Programming Languages and Techniques (CIS120)

Lecture 36
April 20, 2016

Resizable Arrays
Chapter 32
Game project grading

• Final Program Due: (88 points)
  Tuesday April 26th at 11:59pm
  – Submit zipfile online, submission only checks if your code compiles

• Grade based on demo with your TA during reading days
  – Make sure that you test your program in Moore 100, especially if you use outside libraries
  – Grading rubric on the assignment website
  – Recommendation: don’t be too ambitious.

• **NO LATE SUBMISSIONS PERMITTED**
How is the Game Project going so far?

1. not started
2. got an idea, submitted design proposal
3. it's somewhat working
4. it's mostly working
5. debugging / polishing
6. done!
Final exam

• Monday, May 9\textsuperscript{th} at 9AM
  – Use form on course website if you have multiple exams that day
  – Only reason for make up

• Old exams will be available on course website
  – Exam will cover the entire semester (through Friday's lecture)
  – More emphasis on Java part of the course

• Lab this week: final exam review
Design Exercise: ResizeableArray

Arrays that grow without bound
Step 1: Understand the problem

• Say we want to create an abstract data structure, like a Map, that contains associations from keys to values.

• Both keys and values will be ints

• The domain of the map should include all integers greater than or equal to 0. Each int k will be mapped to 0 by default.

• We also want to be able to find the largest key that has a nonzero value
Step 2: Define the interface

```java
public class ResArray {

    /** Constructor, takes no arguments. */
    public ResArray() { ... }

    /** Access position i. If position i has not yet
     * been initialized, return 0. */
    public int get(int idx) { ... }

    /** Update index i to contain the value v. */
    public void set(int idx, int val) { ... }

    /** Return the extent of the array. i.e.
     * one past the index of the last nonzero value in the array. */
    public int getExtent() { ... }
}
```
Step 3: Write tests

```java
ResArray a = new ResArray();
a.set(17, 120);
int result = a.get(17);
```

What should be the result?

1. 0
2. 17
3. 120
4. ArrayIndexOutOfBoundsException
5. NullPointerException
ResArray a = new ResArray();
int result = a.get(17);

What should be the result?
1. 0
2. 17
3. 120
4. ArrayIndexOutOfBoundsException
5. NullPointerException
ResArray a = new ResArray();
a.set(17, 120);
int result = a.getExtent();

What should be the result?

1. 0
2. 16
3. 17
4. 18
5. 120
6. ArrayIndexOutOfBoundsException
7. NullPointerException
ResArray a = new ResArray();
a.set(17, 120);
a.set(17, 0);
int result = a.getExtent();

What should be the result?

1. 0
2. 16
3. 17
4. 18
5. 120
6. ArrayIndexOutOfBoundsException
7. NullPointerException
Demo: Steps 3 & 4

ResArray.java
ResArrayTest.java