int empId;
    private String name;
    private double salary;
    private Address address;

    Employee(int empId, String name, double salary, Address address) {
        this.empId = empId;
        this.name = name;
        this.salary = salary;
        this.address = address;
    }
    double calculateSalaryHike(float hikePercentage)
    {
        return salary * hikePercentage/100;
    }
}
```

Accessor and Mutator Method

```java
public int getEmpId() {
    return empId;
}

public void setEmpId(int empId) {
    this.empId = empId;
}

public String getName() {
    return name;
}

public void setName(String name) {
    this.name = name;
}

public double getSalary() {
    return salary;
}

public void setSalary(double salary) {
    this.salary = salary;
}
```

```java
public double getSalary() {
    return salary;
}

public void setSalary(double salary) {
    this.salary = salary;
}

public Address getAddress() {
    return address;
}

public void setAddress(Address address) {
    this.address = address;
}
```

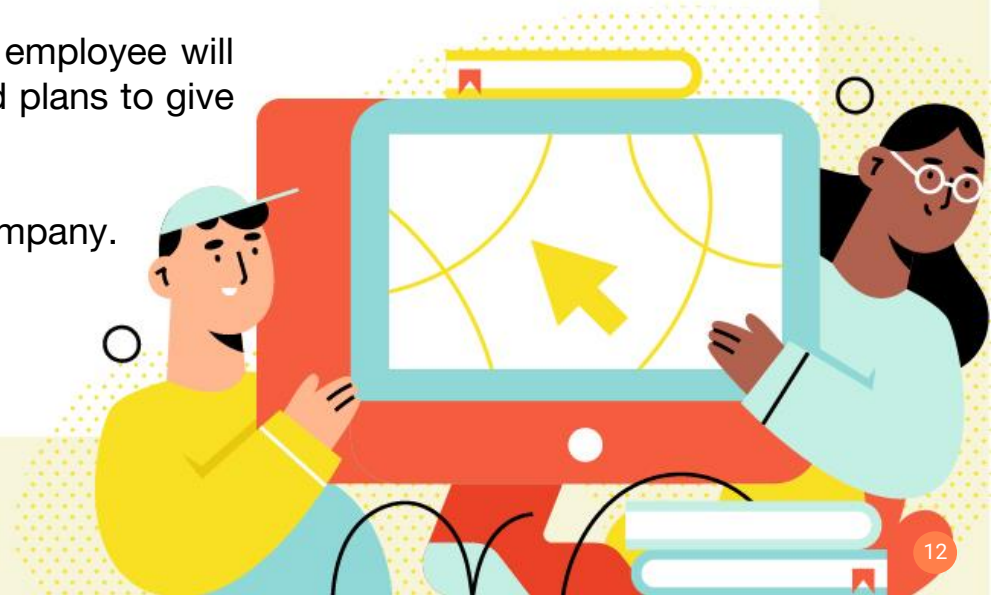The attributes are exposed by the setter methods

Interactive Demo

A startup company wants to manage its HR operations, like

- People management
- Compensation benefits to employees
- Recruitment

Write a program to calculate the hike that each employee will get as the company has gained good profits and plans to give a 20% hike in salary for all its employees.

Display all the names of the employees of the company.

Key Takeaways

- Packages in Java

- Access specifiers

- Implement encapsulation

- Accessor and mutator methods