

Understanding class definitions

Lecture 3

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Presentation outline

Estimated duration presentation

Questions at end presentation - helps to note slide numbers

Topics discussed:

- Documentation
- Style
- Class components
- Operators - arithmetic, unary, equality, relational.
- Access control
- Reference material

Documenting a program

Good documentation of program code

- Helps code maintenance
- Adds to value of project

```
/**  
 * Fixed-price machine  
 */  
public TicketMachine(int ticketCost)  
{  
    //price of tickets in cents  
    price = ticketCost;  
}
```

Note two methods of commenting

- *// inline*: Comment here
- */* block*: Comment here **/*

Style guide

Style guide provides guidelines on layout, indentation, capitalization

- Order of class parts
 - Fields
 - Constructors
 - Methods
- Upper case class name
- Lower case field & method names
 - Student student
 - //Example camel case
 - String getName()

```
public class Circle
{
    private int diameter;
    private int xPosition;
    private int yPosition;
    private String color;
    private boolean isVisible;

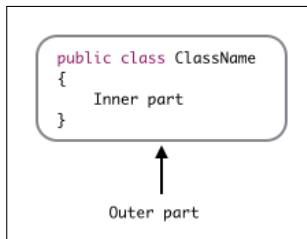
    /**
     * Create a new circle at c
     */
    public Circle()
    {
        diameter = 30;
        xPosition = 20;
        yPosition = 60;
        color = "blue";
        isVisible = false;
    }
}
```

Class components

Class decomposable into

- Outer wrapping or class header
- Inner part containing
 - Constructor
 - Fields
 - Methods

Convention: class name begins with upper case



Class components

Class comprises

- Fields: store data
- Constructors: builds object at instantiation
- Methods: provide object functionality

```
public class ClassName
{
    Fields
    Constructors
    Methods
}
```

Order of class parts

Parts order matter of style

Our style order

- 1 Fields
- 2 Constructors
- 3 Methods

```
public class TicketMachine
{
    private int price;
    public TicketMachine() { ... }
    public String getPrice() { ... }
}
```

Class layout

Example class layout

- Outer part (class header) only
- This a valid class definition
- Compiles and executes
- Does nothing

```
/**  
 * This class compiles ok despite  
 * having no fields, explicit constructor nor methods  
 */  
public class TicketMachine  
{  
    //TODO: Inner part here  
}
```


Reserved words

Java has list 50 reserved words

Also known as keywords

- Only allowed to use for designated role
- Example keyword: *private*
- Allowed: `private String privateSoldier;`
- Disallowed: `private String private;`

Class and instance variables

Class variable

- Preceded by `static`
- Same value all class objects
- `static int counter;`

Instance variable

- Attributes differ across objects
- Example: `int counter;`

```
public class TicketMachine
{
    static private int counter = 0;
    private int price;
    private String name;
}
```

Naming variables

Rules for naming variables

- Any legal identifier permitted
- Unlimited sequence of Unicode characters
 - Legal to begin with letter, dollar(\$) or underscore (_)
 - Convention:: begin with lower case letter
- Case-sensitive : these different
 - `int treebase`
 - `int treeBase`
- Choose self-documentating, non-cryptic names
 - Good: `int speed`
 - Bad: `int s`
 -
- Variable consisting of more than one word
 - Use camel case: `int treeOakBase`
 - Rather than: `int tree_oak_base`

Fields

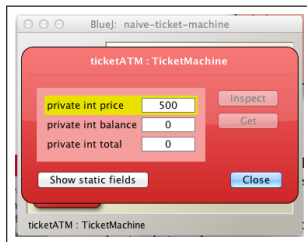
Fields reserve space within object

Data stored in this space

Data sometimes referred to as *attribute* When object created fields may have values

- Assigned during creation
- Assigned later
- Changed later

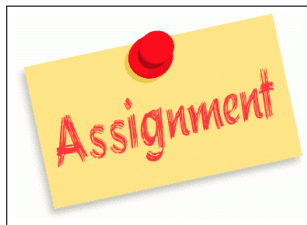
Because fields modifiable also called *variables*



Assignment

Values stored in field variables can be modified.

- `balance = 500`
- Original value in *balance* replaced by 500
- `=` is assignment operator



Assignment Operators

Table 1 : Frequently used assignment operators

<code>+</code>	<code>=</code>	<code>a += 10;</code>	adds 10 to a
<code>-</code>	<code>=</code>	<code>a -= 10;</code>	subtracts 10 from a
<code>*</code>	<code>=</code>	<code>a *= 10;</code>	multiplies a by 10
<code>/</code>	<code>=</code>	<code>a /= 10;</code>	divides a by 10

Unary Operators

Table 2 : Increment and Decrement Operators

++	a++;	adds 1 to a
--	a--;	subtracts 1 from a

Equality and Relational Operators

Table 3 : Equality and Relational Operators

Equal to	==
Not equal to	!=
Greater than	>
Greater than or equal to	>=
Less than	<
Less than or equal to	<=

Access control

Access level modifiers precede fields, methods and constructors.

- `private`: visible only within class
- `public`: visible to world

```
//This field visible only within own class
private int price;
//These methods accessible to objects not of own class(es)
public void setPrice(int price);
public String getPrice();
```

Constructor

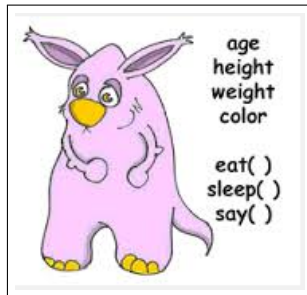
Role and rules

Constructor engaged in object creation
(instantiation)

Construction process initializes fields

Constructors :

- Same name as class & filename
- Zero, one or more arguments (parameters)
- More than one constructor permitted
- If not present, one provided by compiler
- Does not return values



Constructor

Object creation

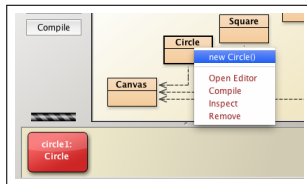
Have already invoked constructor

Example: *shapes* project when creating circle object

- `new Circle()`

This expression creates new Circle object by invoking its constructor

Note absence parameters this instance



Constructor

Default values

```
public class ClassName
{
    int count;
    boolean isValid;
    String name;

    public ClassName() {}
}
```

Default values

count : 0

isValid: false

name: null

Summary

- Documentation & Styling
 - Helps developer team and maintainers
 - Adds value to code
- Class components
 - Fields, constructors & methods
- Fields
 - Class & instance variables; default values
- Reserved words
 - May not be used out of context
- Naming variables
 - Camel case
- Access control
 - public, private, protected, package

References

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5. What is Unicode?

<http://unicode.org/standard/WhatIsUnicode.html>
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