

Homework

Programming Tracing

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

| | Memory | Output |
|---|--|-----------------------------------|
| a) <pre>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);</pre> | a(int): 3 11 20 b(int): 9 | 9 12 20 > |
| b) <pre>int ans = 10; int res = 6; int num; num=ans + res; System.out.println(num + 2); res=num + 3; System.out.println(res);</pre> | ans(int): 10 res(int): 6 19 num(int): 16 | 18 19 > |
| c) <pre>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);</pre> | a(int): 10 18 b(int): 4 c(int): 2 d(double): 10.0 -16.0 e(double): 2.0 f(double): 0.5 | 18 4 2 -16.0 2.0 > |

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?

```
x = 4
```

```
y = 4
```

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?

No, firstly x was set to y's value which is 4, then y is set to x's *current* value which is also 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 a = x;
```

```
x = y;
```

```
y = a;
```

Reference for questions 2

Carter, John. An Introduction To Computer Science Using Java. Toronto: University of Toronto Press, 2003