

A glass of orange juice with a slice of orange and a colorful paper band.

Java Programming 2

Enumerated types

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Enumerations

An enum type is a special data type that allows a variable to be one of a set of predefined constants

Common examples:

- Compass directions (NORTH, SOUTH, EAST, WEST)

- Days of week, months of year, etc.

Declaring an enum in Java

```
public enum Day {  
    SUNDAY, MONDAY, TUESDAY, WEDNESDAY,  
    THURSDAY, FRIDAY, SATURDAY,  
}
```

Note: values are constants ==> conventionally written in ALL_CAPS

You use the `enum` keyword **instead of** `class`

An enum called `Day` should be in a class `Day.java`

An enum is a special class

It has **methods**

- Built-in static method `values()` that returns an array of all values

- Built-in static method `valueOf()` that parses a string into an enum constant

- Appropriate definitions of `compareTo()`, `equals()`, `hashCode()`, `toString()`

- Other methods:

 - `ordinal()` -- returns the position of this constant in the list

 - `name()` -- returns the name of this constant

- Any other methods that you define

You can define **fields** as well if necessary

Declaring a more complex enum

```
public enum Planet {  
    MERCURY (3.303e+23, 2.4397e6),  
    VENUS   (4.869e+24, 6.0518e6),  
    EARTH   (5.976e+24, 6.37814e6),  
    MARS    (6.421e+23, 3.3972e6),  
    JUPITER (1.9e+27,   7.1492e7),  
    SATURN  (5.688e+26, 6.0268e7),  
    URANUS  (8.686e+25, 2.5559e7),  
    NEPTUNE (1.024e+26, 2.4746e7);  
  
    private final double mass;    // in kilograms  
    private final double radius; // in meters  
    Planet(double mass, double radius) {  
        this.mass = mass;  
        this.radius = radius;  
    }  
}
```

<https://docs.oracle.com/javase/tutorial/java/javaOO/enum.html>

Using an enum

It can be used in `switch` statements

You can create them with `valueOf`

You can iterate through them using `values()`

You can access their names and ordinal positions

```
switch (day) {  
    case MONDAY:  
        System.out.println("Monday");  
        break;  
}
```

```
Day day = Day.valueOf("MONDAY");
```

```
for (Day day : Day.values()) {  
    System.out.println(day.ordinal()  
        + " " + day.name());  
}
```