Homework

Programming Tracing

1. Trace through the following code segments and illustrate the output and memory.

	Memory	Output

a)
``java
int a = 3;
int b = 9;
System.out.println(b);
a = b + 2;
a = a + b;
System.out.println(b+3);
System.out.println(a);
``
	a (int): ~~3 11~~ 20
	b (int): 9
		9
		12
		20
		>

b)
``java
int ans = 10;
int res = 6;
int num;
num=ans + res;
System.out.println(num + 2);
res=num + 3;
System.out.println(res);
``
	ans (int): 10
	res (int): ~~6~~ 19
	num (int): 16
		18
		19
		>

c)
``java
int a, b, c;
double d, e, f;
a = 10;
b = 4;
d = a;
c = a / b;
e = a / b;
f = e / b;
a = a + 2 * b;
d = b - d * 2;
System.out.println(a);
System.out.println(b);
System.out.println(c);
System.out.println(d);
System.out.println(e);
``
	a (int): ~~10~~ 18
	b (int): 4
	c (int): 2
	d (double): ~~10~~ -16
	e (double): 2.5
	f (double): 0.625
		18
		4
		2
		-16
		2.5
		>

2. To switch the values contained in the variables x and y, a programmer wrote the following segment:

```
x = y;
y = x;
```

a) If, before execution of the segment, x contains the value 7 and y contains the value 4, what value would each have after the segment was performed?

   Hint: Remember that a computer can only do ONE instruction at a time! Try doing a trace of the above steps. What's the problem? Did it do what the programmer wanted it to do?

   x = 4
   y = 4

b) Rewrite the segment so that it performs the intended task correctly. Try to do it WITHOUT hard-coding any values. (In other words, DON'T do x = 4; or y = 7;)

```
int temp = x;
x = y;
y = temp;
```

<u>Reference for questions 2</u>
Carter, John. An Introduction To Computer Science Using Java. Toronto: University of Toronto Press, 2003