|  |  |  |
| --- | --- | --- |
| **A** | Computer Graphics test – 2017.05.05. |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name:** | **NEPTUN:** | **Signature:** |  |  |

How many points have you got from the

first homework: ……..

second homework: …….

Will you submit the third homework?: ……..

You have 60 minutes to finish the test. Results can be expected by Monday.

Tasks related to the homeworks:

* + - 1. Give the equation of a Lagrange interpolation curve that interpolates point ***p***1 for parameter *t*1 and point ***p***2 for parameter *t*2! (the correct answer is worth of 3 points)
      2. Explain briefly what the following physical quantities mean and what their unit of measure is: index of refraction, extinction coefficient, cross section (3 points)
      3. An extruded surface is defined by spine curve **g**(*u*) and profile curve **p**(*v*). How can its normal vector be computed? (3 points)

Main questions:

* + - 1. The cylinder is the set of those points that are at the distance *R* from a line crossing the origin and having direction **v**. Give the implicit equation of this cylinder surface (3 points). Write a **GLSL program** that computes the point where a ray starting at the origin and of direction **d** intersects the cylinder (6 points). Compute the normal vector here (6 points). Variables **v**, **d** are of type vec3 and *R* is float, and they are declared and their values are already set, the result should be written to variable **n**.
      2. How does the normal vector of a plane change when the points of the plane are transformed with a 4x4 homogeneous linear transformation matrix **M**. Give detailed explanation (15 points).