Parameter Lists & Command Line Arguments

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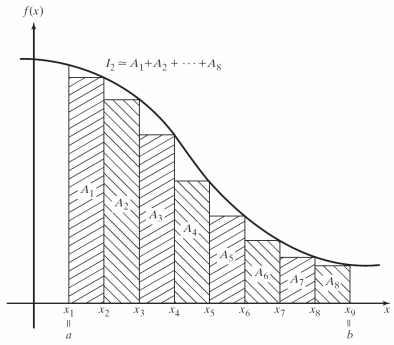
ComS 207: Programming I (in Java)
Iowa State University, FALL 2006
Instructor: Alexander Stoytchev

Example: Numerical Integration

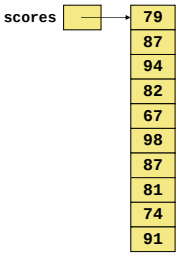


[http://www.cae.tntech.edu/~mwr/Lecture%202004-08-31/numerical-integration.png]

Quick review of last lecture

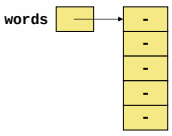
Arrays

- Another way to depict the `scores` array:



Arrays of Objects

- The `words` array when initially declared:

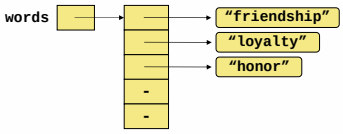


- At this point, the following reference would throw a `NullPointerException`:

```
System.out.println (words[0]);
```


Arrays of Objects

- After some `String` objects are created and stored in the array:



Initial Values for Arrays of Objects

- Keep in mind that `String` objects can be created using literals
- The following declaration creates an array object called `verbs` and fills it with four `String` objects created using string literals

```
String[] verbs = {"play", "work", "eat", "sleep"};
```


Another Way to do the Same Thing

- Initialize each element separately

```
String[] verbs;
verbs=newString[4];

verbs[0] = new String("play");
verbs[1] = new String("work");
verbs[2] = new String("eat");
verbs[3] = new String("sleep");
```

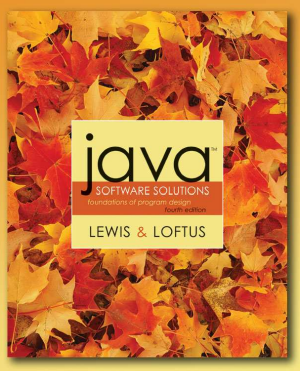

Other Stuff

CD Collection Example

- Now let's look at an example that manages a collection of `CD` objects
- See `Tunes.java` (page 387)
- See `CDCollection.java` (page 388)
- See `CD.java` (page 391)

Chapter 7

Sections 7.4 & 7.5



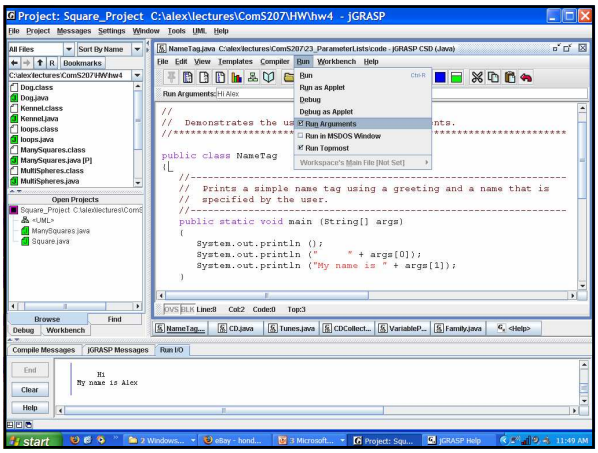
PEARSON Addison Wesley

Command-Line Arguments

- The signature of the `main` method indicates that it takes an array of `String` objects as a parameter
- These values come from *command-line arguments* that are provided when the interpreter is invoked
- For example, the following invocation of the interpreter passes three `String` objects into `main`:

```
> java StateEval pennsylvania texas arizona
```

- These strings are stored at indexes 0-2 of the array parameter of the `main` method
- See `NameTag.java` (page 393)



Example: NameTag.java (page 393)

Variable Length Parameter Lists

- Suppose we wanted to create a method that processed a different amount of data from one invocation to the next
- For example, let's define a method called `average` that returns the average of a set of integer parameters

```
// one call to average three values
mean1 = average (42, 69, 37);

// another call to average seven values
mean2 = average (35, 43, 93, 23, 40, 21, 75);
```


Variable Length Parameter Lists

- We could define overloaded versions of the `average` method
  - Downside: we'd need a separate version of the method for each parameter count
- We could define the method to accept an array of integers
  - Downside: we'd have to create the array and store the integers prior to calling the method each time
- Instead, Java provides a convenient way to create *variable length parameter lists*

Variable Length Parameter Lists

- Using special syntax in the formal parameter list, we can define a method to accept any number of parameters of the same type
- For each call, the parameters are automatically put into an array for easy processing in the method

Indicates a variable length parameter list

```
public double average (int ... list)
{
  // whatever
}
```

element type

array name

Variable Length Parameter Lists

```
public double average (int ... list)
{
   double result = 0.0;

   if (list.length != 0)
   {
      int sum = 0;
      for (int num : list)
         sum += num;
      result = (double)sum / list.length;
   }

   return result;
}
```

Variable Length Parameter Lists

- The type of the parameter can be any primitive or object type

```
public void printGrades (Grade ... grades)
{
   for (Grade letterGrade : grades)
      System.out.println (letterGrade);
}
```


Variable Length Parameter Lists

- A method that accepts a variable number of parameters can also accept other parameters
- The following method accepts an `int`, a `String` object, and a variable number of `double` values into an array called `nums`

```
public void test (int count, String name,
                  double ... nums)
{
   // whatever
}
```


Variable Length Parameter Lists

- The varying number of parameters must come last in the formal arguments
- A single method cannot accept two sets of varying parameters
- Constructors can also be set up to accept a variable number of parameters

Example: `VariableParameters.java` (page 396)

Example: `Family.java` (page 397)

THE END