

ENCAPSULATION PROGRAMS

i)

Code:

```
class Patient {  
    private String name;  
    private double weight; // in kg  
    private double height; // in meters  
  
    public void setName(String name) {  
        this.name = name;  
    }  
  
    public void setWeight(double weight) {  
        this.weight = weight;  
    }  
  
    public void setHeight(double height) {  
        this.height = height;  
    }  
}
```

```
public String getName() {  
    return name;  
}
```

```
public double calculateBMI() {  
    return weight / (height * height);  
}
```

```
public String getHealthStatus() {  
    double bmi = calculateBMI();  
    if (bmi < 18.5) return "Underweight";  
    else if (bmi < 24.9) return "Normal weight";  
    else if (bmi < 29.9) return "Overweight";  
    else return "Obese";  
}  
}
```

```
public class PatientTest {  
    public static void main(String[] args) {  
        Patient p = new Patient();  
        p.setName("John Doe");  
        p.setWeight(70);  
    }  
}
```

```
p.setHeight(1.75);  
System.out.println("Patient: " + p.getName());  
System.out.println("BMI: " + p.calculateBMI());  
System.out.println("Health Status: " +  
p.getHealthStatus());  
}  
}
```

ii)

Code:

```
class Product {  
    private String productName;  
    private double price;  
    private int stock;  
  
    public void setProductName(String productName) {  
        this.productName = productName;  
    }  
}
```

```
public void setPrice(double price) {  
    this.price = price > 0 ? price : 0;  
}
```

```
public void setStock(int stock) {  
    this.stock = stock >= 0 ? stock : 0;  
}
```

```
public String getProductName() {  
    return productName;  
}
```

```
public double getPrice() {  
    return price;  
}
```

```
public boolean isAvailable() {  
    return stock > 0;  
}  
}
```

```

public class ProductTest {
    public static void main(String[] args) {
        Product product = new Product();
        product.setProductName("Laptop");
        product.setPrice(1200);
        product.setStock(5);

        System.out.println("Product: " +
product.getProductName());
        System.out.println("Price: $" + product.getPrice());
        System.out.println("Available: " + (product.isAvailable() ?
"In Stock" : "Out of Stock"));
    }
}

```

iii)

Code:

```

class House {
    private String location;
    private double area; // in square meters
    private double pricePerSquareMeter;

```

```
public void setLocation(String location) {  
    this.location = location;  
}
```

```
public void setArea(double area) {  
    this.area = area > 0 ? area : 0;  
}
```

```
public void setPricePerSquareMeter(double price) {  
    this.pricePerSquareMeter = price > 0 ? price : 0;  
}
```

```
public String getLocation() {  
    return location;  
}
```

```
public double getTotalPrice() {  
    return area * pricePerSquareMeter;  
}  
}
```

```
public class HouseTest {  
    public static void main(String[] args) {
```

```
House house = new House();  
house.setLocation("Downtown");  
house.setArea(200);  
house.setPricePerSquareMeter(1500);  
System.out.println("House Location: " +  
house.getLocation());  
System.out.println("Total Price: $" +  
house.getTotalPrice());  
}  
}
```

iv)

Code:

```
class GameCharacter {  
    private String name;  
    private int level;  
    private int strength;  
    private int intelligence;  
    public void setName(String name) {  
        this.name = name;  
    }  
}
```

```
public void setLevel(int level) {
    this.level = Math.max(level, 1);
}

public void setStrength(int strength) {
    this.strength = Math.max(strength, 1);
}

public void setIntelligence(int intelligence) {
    this.intelligence = Math.max(intelligence, 1);
}

public String getName() {
    return name;
}

public int getPowerLevel() {
    return (strength * 2 + intelligence * 3) * level;
}
}

public class GameTest {
    public static void main(String[] args) {
        GameCharacter hero = new GameCharacter();
        hero.setName("Ketta Paiyyan");
    }
}
```



```
    hero.setLevel(10);  
    hero.setStrength(20);  
    hero.setIntelligence(15);  
    System.out.println("Hero: " + hero.getName());  
    System.out.println("Power Level: " +  
hero.getPowerLevel());  
}  
}
```