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Fundamentals of Programing I – CSIT 111_04
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Project: Histogram Application (Lab Report)

1. When we declared the counts array why did we need to add one to MAX_ROLL for the size of the array? What happens if you remove the + 1 from the declaration of the counts array size and run the program?

Answer: When array is defined, its first index is 0, and its last index is equals to the array number of elements minus one. For example, for the array defined by *int counts = new int[MAX_ROLLS]* its last element is counts[MAX_ROLLS - 1]. Since we're using counts[MAX_ROLLS] to assign how many times the sum of both dices was equals to MAX_ROLLS, we need to add one to MAX_ROLLS when defining the size of the array. If we remove the + 1 from the declaration and invoked the element counts[MAX_ROLLS], the program would give us an error since that element is not defined within the array due to the last element being counts[MAX_ROLLS – 1].

2. Each time you run the program with a large number of dice rolls (e.g. >=1000), you get a distinctive distribution and the distribution shows very similar values from one run to the next. What happens when you run the program several different times with a small number of dice rolls (e.g. <= 100 or <= 10)? Can you explain what is happening?

Answer: If we only run the program with small number of dice rolls, the data would not have enough samples of rolls to result in a more precise output. Some of count values might not even happen once resulting in a histogram with some values equals to 0. There are just not enough data samples to produce a nice distribution.
Just like in scientific research, to study how a seemly random phenomenon behaves, we need larger samples (in this case, samples are each dice roll). The more samples we have, the easier it is to understand and visualize which rolls happen more frequently.

3. Why do we not want to use any names based on the game of Craps in the Histogram class code?

Answer: The Histogram class is completely independent from the game of Craps. It can be used for any other set of data that is passed through its parameters. That is why we do not use any names based on the game of Craps.

4. In the Histogram constructor, we made a scaled copy of each element of the data supplied in the original parameter array. Why did we do that and what would be the consequences if we did not?

Answer: The reason why making a scaled copy is import is because for a large set of data (e.g. >= 10000) some of the counts values would be over 1000, and if we printed over 1000 asterisks in the histogram, it would be hard to visualize what was happening with the data since that would require a lot of room in the screen. With a scaled copy it is much easier to understand how the data is behaving and it allows us to use as many samples as we would like.