High School Coding
On-site Problem

Problem 1 - Sorting Numbers

Write a program that reads a length of 'n' followed by a sequence of integers and prints the given sequence sorted in ascending order. You may assume that 1<=n<=10.

Example:

Enter the length of the sequence: 6
25
-2
15
7
8
0
Ordered Sequence: -2 0 7 8 15 25

Each test case is considered to properly execute if the following are correct:
1. Console prompts user for sequence length with text "Enter the length of the sequence"
2. Console allows for sequence input.
3. Sequence is properly ordered and printed on the screen following the text: "Ordered Sequence:"

Problem 2 - Pythagorean Triples

A Pythagorean Triple is a sequence of three (3) integers: a, b and c – satisfying the following properties:
1. $0<a<b<c$
2. $a^2+b^2=c^2$

Write a program that takes three (3) integers as input and reports whether they form a Pythagorean Triple:

Example 1: A Pythagorean Triple

Enter a: 3
Enter b: 4
Enter c: 5

Example 2: Not a Pythagorean Triple

Enter a: 4
Enter b: 3
Enter c: 5

Each test case is considered to properly execute if the following are correct:
1. Console prompts user for each integer with the following text and successfully accepts the input
   "Enter a:"
   "Enter b:"
   "Enter c:"
2. The correct result, either "A Pythagorean Triple" or "Not a Pythagorean Triple" is printed to the console.

Problem 3 – Combinations

Write a program that determines how many different pairs of socks Sherry can choose from a drawer full of n socks. The program should accept a number 'n' as input and you may assume that 2<=n<=100.

(Hint: C(n,k) = n! / (n-k)!k!)

Example 1:

Enter the number of socks: 7
Number of different pairs: 21

Each test case is considered to properly execute if the following are correct:
1. Console prompts for the input.
2. The correct number of pairs of socks is printed on the console.

Problem 4 – Change in My Pocket

A given string of length 'n' represents the assortment of coins in your pocket. Write a program that takes the string input and returns the value of the change as a dollar amount. You may assume 1<=n<=20.

The only characters in the input string will be some combination of P, N, D and Q. You may assume the following:
P represents a penny
N represents a nickel
D represents a dime
Q represents a nickel

Example 1:

Input the string: PPNQ
The value of the change is: $0.32

Example 2:

Input the string: QNQPPQQ
The value of the change is: $1.07

Correct test case execution consists of the following:
1. Console prompts user for input string.
2. Program correctly returns the amount of change represented on the console.

Problem 5 – Darts

	1"	2"		2"		1"
1"	R	R		R		R
1"	R	G		B		R
1"	R	B		G		R
1"	R	R		R		R

Consider the dart board portrayed above. The area of each colored rectangle is either 1" x 1" or 1" x 2" as noted above. Each rectangle is colored either Red (R), Green (G), or Blue (B).

Your task is to write a program that calculates the probability of 'n' number of darts thrown, hitting ONLY rectangles of a certain color (R,G,B) or NO rectangles of a certain color (R,G,B). The probability should be expressed as a percentage rounded to the second decimal. Assume that every dart thrown hits the board and lands in only one (1) rectangle on the board. You may also assume that 1<=n<=4.

(Hint: C(n,k) = n! / (n-k)!k!)

Example 1:

Enter the number of darts thrown: 3
Enter the color: Red
Enter ONLY or NO: NO

The probability that NO Red rectangles are hit in three (3) throws is: 3.70%

Example 2:

Enter the number of darts thrown: 2
Enter the color: Blue
Enter ONLY or NO: ONLY

The probability that ONLY Blue rectangles are hit in two (2) throws is: 2.78%

Each test case is considered to properly execute if the following are correct:
1. Console prompts for the three (3) inputs: number of darts, color, and ONLY or NO.
2. The console displays the correct probability.