February 20, 2017

Purpose: To create a program simulating the fields of a craps game outputting the total gain and lost, also the average gain and lost per roll.

Sample:

```
Total gain: 501540
Total lost: 554020
Average gain: 5
Average lost: 5
```

```
Total gain: 499020
Total lost: 556840
Average gain: 4
Average lost: 5
```

```
Total gain: 501950
Total lost: 552960
Average gain: 5
Average lost: 5
```

```
Total gain: 497630
Total lost: 556830
Average gain: 4
Average lost: 5
```

```
Total gain: 498140
Total lost: 557110
Average gain: 4
Average lost: 5
```

```
Total gain: 500710
Total lost: 554560
Average gain: 5
Average lost: 5
```

```
First Dice:1
Second Dice:1
Total: 2
Amount of Money= 30
First Dice:4
Second Dice:3
Total: 7
Amount of Money= 20
Total gain: 20
Total lost: 10
Average gain: 10
Average lost: 5
```

```
First Dice:5
Second Dice:3
Total: 8
Amount of Money= 0
First Dice:1
Second Dice:4
Total: 5
Amount of Money= -10
Total gain: 0
Total lost: 20
Average gain: 0
Average lost: 10
```

```
First Dice:4
Second Dice:6
Total: 10
Amount of Money= 20
First Dice:6
Second Dice:2
Total: 8
Amount of Money= 0
Total gain: 10
Total lost: 10
Average gain: 5
Average lost: 5
```

Reflection/Analysis:

This program took about an hour. I worked with small variable (N=2, not N=1,000,000) to double check my work and hand calculated the averages. As I was playing around with the inputs, I've noticed that the more betting will make the average gain and lost similar. As in that you will be losing and gaining around the same amount of time. This makes sense because the outcome of potentially gaining the most money with landing a 2 or a 12 is 1/36 (3%), and gaining just 10 dollars (landing 3,4,9,10,11) is 2/36, 3/36, and 4/36 (6-11%). The other number's probability (landing 5,6,7,8) to losing money is 4/36, 5/36, 6/36 (11-17%). There is a slighter higher probability of losing money than gaining some money here and there making the average gain and lost about the same.

```
package Craps_Table;
public class Table {
	public static void main(String[] args) {
		MultiDie dice= new MultiDie(6);
		int Money = 10 ; //initial amount bet
		final int N=1000000; // number of times played
		int gainCount20=0, gainCount10=0,lostCount10=0; // to count gain and lost
			for( int i=1; i<= N; i++)
			{
				dice.roll();
				int one= dice.getFaceValue();
				//System.out.println("First Dice:" + one);
				 dice.roll();
				 int two= dice.getFaceValue();
			//System.out.println("Second Dice:" + two);
				int x = one + two;
				//System.out.println("Total: " + x);
					if(x==2 || x==12)
					{
						int win20Money= Money + 20;
						Money= win20Money;
						gainCount20++;
					//System.out.println("Amount of Money= " + win20Money);
					}
					else
					{
							if(x==3|| x==4 || x==9 || x==10 || x==11)
							{
								int win10Money= Money+ 10;
								gainCount10++;
					//System.out.println("Amount of Money= " + win10Money);
							}
							else
							{
								int lose10Money= Money- 10;
								lostCount10++;
								Money=lose10Money;
					//System.out.println("Amount of Money= " + lose10Money);

							}
					}
			}

			int a= gainCount20*20;int b= gainCount10*10;int c= lostCount10*10;
			int average_gain= (a+b)/N;
			int average_lost= (c/N);
			System.out.printf("Total gain: %d\n", a+b);
			System.out.printf("Total lost: %d\n", c);
			System.out.printf("Average gain: %d\n", average_gain);
			System.out.printf("Average lost: %d\n",average_lost);
	}
}
```