3주차 실습 보고서

강의명	객체지향프로그래밍및실습
담당교수	류기열
학과 학년	소프트웨어학과 2학년
학번	202220209
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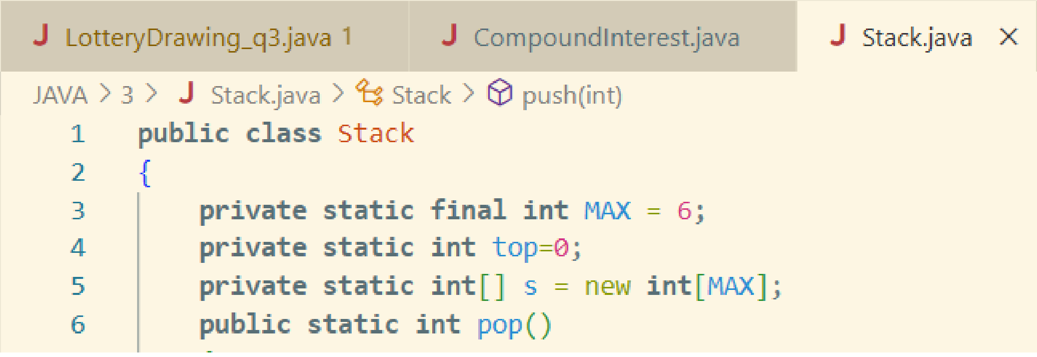
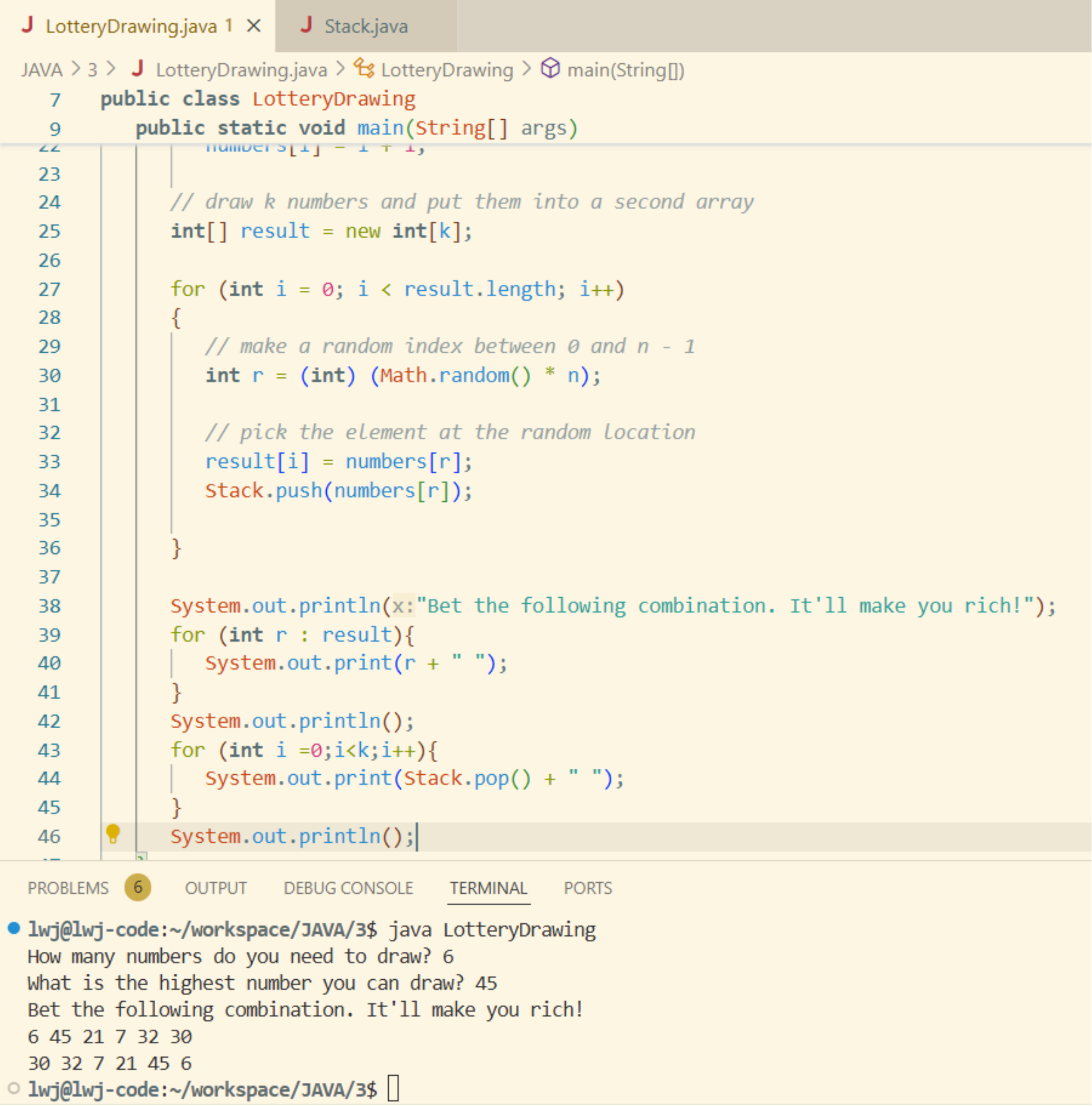
2025. 9.18.

□ 1

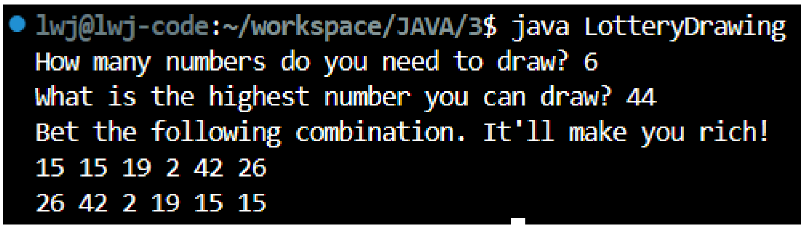


```java
public class Stack
{
    private static final int MAX = 6;
    private static int top=0;
    private static int[] s = new int[MAX];
    public static int pop()
```

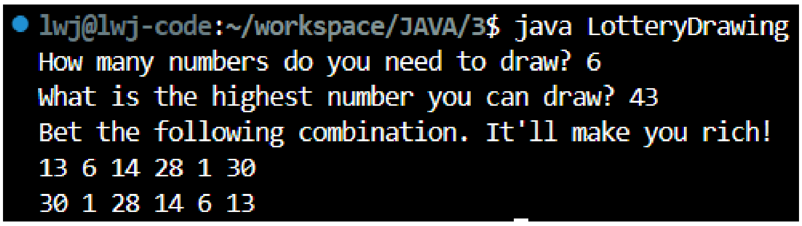


```java
public class LotteryDrawing
    public static void main(String[] args)
            numbers[i] = i + 1;

        // draw k numbers and put them into a second array
        int[] result = new int[k];

        for (int i = 0; i < result.length; i++)
        {
            // make a random index between 0 and n - 1
            int r = (int) (Math.random() * n);

            // pick the element at the random location
            result[i] = numbers[r];
            Stack.push(numbers[r]);

        }

        System.out.println(x:"Bet the following combination. It'll make you rich!");
        for (int r : result){
            System.out.print(r + " ");
        }
        System.out.println();
        for (int i =0;i<k;i++){
            System.out.print(Stack.pop() + " ");
        }
        System.out.println();
```

```
● lwj@lwj-code:~/workspace/JAVA/3$ java LotteryDrawing
  How many numbers do you need to draw? 6
  What is the highest number you can draw? 45
  Bet the following combination. It'll make you rich!
  6 45 21 7 32 30
  30 32 7 21 45 6
○ lwj@lwj-code:~/workspace/JAVA/3$ 
```

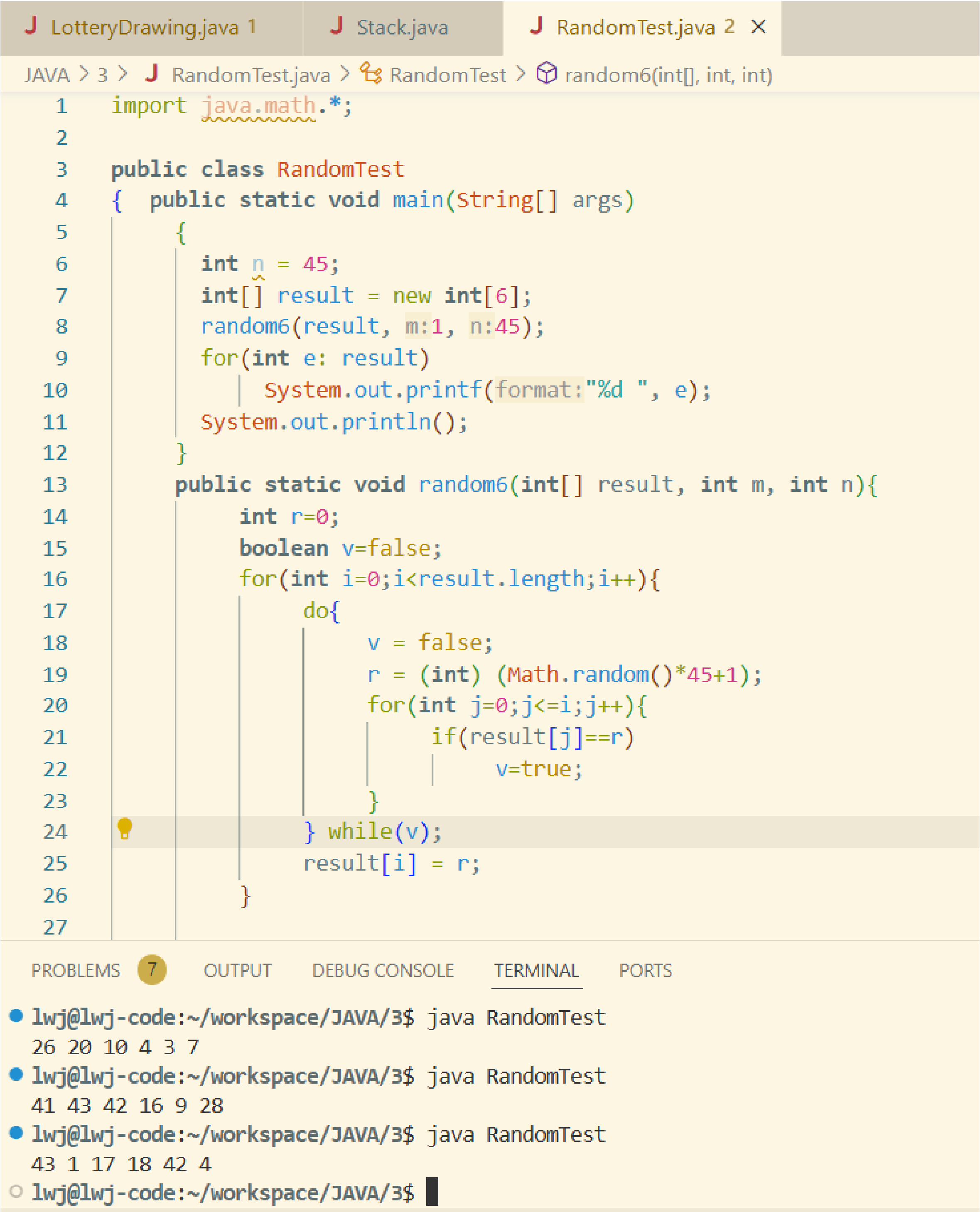


```
lwj@lwj-code:~/workspace/JAVA/3$ java LotteryDrawing
How many numbers do you need to draw? 6
What is the highest number you can draw? 44
Bet the following combination. It'll make you rich!
15 15 19 2 42 26
26 42 2 19 15 15
```



```
lwj@lwj-code:~/workspace/JAVA/3$ java LotteryDrawing
How many numbers do you need to draw? 6
What is the highest number you can draw? 43
Bet the following combination. It'll make you rich!
13 6 14 28 1 30
30 1 28 14 6 13
```

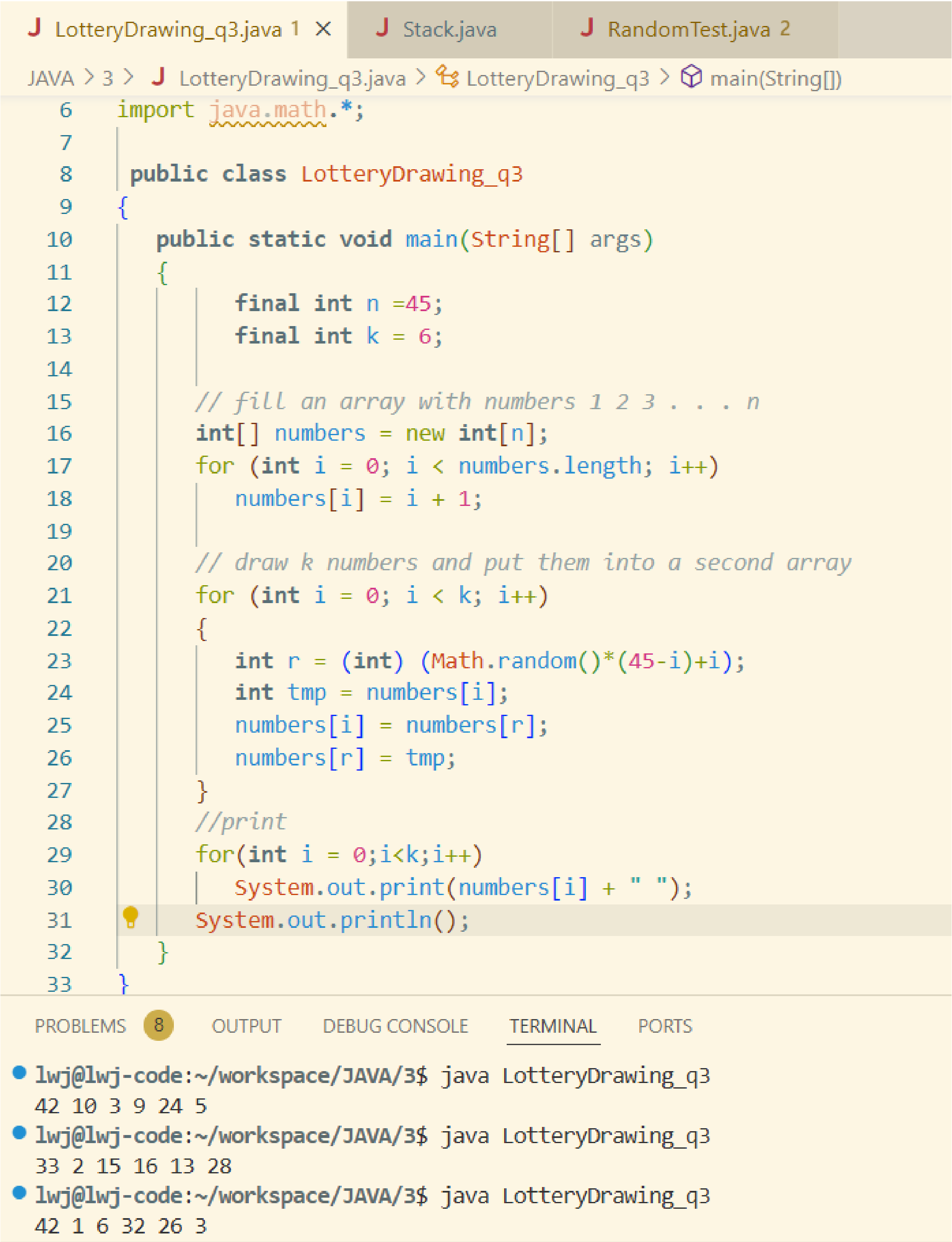
□ 2



```java
import java.math.*;

public class RandomTest
{   public static void main(String[] args)
     {
       int n = 45;
       int[] result = new int[6];
       random6(result, m:1, n:45);
       for(int e: result)
            System.out.printf(format:"%d ", e);
       System.out.println();
     }
     public static void random6(int[] result, int m, int n){
          int r=0;
          boolean v=false;
          for(int i=0;i<result.length;i++){
               do{
                    v = false;
                    r = (int) (Math.random()*45+1);
                    for(int j=0;j<=i;j++){
                         if(result[j]==r)
                              v=true;
                    }
               } while(v);
               result[i] = r;
          }

```

```
lwj@lwj-code:~/workspace/JAVA/3$ java RandomTest
26 20 10 4 3 7
lwj@lwj-code:~/workspace/JAVA/3$ java RandomTest
41 43 42 16 9 28
lwj@lwj-code:~/workspace/JAVA/3$ java RandomTest
43 1 17 18 42 4
lwj@lwj-code:~/workspace/JAVA/3$
```

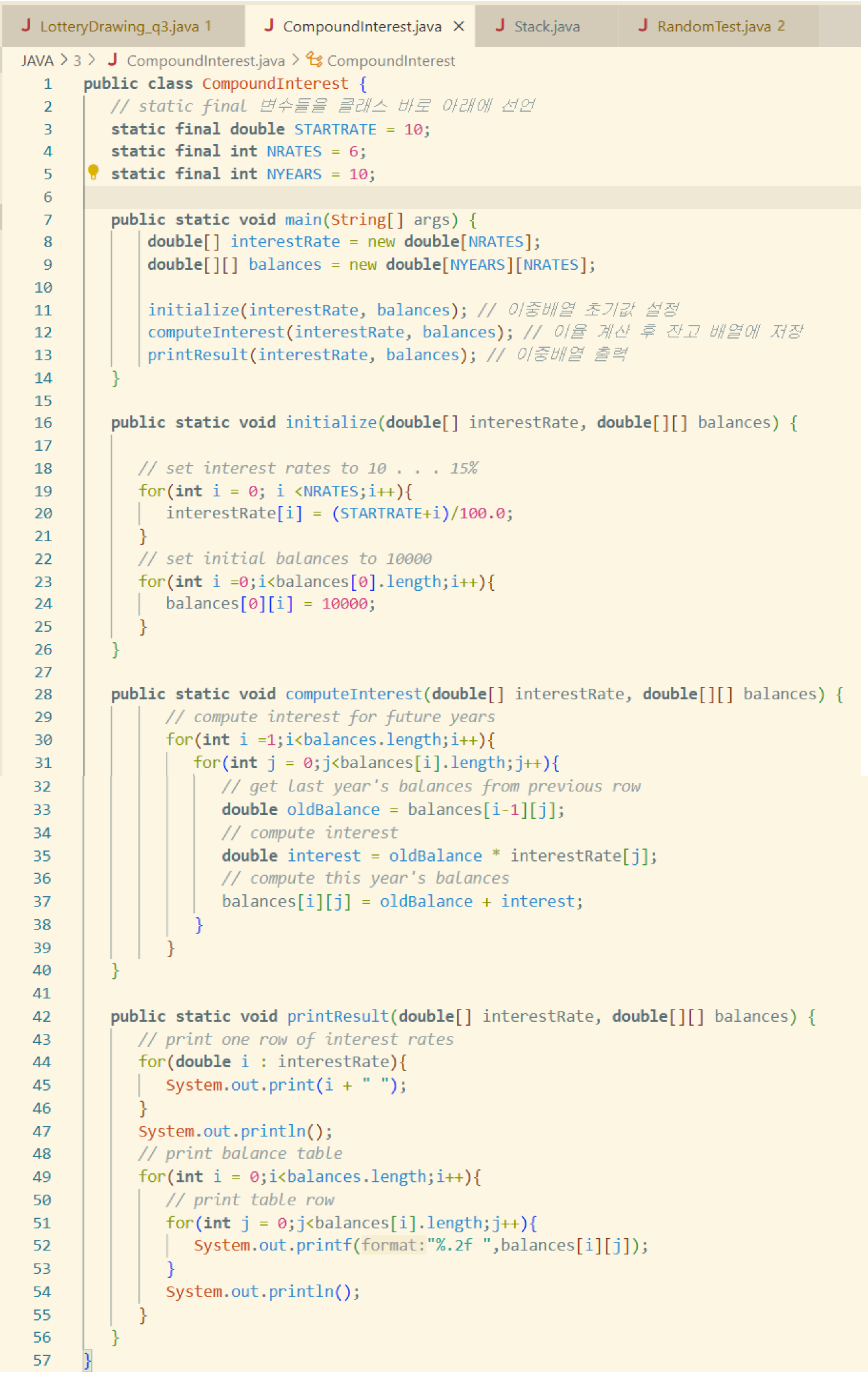
□ 3



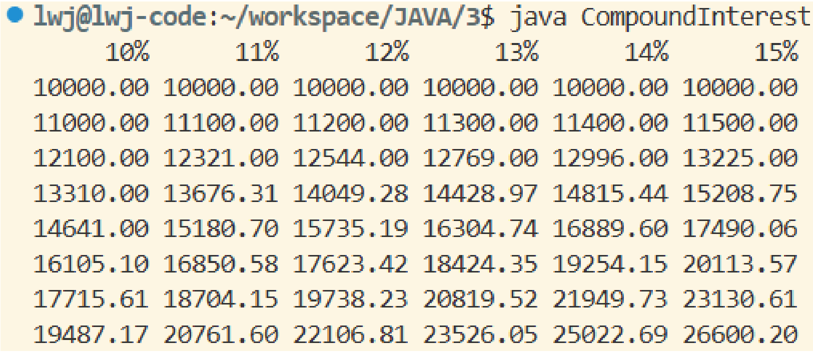
```java
import java.math.*;

 public class LotteryDrawing_q3
{
   public static void main(String[] args)
   {
         final int n =45;
         final int k = 6;

      // fill an array with numbers 1 2 3 . . . n
      int[] numbers = new int[n];
      for (int i = 0; i < numbers.length; i++)
         numbers[i] = i + 1;

      // draw k numbers and put them into a second array
      for (int i = 0; i < k; i++)
      {
         int r = (int) (Math.random()*(45-i)+i);
         int tmp = numbers[i];
         numbers[i] = numbers[r];
         numbers[r] = tmp;
      }
      //print
      for(int i = 0;i<k;i++)
         System.out.print(numbers[i] + " ");
      System.out.println();
   }
}
```

```
lwj@lwj-code:~/workspace/JAVA/3$ java LotteryDrawing_q3
42 10 3 9 24 5
lwj@lwj-code:~/workspace/JAVA/3$ java LotteryDrawing_q3
33 2 15 16 13 28
lwj@lwj-code:~/workspace/JAVA/3$ java LotteryDrawing_q3
42 1 6 32 26 3
```

□ 4


J LotteryDrawing_q3.java 1
J CompoundInterest.java ×
J Stack.java
J RandomTest.java 2
JAVA > 3 > J CompoundInterest.java > CompoundInterest

```java
public class CompoundInterest {
   // static final 변수들을 클래스 바로 아래에 선언
   static final double STARTRATE = 10;
   static final int NRATES = 6;
   static final int NYEARS = 10;

   public static void main(String[] args) {
       double[] interestRate = new double[NRATES];
       double[][] balances = new double[NYEARS][NRATES];

       initialize(interestRate, balances); // 이중배열 초기값 설정
       computeInterest(interestRate, balances); // 이율 계산 후 잔고 배열에 저장
       printResult(interestRate, balances); // 이중배열 출력
   }

   public static void initialize(double[] interestRate, double[][] balances) {

      // set interest rates to 10 . . . 15%
      for(int i = 0; i <NRATES;i++){
         interestRate[i] = (STARTRATE+i)/100.0;
      }
      // set initial balances to 10000
      for(int i =0;i<balances[0].length;i++){
         balances[0][i] = 10000;
      }
   }

   public static void computeInterest(double[] interestRate, double[][] balances) {
         // compute interest for future years
         for(int i =1;i<balances.length;i++){
            for(int j = 0;j<balances[i].length;j++){
               // get last year's balances from previous row
               double oldBalance = balances[i-1][j];
               // compute interest
               double interest = oldBalance * interestRate[j];
               // compute this year's balances
               balances[i][j] = oldBalance + interest;
            }
         }
   }

   public static void printResult(double[] interestRate, double[][] balances) {
      // print one row of interest rates
      for(double i : interestRate){
         System.out.print(i + " ");
      }
      System.out.println();
      // print balance table
      for(int i = 0;i<balances.length;i++){
         // print table row
         for(int j = 0;j<balances[i].length;j++){
            System.out.printf(format:"%.2f ",balances[i][j]);
         }
         System.out.println();
      }
   }
}
```



```
● lwj@lwj-code:~/workspace/JAVA/3$ java CompoundInterest
       10%      11%      12%      13%      14%      15%
  10000.00 10000.00 10000.00 10000.00 10000.00 10000.00
  11000.00 11100.00 11200.00 11300.00 11400.00 11500.00
  12100.00 12321.00 12544.00 12769.00 12996.00 13225.00
  13310.00 13676.31 14049.28 14428.97 14815.44 15208.75
  14641.00 15180.70 15735.19 16304.74 16889.60 17490.06
  16105.10 16850.58 17623.42 18424.35 19254.15 20113.57
  17715.61 18704.15 19738.23 20819.52 21949.73 23130.61
  19487.17 20761.60 22106.81 23526.05 25022.69 26600.20
```

□ 코드 전문

LotteryDrawing.java

```java
import java.util.Scanner;
/**
 * This program demonstrates array manipulation.
 * @version 1.20 2004-02-10
 * @author Cay Horstmann
 */
public class LotteryDrawing
{
   public static void main(String[] args)
   {
      Scanner in = new Scanner(System.in);

      System.out.print("How many numbers do you need to draw? ");
      int k = in.nextInt();

      System.out.print("What is the highest number you can draw? ");
      int n = in.nextInt();

      // fill an array with numbers 1 2 3 . . . n
      int[] numbers = new int[n];
      for (int i = 0; i < numbers.length; i++)
         numbers[i] = i + 1;

      // draw k numbers and put them into a second array
      int[] result = new int[k];

      for (int i = 0; i < result.length; i++){
         // make a random index between 0 and n - 1
         int r = (int) (Math.random() * n);

         // pick the element at the random location
         result[i] = numbers[r];
         Stack.push(numbers[r]);
      }

      System.out.println("Bet the following combination. It'll make you rich!");
      for (int r : result){
         System.out.print(r + " ");
      }
      System.out.println();
      for (int i =0;i<k;i++){
         System.out.print(Stack.pop() + " ");
      }
      System.out.println();
   }
}
```

Stack.java

```
public class Stack
{
    private static final int MAX = 6;
    private static int top=0;
    private static int[] s = new int[MAX];
    public static int pop()
    {
        if (top == 0)  {
             System.out.println("Empty!");
             System.exit(-1);
        } else      top--;
        return s[top];
    }
    public static void push(int x)
    {
      if(top==MAX) {
          System.out.println("Full!");
          System.exit(-1);
      } else  {
          s[top] = x;
          top++;
      }
      return;
    }
}
```

RandomTest.java

```
import java.math.*;

public class RandomTest
{  public static void main(String[] args)
     {
      int n = 45;
      int[] result = new int[6];
      random6(result, 1, 45);
      for(int e: result)
          System.out.printf("%d ", e);
      System.out.println();
     }
     public static void random6(int[] result, int m, int n){
         int r=0;
         boolean v=false;
         for(int i=0;i<result.length;i++){
              do{
                  v = false;
                  r = (int) (Math.random()*45+1);
                  for(int j=0;j<=i;j++){
                       if(result[j]==r)
                           v=true;
                  }
              } while(v);
              result[i] = r;
         }

      }
}
```

LotteryDrawing_q3.java

```
/**
 * This program demonstrates array manipulation.
 * @version 1.20 2004-02-10
 * @author Cay Horstmann
 */
import java.math.*;

 public class LotteryDrawing_q3
{
   public static void main(String[] args)
   {
        final int n =45;
        final int k = 6;

      // fill an array with numbers 1 2 3 . . . n
      int[] numbers = new int[n];
      for (int i = 0; i < numbers.length; i++)
        numbers[i] = i + 1;

      // draw k numbers and put them into a second array
      for (int i = 0; i < k; i++)
      {
            int r = (int) (Math.random()*(45-i)+i);
            int tmp = numbers[i];
            numbers[i] = numbers[r];
            numbers[r] = tmp;
        }
        //print
        for(int i = 0;i<k;i++)
            System.out.print(numbers[i] + " ");
        System.out.println();
    }
}
```

CompoundInterest.java

```
public class CompoundInterest {
    // static final 변수들을 클래스 바로 아래에 선언
    static final double STARTRATE = 10;
    static final int NRATES = 6;
    static final int NYEARS = 10;

    public static void main(String[] args) {
         double[] interestRate = new double[NRATES];
         double[][] balances = new double[NYEARS][NRATES];

         initialize(interestRate, balances); // 이중배열 초기값 설정
         computeInterest(interestRate, balances); // 이율 계산 후 잔고 배열에 저장
         printResult(interestRate, balances); // 이중배열 출력
    }

    public static void initialize(double[] interestRate, double[][] balances) {

        // set interest rates to 10 . . . 15%
        for(int i = 0; i <NRATES;i++){
            interestRate[i] = (STARTRATE+i)/100.0;
        }
        // set initial balances to 10000
        for(int i =0;i<balances[0].length;i++){
            balances[0][i] = 10000;
        }
    }

    public static void computeInterest(double[] interestRate, double[][]
balances) {
            // compute interest for future years
            for(int i =1;i<balances.length;i++){
                for(int j = 0;j<balances[i].length;j++){
```

```
               // get last year's balances from previous row
               double oldBalance = balances[i-1][j];
               // compute interest
               double interest = oldBalance * interestRate[j];
               // compute this year's balances
               balances[i][j] = oldBalance + interest;
            }
         }
   }

   public static void printResult(double[] interestRate, double[][] balances)
{
      // print one row of interest rates
      for(double i : interestRate){
         System.out.print("     " + (int)(i*100) + "% ");
      }
      System.out.println();
      // print balance table
      for(int i = 0;i<balances.length;i++){
         // print table row
         for(int j = 0;j<balances[i].length;j++){
            System.out.printf("%.2f ",balances[i][j]);
         }
         System.out.println();
      }
   }
}
```