1. (Bonus 2 points)
   What is your section?
   101
   101E

2. (5 points) What is the output of the following code segment?
   ```java
   int i = 0;
   while (i > 0) {
       ++i;
       System.out.println("true");
   }
   ```

3. (5 points) What is the output of the following code segment?
   ```java
   for (int i = 0; i < 2; ++i) {
       for (int j = 0; j < 2; ++j) {
           break;
       }
   }
   System.out.println("outer");
   }
   System.out.println("finished");
   ```
4. (5 points) What is the output of the following code segment?

```java
int counter1 = 0;
int counter2 = 0;
for ( int i = 0; i < 5; ++i ) {
    for ( int j = 0; j < 10; ++j ) {
        ++counter1;
    }
    ++counter2;
}
System.out.println ("counter1 = " + counter1);
System.out.println ("counter2 = " + counter2);
```

5. (5 points) Write a code segment using a while loop that performs a comparable task as the following code segment. Assume `Scanner` variable `stdin` has already been defined.

```java
int sum = 0;
for ( int i = 0; i < 10; ++i ) {
    int number = stdin.nextInt();
    sum = sum + number;
}
System.out.println(sum);
```
6. (5 points) What is the compiler error in the following code segment.

```java
int[] array = { 8, 7, 6, 5, 4, 3 };
int sum = 0;
for (int i = 0; i < array.length; ++i ) {
    sum = sum + array[i];
}
if ( i == sum ) {
    System.out.println("Same");
} else {
    System.out.println("Different");
}
```

7. (5 points) Suppose class Widget has an int instance variable myData. Suppose that x and y are separately initialized Widget variables. Is it necessarily the case that x.myData must always equal y.myData? Why? (Use no more than TWENTY words to explain why).

8. (5 points) Suppose class Widget has a static int member variable theCount. Suppose that x and y are separately initialized Widget variables. Is it necessarily the case that x.theCount must always equal y.theCount? Why? (Use no more than TWENTY words to explain why).

9. (3 points) Draw a memory diagram for the following definition.

```java
int[] array;
```
10. (3 points) Draw a memory diagram for the following definition.
   \[
   \text{int}[\ ] \text{array} = \text{new int}[2];
   \]

11. (3 points) Draw a memory diagram for the following definition.
   \[
   \text{int}[\ ] \text{array} = \{ 1, 2 \};
   \]

12. (3 points) Draw a memory diagram for the following definition.
   \[
   \text{String}[\ ] \text{array} = \text{new String}[2];
   \]

13. (3 points) Draw a memory diagram for the following definition.
   \[
   \text{String}[\ ] \text{array} = \{ "A", "B" \};
   \]

14. (5 points) Why do our examples in lecture define \textit{Scanner} variable \texttt{stdin} in the following way
   \[
   \text{Scanner stdin} = \text{new Scanner(System.in)};
   \]
   rather than this way
   \[
   \text{Scanner stdin} = \text{Scanner.create(System.in)};
   \]
For questions 15–18 suppose class `Coordinate` has the following definition.

```
public class Coordinate {
    int x;
    int y;

    public Coordinate(int a, int b) {
        this.x = a;
        this.y = b;
    }
}
```

15. (5 points) Explain in TWENTY words or less why a `Coordinate` object has a `toString()` method.

16. (10 points) Define a public `clone()` member method with return type `Object` that returns a new `Coordinate` whose `x` and `y` values are the same as the `x` and `y` values of the `this` object.

17. (10 points) Define a `boolean` public method `equals()` that has a single `Object` parameter named `v`. The method should return false if `v` is not an `instance of Coordinate`. If `v` is a `Coordinate` then the method returns true if its `x` and `y` values match the `x` and `y` values of the `this` object; otherwise, the method returns false. Hint: if `v` is an instance of `Coordinate` then define a `Coordinate` variable `c` that equals a `Coordinate`-casted version of `v`. 
18. (5 points) Write a single statement that when added to the `Coordinate` definition gives it a public class (static) constant named `ORIGIN` of type `Coordinate`. Constant `ORIGIN` should have both its `x` and `y` values being 0.

19. (10 points) Write a public static method `maximum()` with a return type of `int` that takes a single `int` array parameter named `data`. Method `maximum()` is to return the value of the largest element in `data`. You may assume that `data` has at least one element.

20. (5 points) Suppose class `ArrayManip` has an `int` array instance variable named `data`. Write a public member method `minimum()` with a return type of `int` for `ArrayManip`. Method `minimum()` is to return the value of the smallest element in the `data` array of the `this` object. You may assume that `data` has at least one element.

PLEDGE: