First, recall that a triangle with vertices \((v_1, v_2, v_3)\) is equivalent to the set:

\[
\{ \alpha_1 v_1 + \alpha_2 v_2 + \alpha_3 v_3 \in \mathbb{R}^3 \mid 0 \leq \alpha_1, \alpha_2, \alpha_3 \leq 1 \}.
\]

Assume a light ray is parameterized by its starting position \(p = [p_x, p_y, p_z]^T\) and its direction \(d = [d_x, d_y, d_z]^T\). Assume also that you already have defined a function:

\[
\text{double triangle_intersect}(p, d, v_1, v_2, v_3) \{ \ldots \}
\]

which returns the time \(t > 0\) of intersection with the triangle, or -1 if there is no positive-time intersection.

1) Please write pseudocode for the intersection of a ray with the tetrahedron

\[
\{ \alpha_1 v_1 + \alpha_2 v_2 + \alpha_3 v_3 + \alpha_4 v_4 \in \mathbb{R}^3 \mid 0 \leq \alpha_1, \alpha_2, \alpha_3, \alpha_4 \leq 1 \}
\]

with vertices \((v_1, v_2, v_3, v_4)\):

\[
\text{double tetrahedron_intersect}(p, d, v_1, v_2, v_3);
\]

You may use the triangle_intersect function as a subroutine, and the return convention should be the same.

2) Please write pseudocode for the intersection of a ray with the quadratic bowl:

\[
\{ (x, y, z) \in \mathbb{R}^3 \mid z = \alpha x^2 + \beta y^2 \}
\]

\[
\text{double bowl_intersect}(p, d, \alpha, \beta);
\]

Again, the return convention should be the same.