CSC0049 Advanced Computer Graphics
Assignments 3

Due: April 22
(-10% for each day late)

The goal of this assignment is to extend your ray tracer in the previous assignments to support more complex 3D objects that may contain up to 100,000 primitives (i.e. spheres and triangles), and then report the growth of the run time of your program under various input data.

- Your tasks are the following.
  1. Read in the input file, which contains the same format to assignments 1 & 2, except the addition of normal vectors to the triangles.
     - ✓ Eye position: E x y z
     - ✓ View direction: V x y z
     - ✓ Field of view: F angle (horizontal Field of View)
     - ✓ Resoution: R w h
     - ✓ Spheres: S Ox Oy Oz radius
     - ✓ Triangles: T x1 y1 z1 x2 y2 z2 x3 y3 z3 n1 n2 n3

     where (Ox, Oy, Oz) is the origin of a sphere and (x1, y1, z1), (x2, y2, z2), (x3, y3, z3) are the vertices of a triangle, and (n1, n2, n3) is the normal vector (of length 1.0)
     - ✓ Light position: L x y z
     - ✓ Material: M r g b Ka Kd Ks exp Reflect Refract Nr

     where (**r, g, b**) is the surface color; **Ka, Kd, Ks** are the coefficients of the ambient, diffuse, and specular components; **exp** is the specularity; **Reflect** and **Refract** are within the range of [0, 1] and represent the ratio of reflection of refraction; **Nr** is the density of object which affects refraction angles.

  2. Write a report that contains the output image and the run time of each provided input file. There will be at least two input files. You may choose a reasonable resolution for your output images and keep it the same when you compare the run time.
- Please upload both your program (source code) and the report on Moodle (http://moodle2.ntnu.edu.tw/course/view.php?id=8686) . If you submit multiple files for your program, then you may pack your source files in a single ZIP or RAR file.