1. Consider the two files below. Counter.java allows you to keep a count of anything you wish. UseCounter.java is a simulation of 100 cards which either have a heart or a diamond on them.

(1) (40 pts) Complete the code in UseCounter.java for the blanks labeled A-D so that it correctly uses the Counter objects to complete this simulation.

(a) A) _______ heartCount.increment()______________
(b) B) _______ diamondCount.increment()______________
(c) C) _______ heartCount.getValue()______________
(d) D) _______ diamondCount.getValue()______________

(2) (30 pts) Write a constructor for the Counter.java class which takes a single integer parameter and allows the user to start counting at the value of that integer.

```java
public class Counter {
    // Store the Current
    // value of the counter.
    private int value = 0;
    
    public void increment() {
        this.value++;
    }
    
    public int getValue() {
        return this.value;
    }
}
```

(3) (30 pts) After you add the constructor you wrote in Question 2 to the Counter.java file, the
UseCounter.java file will no longer compile. You will get the following error:

```java
UseCounter.java:4: cannot find symbol
  symbol : constructor Counter()
location: class Counter
  Counter headCount = new Counter();
```

Explain why you now get this error now (after adding the constructor from Question 2) but it previously compiled correctly.

Java supplies a default constructor with no parameters if no other constructors are specified (as in the original code in Question 1). However, once you add a constructor (ANY constructor!), Java no longer supplies the default constructor and the programmer will have to add it if they want to use it.

2. Show the printout of the following code
   (a) (20 pts)

```java
public class Test {
    public static void main(String[] args) {
        T t = new T();
        swap(t);
        System.out.println("e1 = " + t.e1 + " e2 = " + t.e2);
    }

    public static void swap(T t) {
        int temp = t.e1;
        t.e1 = t.e2;
        t.e2 = temp;
    }
}
class T {
    int e1 = 1;
    int e2 = 2;
}
```

```
e1 = 2 e2 = 1
```

(b) (20 pts)

```java
public class Test {
    public static void main(String[] args) {
        T t1 = new T();
        T t2 = new T();
        System.out.println("t1's i = " + t1.i + " and j = " + t1.j);
        System.out.println("t2's i = " + t2.i + " and j = " + t2.j);
    }
}
class T {
    static int i = 0;
    int j = 0;

    T() {
        i++;
        j = 1;
    }
}
```

```
t1's i = 2 and j = 1
t2's i = 2 and j = 1
```