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**Derege H Mussa\*** ([derege.mussa@utdallas.edu](mailto:derege.mussa@utdallas.edu)), 800 West Campbell Road, Richardson, TX 75080-, Dallas, TX 75080. *Partitions of Tetrahedra*. Preliminary report.

A tetrahedron (Plural : tetrahedra ) is a three dimensional solid having four vertices, four triangular faces and six edges which don't lie in a single plane. The labeling of the vertices and edges of this has been chosen to be in accord with the labeling used by J. Scott in describing a very elegant determinant that can be used for telling if there truly exists a tetrahedron with 6 given edge lengths due to W.H. McCrea in the relative positions A sextuple  $S = (a, b, c, d, e, f)$  is a tetrahedron if and only if  $S$  is facial (the lengths of the edges of each four face must obey the (strict) triangle inequality) and that the McCrea determinant is positive. We classify the tetrahedron according to the edges since the tetrahedron has 6 edges then there are 11 partitions. One can also consider the partition for a particular tetrahedron based on congruence of triangles. Theorem ( Derege Mussa Partition ) There are 25 different partition classes of tetrahedra taking in to account graph theoretical aspects of the position of the edges, and all 25 types exist. The paper discuss how to determine the existence of tetrahedra , congruence property of tetrahedra in terms their face and vertex partition, and face partition and edges length. (Received September 13, 2014)