ASSIGMENT 1

Assignment 1: May 13rd

The Assignment 1 weights 70% of the final grade and will evaluate the CPU and GPU ray-tracing tasks

ASSIGNMENT 1 EVALUATION

CPU Ray Tracer (11.5 pts):

- **T. Whitted Ray-Tracer (5.5 pts)**
  - Ray intersections with spheres, triangles, and axis-aligned boxes (2 pt)
  - Local Blinn-Phong reflection model (1 pt)
  - Multiple source lights and Hard Shadows (1 pt)
  - Global color component by implementing the mirror reflection and refraction with Schlick approximation of Fresnel Equations for dieletric materials (1.5 pts)

- **Stochastic sampling techniques (3.5 pts)**
  - **Anti-aliasing** with the jittered method (1 pts)
  - **Soft shadows** using an area of light with a set of N light source points (without antialiasing) and the random method (with antialiasing) (1.5 pts)
  - **Depth of field** effect where the lens is simulated by a random distribution of N samples on a unit disk (1 pts)

- **Acceleration structure (2.5 pts)**
  - Uniform Grid integration (0.5 pts).
  - Bounding Volume Hierarchy (BVH) (2 pts)

GPU Path Tracer (7.5 pts)

- Ray intersections with spheres and triangles (**1 pt**)
- Local color, multiple source lights, hard Shadows (**1 pt**)
- Global color
  - Diffuse reflections for color bleeding (**0.5 pts**)
  - Mirror and fuzzy specular reflections for metallic objects (**1 pts**)
  - reflection and refraction with Schlick approximation of Fresnel Equations for dieletric transparent materials (**1.5 pts**)
- Motion blur with spheres (**1 pts**)
- Depth-of-Field (**0.5 pts**)
- Beer's law for light absorption inside a transparent dieletric (**1 pt**)

Extras (1 pt)

- Extras, like new camera with orbit and zoom movement or area lights in GLSL Path Tracer, fuzzy refractions, caustics, etc. (**1 pt**)

Lab Submission

Submit in the **Fenix** system your C++ and GLSL source code after the discussion.
All the files should be zipped in 2 files called CPU_RayTracer and GPU_PathTracer.

ATTENTION: A **report with up to 6 pages** should be uploaded in Fénix system until **May 20th**.

Late Penalty
You should submit your solution on time. Being late for one checkpoint could affect the time left for you to complete subsequent labs. The Assignment 2 is due at the above specified due data, and there is a 20% penalty each day for up to 40%. After that, you get zero.

Grading Criteria
Grading of the labs will be based on the following:

- 90%: Correctness, adherence to assignment specification and to the topics from the theoretical classes.
- 10%: Report, and Discussion as well as readability, structure of code, use of comments, adherence to lab procedures (submitting, naming conventions, etc.).

Don't copy labs. Discussion of lab assignments is allowed and encouraged. However, you need to complete the lab all by yourself. Labs which are too similar will be properly handled by the teaching members of the discipline.