Name:_____   NetID:_____

Answer all questions in the space provided. Write clearly and legibly, you will not get credit for illegible or incomprehensible answers. This is a closed book exam. However, each student is allowed to bring one page of notes to the exam. Print your name at the top of every page.

Question:	1	2	3	4	5	6	7	Total
Points:	16	12	18	15	12	15	12	100
Score:								

1. Select the best type from `boolean`, `double`, `int`, or `String` to store each of the following.

    (a) The value of the square root of 2.   (2)

        (a) _____

    (b) The number of adults in your household.   (2)

        (b) _____

    (c) My middle name.   (2)

        (c) _____

    (d) Your height in meters.   (2)

        (d) _____

    (e) The result of a coin flip.   (2)

        (e) _____

    (f) The title of a book.   (2)

        (f) _____

    (g) The current temperature in degrees Celsius.   (2)

        (g) _____

    (h) The current state of a light bulb (on or off).   (2)

        (h) _____

2. Multiple choice questions: Select the single correct answer for each.

    (a) Which of the following expressions would evaluate to `2.5`?   (2)
        A. `5 / 2`
        B. `(int)5.0 / 2`
        C. `(double)(5 / 2)`
        D. `(double)5 / 2`

    (b) Which of the following is *not* part of all loops?   (2)
        A. initialization
        B. loop body
        C. termination condition
        D. the keyword "while"

(c) The name of the special type of method that creates objects of a class is (2)

      A. instantiator

      B. initializer

      C. creator

      D. constructor

      E. declarator

(d) Which code would you use to create an array that could hold 50 `String` objects? (2)

      A. `Strings names = new String(50);`

      B. `String names = new String[50];`

      C. `String names[50];`

      D. `String[50] names;`

      E. `String[50] names = new String();`

      F. `String[] names = new String;`

      G. `String[] names = new String[50];`

      H. `String[] names = new String(50);`

      I. `String[] names = new [String](50);`

(e) What is the value of the following expression? `"one" + 2 + 3 * 4` (2)

      A. `"one234"`

      B. `"one212"`

      C. `"one14"`

      D. `15`

      E. This expression would result in a compilation error.

(f) What is displayed when the following code is compiled and executed? (2)

```
public class StringCompare {

    public static void main(String[] args) {
        String s1 = new String("Test");
        String s2 = new String("Test");
        if (s1==s2) System.out.println("Same");
        if (s1.equals(s2)) System.out.println("Equals");
    }
}
```

      A. `Same`

        `Equals`

      B. `Equals`

      C. `Same`

      D. The code compiles, but nothing is displayed upon execution.

      E. The code fails to compile.

3. Why do the following code snippets not compile? (Explain in one sentence each.)

(a)   (3)

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

(b)   (3)

```
int i = 2;
int j = 4;
int k = 6;
if(i < j < k) {
    System.out.println(i + " is smallest");
}
```

(c)   (3)

```
public static String myMethod(int x) {
    if( x > 5 ) {
        return "bigger than five!";
    }
}
```

(d)   (3)

```java
public class Test {
    public void method() {

        for(int i = 0; i < 3; i++) {
            System.out.println(i);
        }

        System.out.println(i);
    }
}
```

(e)   (3)

```java
public class MyClass {
    private int x = 10;

    public static void main(String[] args) {
        System.out.println(x);
    }
}
```

(f)   (3)

```java
int[] values = int[100];
```

4. The following Java program compiles and runs. What is its output?   (15)

```java
public class MethodTest {

    public static int foo(int a) {

        int b = a / 2;
        int c = b * 3;

        System.out.println("a=" + a + ", b=" + b + ", c=" + c);

        if(c % a == b) return b;
        else return c;
    }

    public static void main(String[] args) {
        int a = 2;
        int b = 3;
        int c = 4;

        System.out.println("foo(" + a + ")=" + foo(a));
        System.out.println("foo(" + b + ")=" + foo(b));
        System.out.println("foo(" + c + ")=" + foo(c));
    }

}
```

5. The following Java program compiles and runs. What is its output?   (12)

```java
public class Foo {

    private int x;

    public Foo(int x) {
        this.x = x;
    }

    public void printStuff(int x) {
        System.out.println(x);
        System.out.println(this.x);
    }

    public static void main(String[] args) {

        int x = 5;
        Foo a = new Foo(x);
        x += 3;
        Foo b = new Foo(x + 1);
        Foo c = new Foo(x - 1);

        a.printStuff(1);
        b.printStuff(2);
        c.printStuff(3);
    }
}
```

6. Write a method to *return* the average of all the positive numbers (numbers greater than zero)   (15)
   in the given array of numbers, returning 0.0 for an array with no positive values.

```
[2, 6, 3, 5] -> 4.0
[2, -1, 8, 5] -> 5.0
[2, -1, -2, 3] -> 2.5
[-2, -1] -> 0.0
[] -> 0.0
```

```java
    public static double averagePositive ( int [] numbers ) {
```

7. The following Java program compiles and runs. What are the *first* line, *third* line, and *last* line (12) of its output? (I don't want all the output, just the lines specified.)

```java
public class LoopNest {
    public static void main(String[] args) {
        String[] name = { "John", "Paul", "George", "Ringo" };
        String[] adj = {"alive", "dead", "young", "old"};

        for (int a=1; a<name.length; a++) {
            for (int b=0; b<adj.length; b++) {
                for (int c=3; c<5; c++) {
                    String str = name[a] + " is " + adj[b] + ", " + c;

                    System.out.println(str);
                }
            }
        }
    }
}
```