Craps.java

```
import java.util.Random;
import apcslib.*;
import chn.util.*;
/**
 * Simulates the game of craps.  A modified version of Owen Astrachan's
 * program, A Computer Science Tapestry, 1997, McGraw-Hill, p. 225-231.
 * Revised on 4/10/97, Cary Matsuoka.
 *
 * @author     G. Peck
 * @created    Jun 6, 2002 (converted to Java)
 */
public class Craps
{
  private Random myDie;
  private int myGamesWon, myGamesToPlay;
  private double myPercentWon;

  /**
   *  Constructor for the Craps object
   */
  public Craps()
  {
    myDie = new Random();
  }

  /**
   *  Plays craps the specified number of times and evaluates
   *  the number of games won and winning percentage
   *
   * @param  gamesToPlay  Number of trials (games)
   */
  public void playGame(int gamesToPlay)
  {
    myGamesToPlay = gamesToPlay;
    myGamesWon = 0;
    for (int game = 0; game < myGamesToPlay; game++)
    {
      if (winGame())
      {
        myGamesWon++;
      }
    }
    myPercentWon = (double) myGamesWon / myGamesToPlay * 100;
  }

  /**
   *  Description of the Method
   *
   * @return    Total number of games won
   */
  public int gamesWon()
  {
    return myGamesWon;
  }

  /**
   *  Description of the Method
   *
   * @return    Winning percentage
   */
  public double percentWon()
  {
    return myPercentWon;
  }
```

```
  /**
   *  Gets the point attribute of the Craps object
   *
   * @param  point  Value to match, 2 <= point <= 12
   * @return        true if point is matched, false if 7 is rolled first
   */
  private boolean getPoint(int point)
  {//  precondition:  2 <= point <= 12
    int sum;
    do
    {
      sum = rollDice();
    } while ((sum != point) && (sum != 7));  // <--- application of DeMorgan's Laws
    return (sum == point);
  }

  /**
   *  Determines if a single game of craps is won or lost
   *
   * @return    true if a single game of craps is won, otherwise false
   */
  private boolean winGame()
  {
    int point = rollDice();

    switch (point)
    {
        case 7:
        case 11:
          // System.out.println("7 or 11 rolled, win");
          return true;
        case 2:
        case 3:
        case 12:
          // System.out.println("2, 3,or 12 rolled, lost");
          return false;
        default:
          return getPoint(point);
    }
  }

  /**
   *  Simulates the rolling of two dice
   *
   * @return    sum of rolling two dice
   */
  private int rollDice()
  {
     //Using Random
    int first = myDie.nextInt(6) + 1;
    int second = myDie.nextInt(6) + 1;

     /*Using Math.random()
     int first = (int)(Math.random() * 6) + 1;
     int second = (int)(Math.random() * 6) + 1;
     */

    int sum = first + second;
    return sum;
  }



//main() on next page
```

```
  public static void main(String[] args)
  {
    ConsoleIO console = new ConsoleIO();
    Craps shootCraps = new Craps();

    System.out.print("Enter number of games to play ---> ");
    int gamesToPlay = console.readInt();
    shootCraps.playGame(gamesToPlay);

    System.out.println("Games won = " + shootCraps.gamesWon());
    System.out.println("% of games won = " +
                       Format.left(shootCraps.percentWon(), 5, 2) + "%");
  }
}
```