

CS100J 29 March 2005 Arrays

Reading: You are responsible for: Secs 8.1, 8.2, 8.3, 8.4

A decimal point	I'm a dot in place	Slot machines	Cash lost in 'em
Animosity	Is no amity	Parishioners	I hire parsons
Debit card	Bad credit	Schoolmaster	The classroom
Desperation	A rope ends it	Statue of liberty	Built to stay free
Dormitory	Dirty room	The Morse code	Here come dots
Eleven plus two	Twelve plus one	Vacation times	I'm not as active
Evangelist	Evil's agent	Funeral	Real fun
The earthquakes	That queen shake	Intoxicate	Excitation
Mother-in-law	Woman hitler	Western Union	No wire unsent
Ronald Wilson Reagan	Insane Anglo Saxon warlord		
Snooze alarms	Alas! No more Z's		
Victoria, England's queen	Governs a nice quiet land		
William Shakespeare	I am a weakish speller		
William Shakespeare	We all make his praise		

Some Anagrams  
(permutations of  
sequences of letters)

Today

- Quick overview of next two assignments.
- Look at horizontal notation for writing assertions about arrays.
- Write a method to tell whether two arrays are equal.
- Write a method to copy an array.
- Look at storing a table of values in a Java array.

including adding a value to the table,  
deleting the last value of the table,  
deleting some other value from the table.

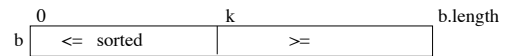
The material on tables is in Sec. 8.4 of course text.

Next two assignments: A5 and A6

Create a rat race game.

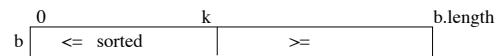
1. The emphasis is on manipulating a rectangular array (we show you rectangular arrays on Thursday).
2. You will have to write code to read from a file (topic of this week's lecture).
3. You will learn a little bit about GUIs (graphical user interfaces), but you won't have to do any GUI programming. You will see how a program can "listen" for keystrokes.

Horizontal notation for arrays, strings, Vectors

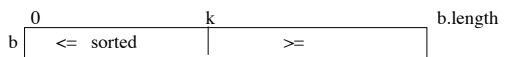


Example of an assertion about an array  $b$ . It asserts that:

1.  $b[0..k-1]$  is sorted (i.e. its values are in ascending order)
2. Everything in  $b[0..k-1]$  is  $\leq$  everything in  $b[k..b.length-1]$



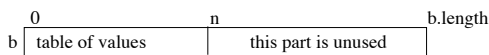
1.  $b[0..k]$  is sorted (i.e. its values are in ascending order)
2. Everything in  $b[0..k]$  is  $\leq$  everything in  $b[k+1..b.length-1]$



Maintain a table of values in an array

As a program executes, it may have to maintain a table of values, say temperatures, within an array. The table will start out empty; then values will be added to it. We must say *where* in the array the values are stored.

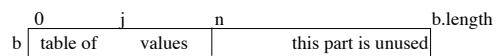
```
int[] b= new int[5000]; // The n values in the table are in b[0..n-1]
int n=0; // 0 ≤ n <= 5000
```



```
// Add t to the table:
b[n]= t;
n= n+1;
```

```
// Delete last element of table
// (assuming it exists).
n= n -1;
```

Maintain a table of values in an array



// Delete value  $b[j]$  from the table.

```
If the order of values in
the table doesn't matter:
n= n-1;
b[j]= b[n];
```

```
If the order of values in table does matter:
n= n-1;
// Move b[j+1..n] to b[j..n-1]
// inv: b[j+1..k-1] have been moved
for (int k= j+1; k-1 != n; k= k+1 ) {
    b[k-1]= b[k];
}
```