

Write a Java program to create a class called "GymMembership" with attributes for member name, membership type, and duration. Create a subclass "PremiumMembership" that adds attributes for personal trainer availability and spa access. Implement methods to calculate membership fees and check for special offers based on membership type.

Sample Solution:

Java Code:

GymMembership.java

```
// Define the GymMembership class
class GymMembership {
    // Attributes for GymMembership
    String memberName;
    String membershipType;
    int duration; // in months

    // Constructor for GymMembership
    public GymMembership(String memberName, String membershipType, int duration) {
        this.memberName = memberName;
        this.membershipType = membershipType;
        this.duration = duration;
    }

    // Method to calculate membership fees
    public double calculateFees() {
        double baseFee = 50.0; // Base fee per month
        return baseFee * duration;
    }

    // Method to check for special offers
    public String checkSpecialOffers() {
        if (membershipType.equalsIgnoreCase("annual")) {
            return "10% discount on annual membership.";
        } else {
            return "No special offers available.";
        }
    }

    // Method to display membership details
```

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```

    public void displayDetails() {
        System.out.println("Member Name: " + memberName);
        System.out.println("Membership Type: " + membershipType);
        System.out.println("Duration: " + duration + " months");
        System.out.println("Membership Fees: $" + calculateFees());
        System.out.println("Special Offers: " + checkSpecialOffers());
    }
}

```

Explanation:

- Class definition: Defines the GymMembership class.
- Attributes: Declares three attributes: memberName (String), membershipType (String), and duration (int, in months).
- Constructor: Initializes the memberName, membershipType, and duration attributes with provided values.
- calculateFees() method:
 - Sets a base fee of \$50.0 per month.
 - Returns the total fee by multiplying the base fee with the duration in months.
- checkSpecialOffers() method:
 - Checks if the membership type is "annual".
 - Returns a 10% discount message if the membership type is annual.
 - Returns a message indicating no special offers for other membership types.
- displayDetails() method:
 - Prints the member's name, membership type, and duration.
 - Calls calculateFees() to print the total membership fees.
 - Calls checkSpecialOffers() to print any applicable special offers.

PremiumMembership.java

```

// Define the PremiumMembership class that extends GymMembership
class PremiumMembership extends GymMembership {
    // Additional attributes for PremiumMembership
    boolean personalTrainerAvailable;
    boolean spaAccess;
}

```

```

// Constructor for PremiumMembership
public PremiumMembership(String memberName, String membershipType, int
    super(memberName, membershipType, duration);
    this.personalTrainerAvailable = personalTrainerAvailable;
    this.spaAccess = spaAccess;
}

// Override the calculateFees method to include additional costs
@Override
public double calculateFees() {
    double baseFee = super.calculateFees();
    double additionalFee = 0.0;

    if (personalTrainerAvailable) {
        additionalFee += 30.0 * duration; // Additional fee per month
    }
    if (spaAccess) {
        additionalFee += 20.0 * duration; // Additional fee per month
    }
    return baseFee + additionalFee;
}

// Override the displayDetails method to include premium details
@Override
public void displayDetails() {
    super.displayDetails();
    System.out.println("Personal Trainer Available: " + (personalTrainerAvailable ? "Yes" : "No"));
    System.out.println("Spa Access: " + (spaAccess ? "Yes" : "No"));
}
}

```

Explanation:

- Class definition: Defines the PremiumMembership class, which extends GymMembership.
- Additional attributes: Declares two attributes: personalTrainerAvailable (boolean) and spaAccess (boolean).
- Constructor.
 - Calls the superclass (GymMembership) constructor to initialize memberName, membershipType, and duration.

- Initializes `personalTrainerAvailable` and `spaAccess` attributes with provided values.
- Override `calculateFees()` method:
 - Calls the superclass method `super.calculateFees()` to get the base fee.
 - Adds additional fees if `personalTrainerAvailable` and `spaAccess` are true.
 - Returns the total fee, which includes the base fee and any additional fees.
- Override `displayDetails()` method:
 - Calls the superclass method `super.displayDetails()` to display base details.
 - Adds lines to print whether a personal trainer is available and whether spa access is available.

Main.java

```
// Main class to test the GymMembership and PremiumMembership classes
public class Main {
    public static void main(String[] args) {
        // Create an instance of GymMembership
        GymMembership basicMember = new GymMembership("Njeri Inka", "Monthly", 10000, 10000, 10000);

        // Create an instance of PremiumMembership
        PremiumMembership premiumMember = new PremiumMembership("Willy Diano", "Monthly", 15000, 15000, 15000);

        // Display details of the basic membership
        System.out.println("Basic Membership Details:");
        basicMember.displayDetails();

        // Display details of the premium membership
        System.out.println("\nPremium Membership Details:");
        premiumMember.displayDetails();
    }
}
```

Explanation:

- Class definition: Defines the Main class to test GymMembership and PremiumMembership classes.
- main method: Entry point of the program.
 - Create an instance of GymMembership:

- Instantiates a GymMembership object named basicMember.
- Initializes with memberName as "Njeri Inka", membershipType as "Monthly", and duration as 6 months.
- Create an instance of PremiumMembership:
 - Instantiates a PremiumMembership object named premiumMember.
 - Initializes with memberName as "Willy Diantha", membershipType as "Annual", duration as 12 months, personalTrainerAvailable as true, and spaAccess as true.
- Display details of the basic membership:
 - Prints "Basic Membership Details:" to the console.
 - Calls basicMember.displayDetails() to print the details of the basic membership.
- Display details of the premium membership:
 - Prints "\nPremium Membership Details:" to the console.
 - Calls premiumMember.displayDetails() to print the details of the premium membership.

Output:

```
Basic Membership Details:
Member Name: Njeri Inka
Membership Type: Monthly
Duration: 6 months
Membership Fees: $300.0
Special Offers: No special offers available.

Premium Membership Details:
Member Name: Willy Diantha
Membership Type: Annual
Duration: 12 months
Membership Fees: $1200.0
Special Offers: 10% discount on annual membership.
Personal Trainer Available: Yes
Spa Access: Yes
```

Java Code Editor: