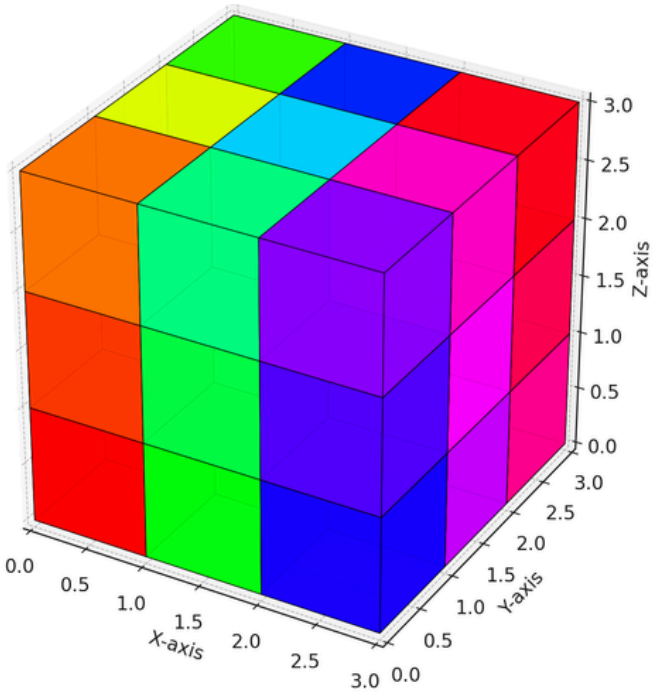
CSE 107 HOMEWORK 9

Question 1: *Statistical Analysis of a Multidimensional Array Representing the Unit Weights of Materials Used in Cube Construction*



The cube shown on the left with a side length of 3 units is constructed by combining **unit cubes made of different materials**. Each unit cube has a **weight** value depending on the material it is made of. The cube contains unit cubes of varying weights, and these weights are represented in a 3x3x3 array.

Assignments:

1. **Mean (Average):** Compute the average weight of all unit cubes within the cube.
2. **Median:** Identify the central value of the ordered list of weights arranged in ascending sequence.
3. **Range (Minimum and Maximum):** Determine the lightest and heaviest unit cubes within the cube and compute the range of weight values.
4. **Mode (Most Frequently Utilised Weight):** Identify the weight that appears most frequently in the cube, signifying the predominant material employed in the construction.
5. **Weight Frequency:** Enable the user to enter a certain weight value and determine the frequency of its occurrence within the cube.

The Expected Scenario and the results of the weights:

Defining an array for representing weight values of the cube:

```
int cube[3][3][3] = { {{5, 5, 12}, {13, 15, 7}, {10, 5, 13}},
                      {{18, 10, 15}, {7, 10, 15}, {12, 12, 10}},
                      {{12, 7, 15}, {10, 12, 15 }, {10, 10, 12}} };
```

Results:

```
1. Mean: 11
2. Median: 12
3. Range: [5, 18]
4. Mode: 10
5. Enter a weight to check its frequency: 12
The weight value of 12 occurs 6 times within the cube.
```

Question 2: Finding the Frequency of a Certain Character in a Given Text Using Char Counting

Write a program that takes a character input from the user and counts how many times that character appears in a fixed text.

The text is "**happynewyear**".

The program **should prompt the user for the character to count**, move through the text looking for matches, calculate the number of times this character appears, and show the result.

The Expected Scenario:

The user enquires about the frequency of a particular character's occurrence in the text. For example, if the user inputs the character "**y**", the software must examine the entire text "happynewyear", ascertain that the character "**y**" occurs 2 times, and thereafter present **the following output**:

```
The character 'y' appears 2 times in the text.
```