Name: _____ Computer Science Principles

Lists & Loops Challenges

Challenge 1 – Dice Rolling Simulation

Question: How does the number of dice you roll affect the distribution of scores obtained?

Requirements:

1. Create a computer simulation of rolling any number of dice with any number of sides. Store the number of times each score occurs in a list and print the list.
2. Display a histogram showing the number of times each score is rolled.
3. Allow the user to run the simulation repeatedly without restarting the program.

Input: (may be global variables or user input)

dice – the number of dice to roll
sides – the number of sides on each die
rolls – the number of times the dice are rolled

Output – The histogram of scores. May written be to the console or to the screen for JavaScript.
Sample output:

```
Roll em? Y or N:Y
[0, 0, 312, 531, 845, 1089, 1395, 1653, 1351, 1152, 816, 561, 295]
1
2 ***
3 *****
4 ********
5 **********
6 ************
7 **************
8 ************
9 **********
10 ********
11 *****
12 **
```

Questions:

1. Describe the differences in the score distributions (mean, min, max, shape) between rolling one 12-sided die and rolling two 6-sided dice.

2. Describe the differences in the score distributions (mean, min, max, shape) between rolling two 6-sided dice and rolling 3 4-sided dice.

Challenge 2 – Sort a list of integers

Problem – Sort a list of random integers from least to greatest.

Requirements:

1. Generate a list of 20 random integers between -30 and 30. Print the list.
2. Write a sort_list() function that returns a new list sorted from minimum to maximum. You must write your own code for sorting instead of calling a sort function from a library. However you are welcome to research sort algorithms before writing your code.

   list2 = sort_list(list1)

3. Sort the random integer list and print the sorted list.