Midterm In-Review

COMP 110
Summer II 2012

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7/12/2012
Announcements

- Midterm is graded
  - Will hand back today
Questions?

Yesterday:

- Objects & References
- Constructors & Static Methods
- Lab 6 Started
Today in COMP 110

- Midterm In-Review

- Lecture
  - Designing & Overloading Methods
Q1: Primitive Types

- Yes
  - boolean
  - long

- No
  - decimal
  - String
  - Student
Q2: Variable Names

- Illegal
  - week-day
  - 2pieces
  - Import
  - helloWorld!
  - default

- Legal but not Java Conventions
  - TotalCost

- Legal
  - dayCount
  - itemPrice
<table>
<thead>
<tr>
<th>Result</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>double var1 = (15 / 4) - 2.0;</td>
</tr>
<tr>
<td>3</td>
<td>int var2 = (int)(9.4 / 3.0);</td>
</tr>
<tr>
<td>5.5</td>
<td>float var3 = (float)11 / 2;</td>
</tr>
<tr>
<td>1</td>
<td>int var4 = 21 % 4;</td>
</tr>
</tbody>
</table>
Q4: Declare/Assign

- Winning score from a baseball team
  - int gameScore = 7;

- Array for gymnast’s scores from 7 judges
  - double[] gynmastScores = new double[7];
  - double[] judgeScores = { 7.2, 8.5, 4.3, 8.6, 9.2, 7.5, 8.4 };
Q5: Three Main Design Principles of Java

- Encapsulation
  - Information Hiding

- Polymorphism
  - “Many Forms”

- Inheritance
  - Hierarchy of Classes
Q6: Boolean Expressions

- int x = 5, y = 9;
  (x < 7) || (y < 3)
  - true

- int x = 3, y = 4;
  ((x + y > 7) || (x != 6)) &&
  (y >= 5)
  - false
Q7: String

What happened to three?
Q8: String Operations

- `str.length()`
  - int, 23

- `str.charAt(9)`
  - char, ‘e’

- `str.indexOf(“d”)`
  - int, 12

What happened to three?
Q8: String Operations

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>h</td>
<td>a</td>
<td>t</td>
<td>h</td>
<td>a</td>
<td>p</td>
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<td>t</td>
<td>o</td>
<td>t</td>
<td>h</td>
<td>r</td>
<td>e</td>
</tr>
</tbody>
</table>

- `str.equals("What")`
  - boolean, false

- `str.lastIndexOf("t")`
  - int, 17

- `str.substring(10, 20)`
  - String, “ned to thr”
Q9: Sorting (0, 8, 5, 10, 3)

<table>
<thead>
<tr>
<th>Bubble Sort</th>
<th>Selection Sort</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 5, 8, 3, 10</td>
<td>1. 3, 5, 10, 8</td>
</tr>
<tr>
<td>2. 5, 3, 8, 10</td>
<td>2. 3, 5, 10, 8</td>
</tr>
<tr>
<td>3. 3, 5, 8, 10</td>
<td>3. 3, 5, 8, 10</td>
</tr>
<tr>
<td></td>
<td>4. 3, 5, 8, 10</td>
</tr>
</tbody>
</table>

Step 4 may not be needed in the presence of an optimization.
Q10: What’s Wrong?

```java
for (int x = 0; x < 5; x++)
{
    System.out.println("x = " + x);
    int y = 1;
    while (y < 5)
    {
        System.out.println("x * y = " + (x * y));
        y++; }
    System.out.println();
}
```

- Logic Error
- Infinite Loop (y++ wasn’t part of the loop body)
Q11: Times Executed

double[] values = { 3.0, 4.0, 5.0, 9.0 };  
int i = 0;

do 
{
    for (int j = 6; j >= 0; j -= 2)
    {
        for (double val : values)
        {
            System.out.println(i +", " + j +": " + val);
        }
    }
    i++;
} while (i < 3);

4 * 4 * 3 = 48 times

4 * 4 * 3 = 48 times
Q12: Tracing

- **Input:** 10 4 9 15 7 12 2 21 -1

Scanner kb = new Scanner(System.in);
int input = kb.nextInt();
int temp = 0;
while (input > 0)
{
    if (input < 12)
    {
        temp++;
        input = kb.nextInt();
    }
}

Temp = 5
Temp is the number of entries less than 12
Sentinel is -1
Q13: Tracing

- **Input:** 2 7 9 4 1 10 3 14 -1

Scanner kb = new Scanner(System.in);
int temp = 0;
for (int k = 0; k < 6; k++)
{
    int input = kb.nextInt();
    if (k % 2 == 1)
        temp += input;
}

temp = 21

temp is the sum of the entries at index 1, 3, 5

No sentinel
Q14: Tracing

- **Input:** 2 5 -4 -1 3 -5 6 -2 0

Scanner kb = new Scanner(System.in);
int input = kb.nextInt();
int temp = 1;
do {
    if (input % 2 == 0) {
        temp *= input;
        temp = 96
    }
    input = kb.nextInt();
} while (input != 0);

temp is the product of the even numbers
Sentinel is 0
Q15: Absolute Value Array

```java
for (int i = 0; i < intArr.length; i++)
{
    if (intArr[i] < 0)
    {
        intArr[i] = -intArr[i];
    }
}
```
Q16: Yoda-ification

```java
int firstSpace = str.indexOf(" ");
int lastSpace = str.lastIndexOf(" ");
String result =
    str.substring(firstSpace + 1, lastSpace + 1) +
    str.substring(0, firstSpace) +
    str.substring(lastSpace);
```
Q17: Tic-Tac-Toe

- A few solutions to this one

```java
int xCount = 0, oCount = 0;
for (int row = 0; row < board.length; row++)
{
    for (int col = 0; col < board[row].length; col++)
    {
        if (board[row][col] == 'X')
            xCount++;
        else if (board[row][col] == 'O')
            oCount++;
    }
}

char nextPlayer = (xCount == oCount) ? 'X' : 'O';
```
Questions?
Logistics

Next:
- Designing & Overloading Methods

Tomorrow:
- Program 2 In-Review
- Inheritance