CMSC 113: Computer Science I
Exam #2 Review

1. Write a program that finds the least number with exactly 20 divisors. For the purposes of this problem, 1 counts as a divisor, but the number itself does not. For example, 10 has 3 divisors: 1, 2, and 5. The number 12 has 5 divisors: 1, 2, 3, 4, and 6. When the program is done running, it should print out the number it finds.

2. Write a program that asks the user for a string and prints it out in reverse, character by character.

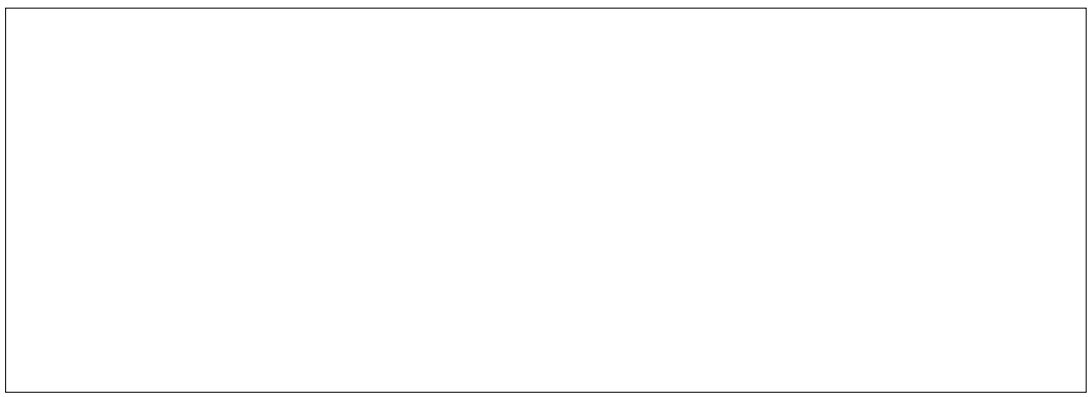
3. Write out what the following programs print.

a.
```
public static void main(String[] args)
{
   int i;
   for(i = 2; i < 15; i += i - 1)
   {
         System.out.println(i);
   }
   System.out.println(i);
}
```

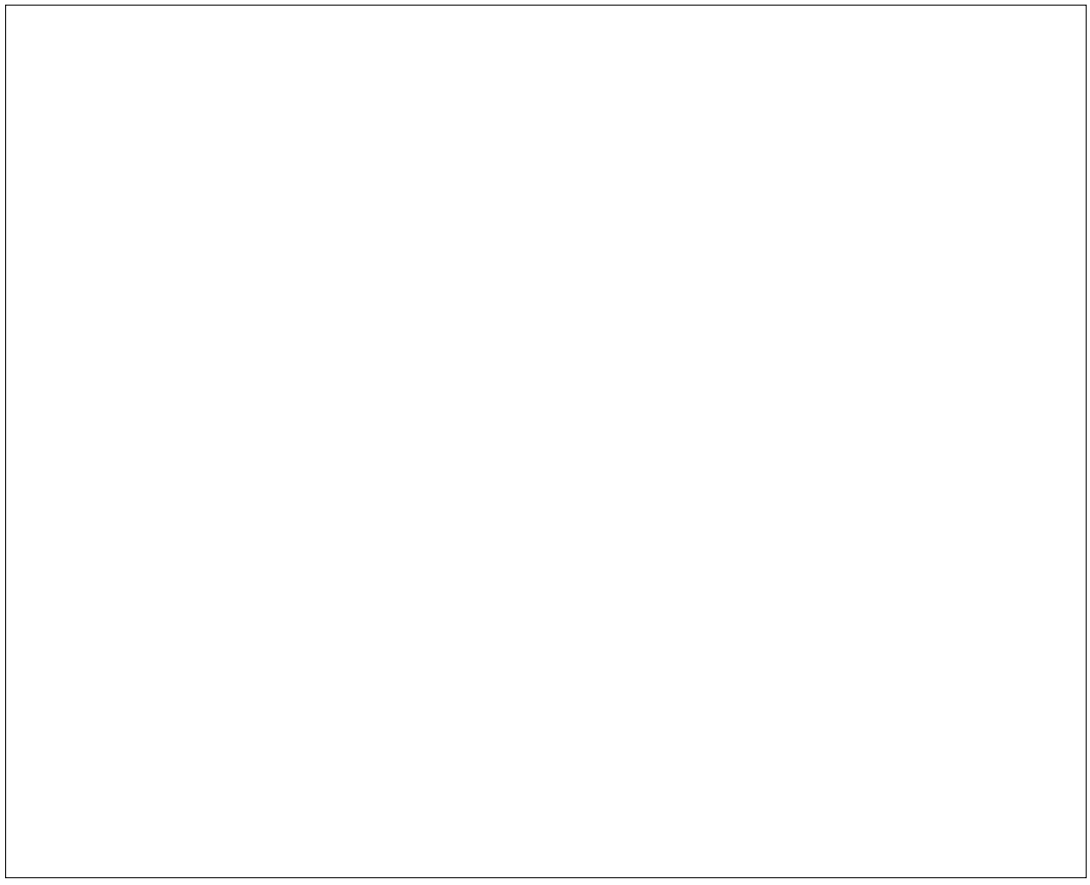
b.
```
public static void main(String[] args)
{
   int j = 0;
   for(int i = 10; j < i; i--)
   {
         j++;
         System.out.println(2 * i + j);
   }
}
```

c.
```
public static void main(String[] args)
{
   for(int num = 384950; num > 0; num /= 10)
   {
        System.out.println(num % 10);
   }
}
```

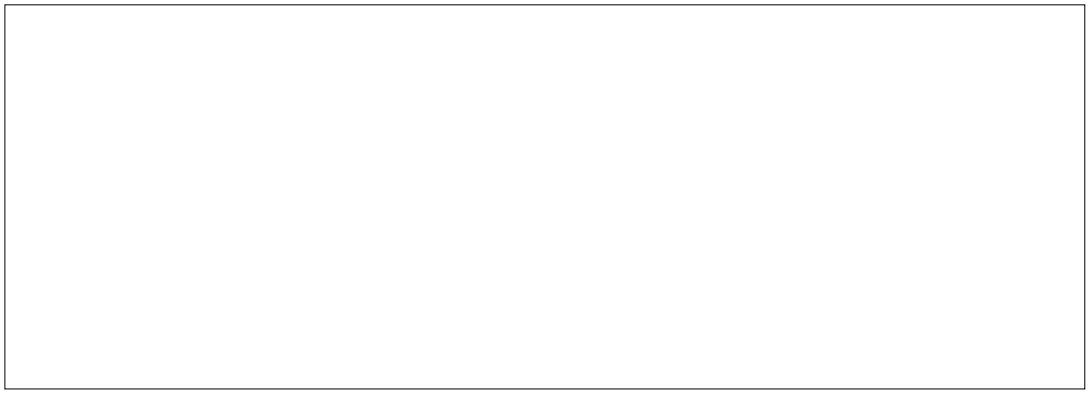
d.
```
public static void main(String[] args)
{
   int a = 14;
   int b = 1;

   while(b < 10)
   {
        System.out.println(a + ", " + b);

        int c = a % 7;
        b += c;
        a -= b;

        System.out.println(c);
   }

   System.out.println(a + ", " + b);
}
```



e.
```
public static void main(String[] args)
{
   int[] nums = new int[4];
   nums[0] = 13;
   nums[1] = 12;
   nums[2] = 15;
   nums[3] = 7;

   for(int i = 0; i < nums.length; i++)
   {
        int a = 0;
        while(nums[i] > 0)
        {
             if(nums[i] % 2 <= 0)
             {
                  a++;
             }

             nums[i] /= 3;
             System.out.println(i + ": " + nums[i]);
        }

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



f.
```
public static void main(String[] args)
{
   String str = "existential";

   System.out.println(str.length());

   for(int i = 0, j = str.length(); i <= j; i++, j--)
   {
        System.out.println(str.substring(i, j) + ".");
   }
}
```



g.
```
public class MutableInteger
{
   private int value;

   public MutableInteger(int startingVal)
   {
         value = startingVal;
   }

   public int getValue()
   {
         return value;
   }

   public void setValue(int newValue)
   {
         value = newValue;
   }

   @Override
   public String toString()
   {
         return "" + value;
   }
}

public class Main
{
   public static void main(String[] args)
   {
         MutableInteger a = new MutableInteger(5);
         MutableInteger b = a;
         MutableInteger c = new MutableInteger(5);

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

         a.setValue(6);

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

         b.setValue(7);

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

         c.setValue(8);

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