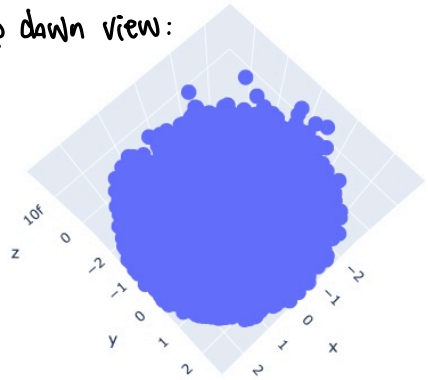
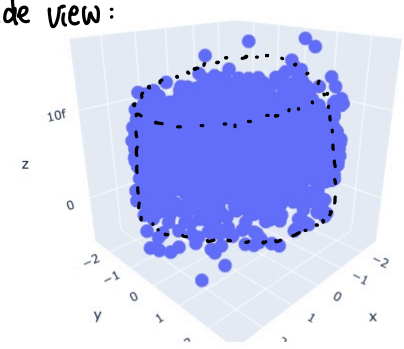
HW 4 Explaination :

Cylinder :

Top down view :



Side view :



How do i calculate the diameter :

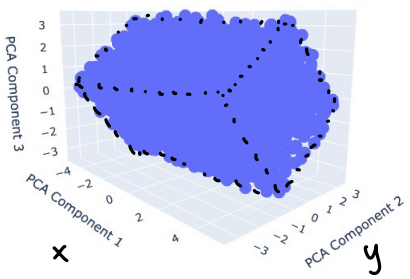
1) Filter out all pairs of points in the cluster that has the largest pairwise distance :
   The pairs will contain all the pts on the circles : 
2) Cluster those points to 2 clusters : 1:  2: 
3) Find pairwise distance between the points in the same cluster and take the max.
   ↳ the max will be  the diameter.
4) To be fair, I average the max of the two circle and take that as my diameter.

conclusion : the answer is about 4.77 , which is reasonable because :

≈ 2.669 x 2 = 5.338

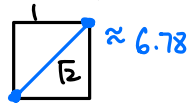
Height = $\sqrt{5.338^2 - 4.77^2} \approx 2.396$

Rectangular prism 1 :



How to find square sides :

↳ perform the same 1-4 steps as cylinder

↳ the max will be  ≈ 6.78

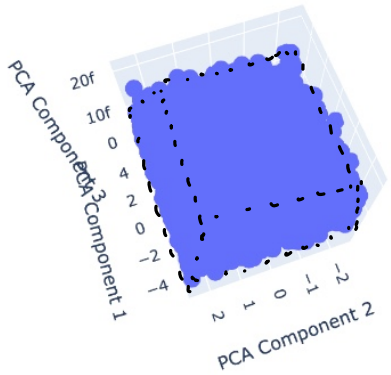
↳ the side will be $1 : \sqrt{2} = \text{side} : \text{max}$

$\text{side} \approx 4.79$

↳  $\sqrt{5.59^2 - 2.395^2} \approx 5.051$

↳ full height = $2(5.051) \approx 10$

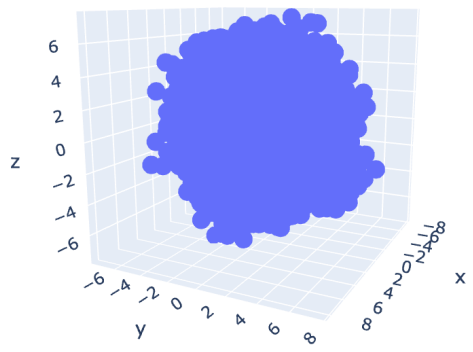
Rectangular prism 2 :



My algorith does not work for this one to find the square diagonal because when encounter the stage of clustering :

 pyspark might not cluster them properly by top and botton. It might do a left right cluster since this prism is too short.

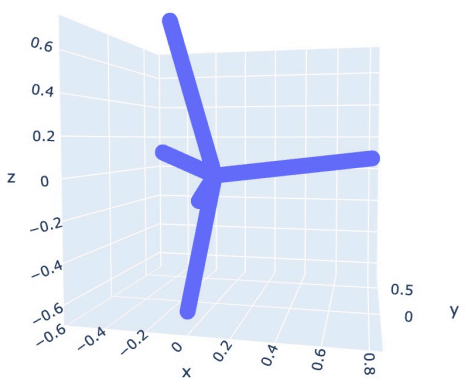
Sphere :



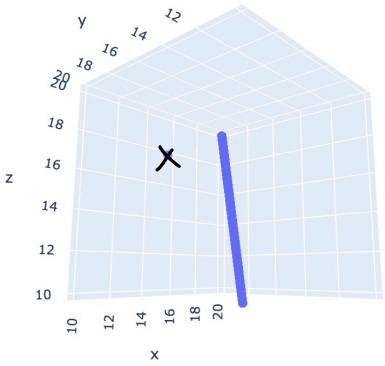
↳ Radius is the max distance from center

≈ 9.64

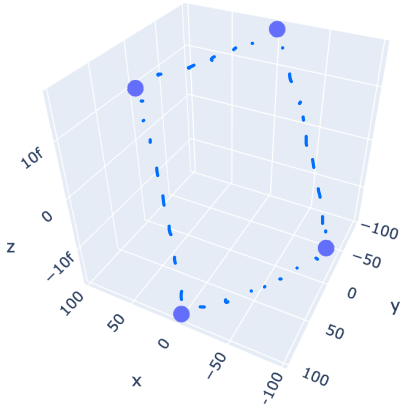
Spider lines connecting together :



line:



outliers:



Objects	Location (Center)	Size(unit)	Orientation	Total Points
Sphere	(14.99656549, 80.01182547, 14.99467628, 80.05577159, 14.97239517, 80.02087051)	Radius = 9.64	Tiled 45 degree on the y-axis and 45 degree at the x-axis	4000
Cylinder	(69.99465249 60.01054572 50.00943159 40.00236875 30.00059383 20.02083755)	Diameter=4.77 Height = 2.396	The bases are parallel with the xy-plane	2500
Rectangular prism	(74.96625246 74.99934987 74.95315181 74.99604854 74.97747357 74.98671432])	Dimension: 4.79* 4.79*10	The two squared faces parallel to the xy-plane	3000
Rectangular prism	(25.00530545, 25.00877927, 24.98270557, 75.00813933, 75.00625891, 75.00204318)		45 degree rotated about the x axis, with the squared faces parallel to the yz-plane	3500
line	(14.87519246, 14.87569221, 14.87619196, 14.87669171, 14.87719146, 14.87769121)	25.04 units	A symmetric object by x-axis	2000
6 straight lines connecting together at the same end	(0,0,0,0,0,0)	Each of them is 1 unit long	Spider like shape connecting at (0,0,0,0,0,0).The lines sticking out at different direction	2400
~~Outliers~~ Square	(11.0, 12.0, 13.0, 14.0, 15.0, 16.0), (91.0, 92.0, 93.0, 14.0, 15.0, 16.0), (91.0, 92.0, 93.0, 94.0, 95.0, 96.0), (11.0, 12.0, 13.0, 94.0, 95.0, 96.0)	138.564	4 points formed a fitted square!	4