**#1** (10 Points)

**Is the following function a proper distance function? Why? Explain your answer. Measure the distance between (0, 0, 0), (0, 1, 0), (0, 1, 1), and (1, 1, 1)**

**Solution: Lets take the points A (0,0), B(0,1), C(1,1) to show the distance function.**

Distance AB=| (0-0) +(0-1) |2= 1

Distance AC=| (0-1) +(0-1) |2= 4

Distance BC =| (0-1) +(1-1) |2=1

**Property 1: The distance cannot be negative.**

**Property 2: The distance from A to B should be equal to Distance from B to A**

**Property 3: The sum of the distance of any two sides of a triangle should be greater than the third side of the triangle**

Property 3 does not satisfy with the above equation as 1+1<4 which does not satisfy the property 3.

Let’s us consider A (0,0,0), B(0,1,0), C(0,1,1), D(1,1,1)

Distance Formula = √(x2-x1)2+(y2-y1)2+(z2-z1)2

Distance AB = 1

Distance AC= 1.414

Distance AD= 1.732

Distance BC= 1

Distance BD= 1.414

Distance CD= 1