Model 1 Assignment

Consider the following Java statements. What is the resulting value of each variable?

A:

```
int x, y;
x = 1;
y = 2;
y = x;
x = y;
```

Value of x: 1

Value of y: 1

B:

```
int x, y, z;
x = 1;
y = 2;
z = y;
y = x;
x = z;
```

Value of x: 2

Value of y: 1

Value of z: 2

C:

```
int z, y;
z = 2;
z = z + 1;
z = z + 1;
y = y + 1;
```

Value of z: 4

Value of y: ?

Questions (15 min)

Start time:

1. In program A, why is the value of `x` not 2?

Each statement is executed one after the other, so the third assignment changes the value of `y` to 1. The last assignment then assigns 1 to the value `x`.

2. In program B, what happens to the values of `x` and `y`?

They get swapped; `x` was 1 and `y` was 2, but in the end `x` was 2 and `y` was 1.

3. In program B, what is the purpose of the variable `z`?

It is a temporary variable that makes it possible to swap the values of `x` and `y`.

4. If program C runs, what happens to the value of `z`?

It gets incremented twice; the value starts at 2, then it becomes 3, and then it becomes 4.

5. In program C, why is it possible to increment `z` but not `y`?

The variable `z` was initialized, but `y` was not. Java doesn't know what value to increment.

6. Because ***increment*** and ***decrement*** are so common in algorithms, Java provides the operators `++` and `--`. For example, `x++` is the same as `x = x + 1`, and `y--` is the same as `y = y - 1`. Write the value of `x` and `y` next to each statement below.

```
int x = 5;
x--;
x--;
```

```
x is 5
x is 4
x is 3
```

```
int y = -10;
y++;
y++;
```

```
y is -10
y is -9
y is -8
```

7. Like the assignment operator, the `++` and `--` operators replace the value of a variable. Java also has ***compound assignment*** operators for convenience. For example, the statement `x = x + 2` can be rewritten as `x += 2`. Simplify the following assignment statements.

```
step = step + 5;
size = size - 3;
total = total * 2;
change = change / 10;
hours = hours % 24;
```

```
step += 5;
size -= 3;
total *= 2;
change /= 10;
hours %= 24;
```

8. Which of the following assignment statements can also be rewritten like the ones in #7?

```
step = 5 + step;
size = 3 - size;
total = 2 * total;
change = 10 / change;
hours = 24 % hours;
```

```
step += 5;
NO
total *= 2;
NO
NO
```