

Gym Management System

Overview

Design a Gym Management System that tracks gym members, their memberships, and the classes they attend.

The system must demonstrate object-oriented programming principles, including encapsulation, inheritance, polymorphism, and abstraction.

Note: class descriptions are purposefully vague. Check the code provided in the `main()` method calls to get more context.

The output your program creates must match what is provided in the "Output should be" examples.

Requirements

Member class (2 points)

- Create a class called `Member`.
- Encapsulate member details `id`, `name`, and `age`.

Run the code below in the `main()` method:

```
Member freshMember = new Member(18, "Jurgis", 60);
System.out.println(freshMember);
```

Output should be:

```
18: Jurgis, Age: 60
```

Membership class (2 points)

- Create an abstract `Membership` class with encapsulated attributes `membershipId`, `memberId`.
- Don't forget the constructor.
- Provide a method to calculate membership fees, called `getCost`. It must be abstract.

Run the code below in the `main()` method:

```
Membership membership = new Membership(5, 9);  
// The compiler should display an error
```

MonthlyMembership class (3 points)

- Needs an encapsulated field for assigning the duration of membership.
- The monthly membership cost is calculated as duration * 30, in the method you have inherited.

Run the code below in the main() method:

```
Membership membership = new MonthlyMembership(9, 18, 8);  
System.out.println(membership);
```

Output should be:

MonthlyMembership, Cost: 240.0, Duration: 8 months

AnnualMembership class (2 points)

- The cost of this particular membership is a flat fee of 300 per year.

Run the code in the main() method:

```
Membership yearlyMembership = new AnnualMembership(70, 82);  
System.out.println(yearlyMembership);
```

Output should be:

AnnualMembership, Cost: 300.0, Duration: 12 months

GymClass class (5 points)

- Create a GymClass class to manage information about classes (className, schedule, enrolledMembers). Has to be encapsulated.
- Provide methods to enroll members, and display the enrolled members for a specific gym class (using toString method).
 - Note that a , should only be displayed when separating more than one member in the same gym class.

Run the code below in the main() method:

```
GymClass pilates = new GymClass("Pilates", "Tuesday 7PM");
System.out.println(pilates);

pilates.enroll(new Member(157, "Michael", 55));
System.out.println(pilates);

pilates.enroll(new Member(28, "Ernesto", 81));
System.out.println(pilates);

GymClass yoga = new GymClass("Yoga", "Friday 9AM");
yoga.enroll(new Member(78, "Jeffery", 54));

System.out.println(yoga);
```

Output should be:

```
Pilates (Tuesday 7PM)
Pilates (Tuesday 7PM): Michael
Pilates (Tuesday 7PM): Michael, Ernesto
Yoga (Friday 9AM): Jeffery
```

Grading

The assignment totals to 14 points. 14 points = grade 10.