3D Vector Addition Calculator and Visualization

Instructions:
Run the program (go to the cell below this and press shift+enter)

Following the prompts, enter the number of vectors you want to add, followed the the start and end coordinates of each vector

The program will graph all the original vectors in blue

It will then transform each vector to show how the vectors sum, tip to tail - the transformed vectors will be in red (with the exception of the first vector, which will stay in blue, since the vector addition diagram is original from that vector)

The resultant vector will be displayed in green

The start and end points of the resultant vector will be output by the function

This program is a good way to visualize vector addition in 3D

NOTE: This program also handles 2D vector addition fine

```
In[ ]:=
    f[] = numVectors = Input["How many Vectors are you adding?"];
    l = {}
    l1 = {}
    l2 = {}
    While[numVectors > 0, x1 = Input["Enter the first x-coordinate of a vector:"];
     y1 = Input["Enter the first y-coordinate of a vector"];
      z1 = Input["Enter the first z-coodrinate of a vector"];
     x2 = Input["Enter the second x-coordinate of a vector"];
     y2 = Input["Enter the second y-coordinate of a vector"];
     z2 = Input["Enter the second z-coordinate of a vector"];
     arrow = {{x1, y1, z1}, {x2, y2, z1}};
     AppendTo[l, arrow]; AppendTo[l1, Graphics3D[{Blue, Arrow[arrow]}]];  numVectors --]
    i = 1;
    vtrack = 1;
    y = 1;
    z = 3;
    x = Length[l];
    While[x > 1, vector1 =
      {{l[[1, 2, 1]], l[[1, 2, 2]], l[[1, 2, 3]]}, {l[[2, 2, 1]] - l[[2, 1, 1]] + l[[1, 2, 1]],
        l[[2, 2, 2]] - l[[2, 1, 2]] + l[[1, 2, 2]], l[[2, 2, 3]] - l[[2, 1, 3]] + l[[1, 2, 3]]}};
     If[i ≠ 1, vector1 = {{l2[[y, 2, 1]], l2[[y, 2, 2]], l2[[y, 2, 3]]},
         {l[[z, 2, 1]] - l[[z, 1, 1]] + l2[[y, 2, 1]], l[[z, 2, 2]] - l[[z, 1, 2]] + l2[[y, 2, 2]],
          l[[z, 2, 3]] - l[[z, 1, 3]] + l2[[y, 2, 3]]}};
      z++;
      y++;];
     I AppendTo[l1, Graphics3D[{Red, Arrow[vector1]}]];
     AppendTo[l, vector1]; AppendTo[l2, vector1];
      i = 2;
      x --]
    q = Length[l2]
    sumVector = {{l[[1, 1, 1]], l[[1, 1, 2]], l[[1, 1, 3]]},
       {l2[[q, 2, 1]], l2[[q, 2, 2]], l2[[q, 2, 3]]}};
    AppendTo[l1, Graphics3D[{Green, Arrow[sumVector]}]];
    Print["The resultant vector starts at (", l[[1, 1, 1]] ,
      ", ", l[[1, 1, 2]], ", ", l[[1, 1, 3]], ") and ends at (",
      l2[[q, 2, 1]] , ", ", l2[[q, 2, 2]], ", ", l2[[q, 2, 3]], ")"];
    Show[l1, Axes → True]
```

Out[ ]= { }

Out[ ]= { }

Out[ ]= { }

Out[ ]= 2

An Example

The resultant vector starts at (3, 4, 5) and ends at (10, 4, 5)

Out[ ]=