More Sophisticated Behaviour

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Feb 4, 2004
Review: Grouping Objects

- Many applications need collections of objects, with number of objects unknown in advance.
- Java provides a rich and powerful API for Collections, part of Java standard class library.
- Use import statement to gain access to a Java class library.
- Use Java documentation to find the methods in a class.
- ArrayList collection
  - Can store unlimited number of objects of any type.
  - Cannot store a primitive type.
  - Use while/for loops to examine each object in the ArrayList.
**Iteration: while vs. Iterator**

```java
public void showLots()
{
    int index = 0;
    while (index < lots.size())
    {
        Lot lot = (Lot) lots.get(index);
        // process lot.
    }
}
```

```java
public void showLots()
{
    Iterator itr = lots.iterator();
    while (itr.hasNext())
    {
        Lot lot = (Lot) itr.next();
        // process lot.
    }
}
```

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Fixed-Size Collections

- Use Java arrays when you know the maximum size of the collection.
- Java arrays can store objects or primitive types.
- You must specify type of object that an array stores.
- Arrays use a special syntax for access.
- Read about for loops on your own.
Example Using BlueJ

- LogAnalyzer class
- Web server records details of each access.
- Supports a webmaster’s tasks.
  - Most popular pages.
  - Busiest periods.
  - How much data is being delivered.
  - Broken references.
- Analyse accesses by hour.
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- Use Java library classes to implement advanced functionality.
- Java class library has 1000s of classes with 10000s of methods.
- Many useful classes that make programming much easier.
- You must learn how to use these libraries.
Using the Java Class Library

- Know some important classes by name.
- Know how to find out about classes.
- We only need to know the interface, not the implementation.
BlueJ Example: Technical Support System

- A textual dialog system
- Takes question from user, processes question, and responds.
Class documentation: Interface vs implementation

- The documentation includes the interface of the class
  - the name of the class;
  - a general description of the class;
  - a list of constructors and methods
  - return values and parameters for constructors and methods
  - a description of the purpose of each constructor and method
The documentation does not include the implementation of the class
- private fields (most fields are private)
- private methods
- the bodies (source code) for each method
Using library classes

- To use a class from the library, use the `import` statement (except classes from `java.lang`).
- You can use the as if it is part of your current project.
Packages and import

- Classes are organised in packages.
- You can import a single class from a package: `import java.util.ArrayList;`
- You can import a complete package: `import java.util.*;`