Homework 3

CS 1323, Fall 2015

Name (5 points): Hunter Black

Student ID: 113229605

This assignment is submitted in a dropbox on Janux in PDF format by 11:59 on Wednesday, October 14. Scanned homework is not accepted.

1. (10 points; 5 points each) Use memory diagrams to trace the code below:

a)

```
int[] data;
data = new int[5];
for (int i=0; i<data.length; ++i)
        data[i] = (i+1)*3;
```

Stack Frame

Identifier	Address	Contents
data	100	1000
	101	
	102	

Heap

Identifier	Address	Contents
0	1000	3
1	1001	6
2	1002	9
3	1003	12
4	1004	15
length	1005	5
	1006	

b)

```
int[] data  = {1, 3, 5, 7, 9};
int[] copy = data;
copy[0] = 11;
copy[1] = 9;
```

Stack Frame

Identifier	Address	Contents
data	100	1000
copy	101	1000
	102	

Heap

Identifier	Address	Contents
0	1000	~~1~~ 11
1	1001	~~3~~ 9
2	1002	5
3	1003	7
4	1004	9
length	1005	5
	1006	

2. (30 points; 10 points each) Trace the following for loops using the table on the right. Show every time a variable is changed—including the last change. If the code is illegal or does not run properly, trace as far as you can.

a.

```
int[] data = {1, 9, 7, 4, 2};  // constructs and initializes an array

int sum = 0;
for (int count = 0; count < data.length/2; ++count)
{
    sum = sum + data[count];
}
```

sum	count
0	0
1	0
4	1

b.

```
int[] data = {9, 4, 1, 7, 6, 3, 2};
int sum = 0;
for (int index = data.length-1; index >0 ; --index)
{
        if (data[index]%2==0)
                sum = sum + data[index];
        else
                sum = sum + 1;
}
```

sum	index
0	6
2	6
3	5
9	4
10	3
11	2
15	1

c.

```
int[] data = {10, 8, 6, 4, 3, 1};
int target = 5;
int sum = 0;
for (int index = 0; index < data.length && data[index] != target ||
data[index] !=target+2;
     ++index)
{
    sum = sum + 1;
}
Error ArrayIndexOutOfBounds
```

sum	index
0	0
1	0
2	1
3	2
4	3
5	4
6	5
	Error

3. (5 points; 1 point each) Find the value of each of the logical operators below. If the statement is illegal in Java, say so.
    a. 8 < 12 && 15 < 7
        False
    b. 8 < 12 || 15 < 7
        True
    c. 14 < 9 || 12 != 5 && 3 == 9
        False
    d. !4<9 && !3 > 7
        Illegal code in Java
    e. ! (3 != 7) && 4 == 2
        False