CS 302 Week 15

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Short vs. Long

"I have made this longer than usual because I have not had time to make it shorter."   - Blaise Pascal

"I have already made this paper too long, for which I must crave pardon, not having now time to make it shorter." - Benjamin Franklin

"Not that the story need be long, but it will take a long while to make it short." - Henry David Thoreau

"That depends on the length of the speech," answered the President. "If it is a ten-minute speech it takes me all of two weeks to prepare it; if it is a half-hour speech it takes me a week; if I can talk as long as I want to it requires no preparation at all. I am ready now." - Woodrow Wilson

Types of Errors

What are different kinds of errors?
When do they occur?

What do these evaluate to?

Assume:
    int m, k;
    System.out.println(expr);

new Random()
m = 5
k = m + 4
"hello"
"hello" + " today"
"hello".length()
"int".toUpperCase()
"".isEmpty()

Declaring/Defining vs. Calling

```
static void happy(boolean whether) {
    System.out.println("Happy=" + whether);
}


...somewhere else…
happy( true);
```

What is print out?

```
static void myPrint( int out) {
    System.out.println( "i: " + out);
}
static void myPrint( String s) {
    System.out.println( "s: " + s);
}
…. in main….
int i = 5;
myPrint(  i + "3" + (3 + 4 * 6) + 4);
```

Announcements

P4 now Due Monday, December 14th, 8am.
- No consulting hours after noon on Friday.

Office Hours:
- Wednesday (today): 2:30pm - 3:30pm?
- Thursday: 9:00am to 10:45am

What will print out and why?

```
int k = 'A';
System.out.println( k);
```

Heap vs. Stack

Heap
- at runtime, JVM allocates memory for objects and classes
- Garbage collector runs periodically
- Global access, need a reference though

Stack
- method specific values that are short-lived
- always referenced, last-in first-out (LIFO)
- when method invoked (called) new block is created on stack to hold primitive values and references to other objects
- as soon as method ends, block becomes unused and available for other methods

Wrapper Classes

int k;
Integer m;

//if local variables, what memory, when and where for k & m?
//if class variables, what memory, when and where for k & m?
//if instance variables, what memory, when and where for k & m?

Draw a picture of memory and describe each.

```
public static void main( String []args) {
      int k;
      Integer m;
      k = 2;        //example of ?
      m = 3;     //example of ?
      k = m;     //example of ?
}
```

Strings and memory

```
class S {
    public static void main( String []args) {
        String name;    //Where and what is the value?

        new String("sad");  //What and where is the value?

        name = new String("happy");  //What and where is the value?
    }
}
```

Discuss the differences.

```
class C {                                    class C {
      static int k;                                static int k;
      int m;                                       int m;
      static void printK() {                       static void printK() {
            System.out.println( k);                      System.out.println( k);
            System.out.println( m); //? A                System.out.println( m); //? C
      }                                            }
      void printM() {                              static void printM(C this) {
            System.out.println( this.m);                 System.out.println( this.m);
            System.out.println( k); //? B                System.out.println( k); //? D
      }                                            }
}                                            }
...main() {                                  … main() {
      C.printK();                                  C.printK();
      C varC = new C();                            C varC = new C();
      varC.printM();                               C.printM( varC);
}                                            }
```

What is print out?

```
File f = new File( "myfile.txt");
Scanner scnr = new Scanner( f);
scnr.nextLine();
int count = 4;
if ( scnr.hasNextInt())
    count = scnr.nextInt();
else {
    scnr.nextLine();
    count = scnr.nextInt();
}
for ( int i = 0; i < count; i++)
    scnr.nextLine();
System.out.println( scnr.nextLine());
```

3
hello
2
8 line
5 line
3 line
4 line

Online Course Evaluation - http://aefis.wisc.edu

Thoughts on?
- In-class problems
- Polling the class
- Java Visualizer demos
- Eclipse demos
- Worked Problems:
  - 3D Tic-Tac-Toe (P2)
  - Bouncing Balls (P3)
  - Uline Boxes (P4)
- Class & Sequence diagrams (P3)
- Recorded lectures
- Exam wrappers

- Hand drawn diagrams
  - UML, Memory
- About learning
- Misconceptions
- Muddiest Point
- Personal Stories
- Navigating This Social System
- Research Ideas
  - how do people learn programming?
  - build a graphical, professional programming language

What would make lecture better for you?

Output - What is the difference?

```
String filename = "aFile.txt";
try (
    PrintWriter output = new PrintWriter(filename);
) {
    output.println( "hello");
    output.println( " world");
} catch ( FileNotFoundException e) {
    e.printStackTrace();
    //OR
    System.out.println( "File + " + filename + " not found. ");
}
//is the PrintWriter closed?
```

```
System.out.println( "hello");
System.out.println( " world");
```

Draw a picture of memory, at each time point

```
class Dag {
    static int smop;
    Hup h;
    Dag( int smop, Hup h) {
        Dag.smop = smop;
        this.h = h;  //4
    }
}
class Hup {
    double gep;
    Hup( double g) {
        gep = g; //2
    }
}
```

```
class TestDag {
    Dag methodB( Hup p) {
        Dag t;   //3
        t = new Dag( 2, p);
        t = new Dag( 3, p);
        return t; //5
    }
    main() {
        Dag y;    //1
        y = methodB( new Hup( 13));
        //6
    }
}
```

What is print out?

```
File f = new File( "myfile.txt");
Scanner scnr = new Scanner( f);
int count= -1;
count = scnr.nextInt();
for ( int i = 0; i < count; i++)
    scnr.nextLine();
if ( scnr.hasNextInt()) {
    count = scnr.nextInt();
    scnr.nextLine();
} else {
    scnr.nextLine();
    count = scnr.nextInt();
}
System.out.println( "count: " + count + " nl:" + scnr.nextLine());
```

```
3
hello
2
8 line
5 line
3 line
4 line
```

What is print out?

String str = "'Falling Off a Cliff' by Eileen Dover";
System.out.println(str.substring(4,8));

String str2 = "'The Future of Robotics' by Cy Borg and Anne Droid";
System.out.println(str2.substring(str2.indexOf('o'),
    str2.lastIndexOf('B')));

String str3 = "'Technology in the 21st Century' by Rob Ott";
System.out.println(str3.substring(str3.indexOf('R')).concat("."));

Strings courtesy of Boy Scouts