07.05 Discussion-based Assessment

Consider the following code segment, where `m` is a variable of the type `int`:

```
if (m > 0)
{
  if ((1000 / m) % 2 == 0)
    System.out.println("even");
  else
    System.out.println("odd");
}
else
  System.out.println("not positive");
```

1. Explain why the programmer did not use an ELSE IF statement directly under the ELSE statement for the last line. Rewrite this segment of code using only Boolean variables in the conditional statements.

2. List five relational operators. List three logical operators. Which is best used for integers? Which is best used for doubles? Which is used for Booleans? What methods can be used instead of relational operators? Why would you use a method instead of a relational operator? Which of the three (relational, logical, method) needs to be used with the Java null?

Assuming that `x`, `y`, and `z` are integer variables, which of the following three logical expressions are equivalent to each other, that is, have equal values for all possible values of `x`, `y`, and `z`?

I. `(x == y && x != z) || (x != y && x == z)`

II. `(x == y || x == z) && (x != y || x != z)`

III. `(x == y) != (x == z)`

A. None of the three

B. I and II only

C. II and III only

D. I and III only

E. I, II, and III

3.

Consider the following methods:

```
public int fun1(int n)
{
  int product = 1;
  for (int k = 2; k <= n; k++)
  {
    product *= k;
  }
  return product;
}
```

```
public int fun2(int n)
{
  int product = 1;
  int k = 2;
  while (k <= n)
  {
    product *= k;
    k++;
  }
  return product;
}
```

For which integer values of `n` do `fun1(n)` and `fun2(n)` return the same result?

A. Only `n > 1`

B. Only `n < 1`

C. Only `n == 1`

D. Only `n >= 1`

E. Any integer `n`

4. What is the negation statement for >=?

5. What is the main difference between using a FOR loop and a FOR EACH loop?

6.

Suppose the method `int sign(int x)` returns `1` if `x` is positive, `-1` if `x` is negative, and `0` if `x` is `0`. Given

```
int[] nums = {-2, -1, 0, 1, 2};
```

what are the values of the elements of `nums` after the following code is executed?

```
for (int k = 0; k < nums.length; k++)
{
  nums[k] -= sign(nums[k]);
  nums[k] += sign(nums[k]);
}
```

A. `-2,-1,0,1,2`

B. `-1,0,0,0,1`

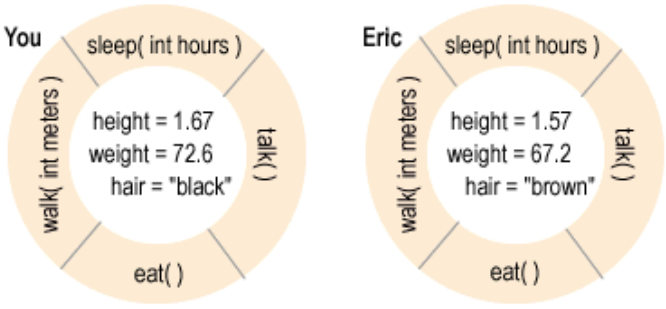
C. `0,0,0,0,0`

D. `-2,0,0,2,3`

E. `-2,0,0,0,2`

7. Analyze the diagram below. Create code that does the following:
   a. Define a class named Person
   b. Create three instance variables based on the diagram
   c. Implement a constructor statement for the new class Person
   d. Create four instance methods with proper method signatures per the diagram below.
   e. You can make up whatever you want for each of the four method bodies.

The following picture represents two software objects, one called **You** and the other called **Eric**:



8. Do you have any concerns?