

Wednesday, April 4, 2012 4-6 PM in Duffield Atrium

Announcements for Today

Reading

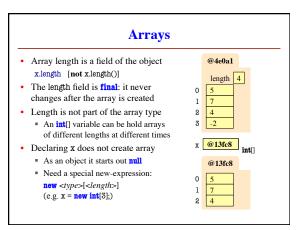
- Sections 8.1 8.3
- PLive Lessons 7.5, 7.6
- Prelim, April 17th 7:30-9:30
- Material up to next class
 - Review posted this weekend
 - Not the same as previous years
 - **Conflict with Prelim time?**
 - Submit to Prelim 2 Conflict assignment on CMS
 - Do not submit if no conflict

Assignments

- A5 is due Thursday night
 - Keep reading Piazza
 - Should have worked on a method a day
 - Cannot give extensions
- A6 posted on Thursday
 - Get started immediately!
 - Prelim is same week it is due

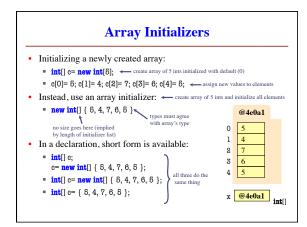
 - If you get started right away, you will not have problems

Arrays						
 Array: an object that holds a fixed number of values of the same type. Type of an array is written: <type>[] (e.g. int[])</type> Declare a variable x that holds the name of an array of ints: 	(2) (4 c0a1 x[0] x[1] x[2] x[3] -2					
<pre><type> <name>; (e.g., int[] x;) Elements of array x are numbered: 0, 1, 2,, n - 1 To refer to an element of an array: <var>[<index>] (e.g. x[3])</index></var></name></type></pre>	This array contains 4 values of type int x @4e0a1 int[]					



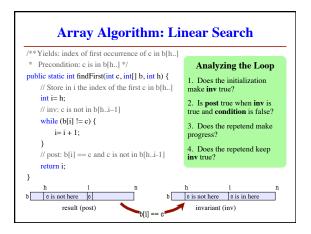
Overview of Array Syntax					
Create a variable named x to hold an int [] value	x <u>@4e0a1</u> int[]				
Create array object of length 4; put name in x	@4e0a1				
Assign 5 to element 2 and -4 to element 0	0 1 2 4 6 4 5				
Assign –8 to x[3] and 6 to x[1]	k 3 int				
	Create a variable named x to hold an int[] value Create array object of length 4; put name in x Assign 5 to element 2 and -4 to element 0 Assign -8 to x[3]				

	Arrays	VS.	. Vectors	vs.	Strings
	Declaration int[] a; (contains ints) Creation a = new int[n]; (size fixed forever) Reference x = a[i]; Change a[i] = x;		Declaration Vector <integer> v; (contains Integers) Creation v= new Vector<integer>(); (can be resized at will) Reference x= v.get(1); Change v.set(1, x);</integer></integer>	• (Declaration String s; (contains chars) Creation s = "foo"; (contents fixed forever deference c = s.charAt(i); Cannot Change
at s	riables a[0], a[1], an successive locations in emory. Element type c class or primitive type	n (an E	Storage layout unspecified but really, it is an array). Element type can only be a class type.	(but	age layout unspecified really, it is an array) tent type is always



```
Array Initialization Example
public class ArrayDemo {
  public static final String[] months=
     {\color{red} \textbf{new String[]}} \{ \texttt{"January"}, \texttt{"February"}, \texttt{"March"}, \texttt{"April"}, \texttt{"May"}, \\
                    "June", "July", "August", "September", "October",
                    "November", "December" };
    /** Yields: the month name, given its number m
      * Precondition: 1 <= m <= 12 */
                                                      e.g. ArrayDemo.theMonth(4)
    public static String theMonth(int m) {
                                                      returns months[3], or "April".
        return months[m-1];
                                   Variable months is:
                                   static: object assigned is created only once
}
                                   public: can be seen outside class ArrayDemo
                                   final: it cannot be changed once initialized
```

```
Procedure: Swap
public class ArrayDemo {
                                                       Swaps b[h] and b[k],
  /{**} Procedure swaps b[h] and b[k] in b */
                                                      because parameter b
contains name of array
  public static void swap (int[] b, int h, int k) {
     int temp= b[h];
    b[h]= b[k]:
                                                            @4e0a1
     b[k]= temp;
                                                        0
                                                        1
                                     ArrayDemo
}
                                                        2
                   b @4e0a1 h 3 k 4
                                                        3
                                                                6
                    temp 6
                                                        c @4e0a1 int[]
swap(c, 3, 4);
```



```
Array Algorithm: Loaded Dice
/** Yields: a random int in 0..p.length-1; i is returned with probability p[i].
 * Precondition: the entries of p are positive and sum to at least 1. *
public static int roll(double[] p) {
                                                                 Analyzing the Loop
  double r= Math.random(); // r in [0,1)
  // Think of interval [0,1] as divided into segments of size p[i]
                                                              1. Does the initialization
  // Store into i the segment number in which r falls.
  int i= 0; double pEnd= p[0];
                                                             2. Is post true when inv is true and condition is false?
  // inv: r >= sum of p[0] .. p[i–1]; pEnd = sum of p[0] .. p[i]
  while (r >= pEnd) {
    pEnd= pEnd + p[i+1];
                                                              3. Does the repetend make
   i = i + 1;
                                                              4. Does the repetend keep
  // post: sum of p[0] .. p[i-1] <= r < sum of p[0] .. p[i]
                                                              inv true?
                                          r < pEnd
                                                        ↔ ↔ p[0] p[1]
```