Name: .... 01.02.2024 r.

Computer Graphics – Exam

Exam consist of 15 mulitchoice tasks, each chaving three questions with answers **Yes** or **No**. For each correct answer you get 1 point and for three correct answers within one task there is 1 bonus point. Thus, for each task it is possible to get **0, 1, 2, or 4 points**. To pass the exam it is necessary to get at least **30** points (half of all points).
Time: **60 minutes**. *Good luck!*

Task 1. *Complementary color to $(1, 1, 0)$ in RGB model is*

☒ $(0, 0, 1)$

☐ $(1, 1, 1)$

☐ $(0, 0, 0)$

Task 2. *The following is true*

☒ *In RGB model if we add a color with its complementary color we get white color*

☐ *If (s,m,y) represents a color in CMY model, then (y,m,s) represents this color in RGB model*

☒ *A gray color in RGB model has all components: red, green and blue of the same amount*

Task 3. *The following is true*

☐ *Depth sort is an algorithm with image precision*

☒ *In backface removal algorithm if the angle between the normal vector to a face of an object and the vector to the viewer is between 0 and 90 degrees, then we do not remove this face*

☒ *In object precision algorithms we compare objects with themselves*

Task 4. *Point $(1, -2, 4)$ has the same homogeneous coordinates as a point*

☐ $(3, -6, 12)$

☐ $(-1, 2, -4)$

☐ $(2, -1, 5)$

Task 5. *In homogeneous coordinates:*

☒ *translation is a linear transformation*

☐ *scaling is not a linear transformation*

☒ *perspective projection is a linear transformation*

Task 6. *Consider the following lines in the program:*

```
x+=3*cos(a);
y+=3*sin(a);
```

where (x, y) is a position and `a` *some fixed angle. Then*

☐ *equations define the move along a circle* It's a line

☐ *the distance between current and the next position is 9*

☐ *if $a = 0$, then the position does not change*

Task 7. *The following is true*

☐ *There are two types of lights in computer graphics: ambient and diffuse*

☐ *Ambient light has its source at* $(0,0,0)$

☐ *Diffuse light is sourceless*

Task 8. *The normal vector to a face is neccesary*

☒ *to compute angle of incidence and reflection of a light*

☒ *to use shading algorithms*

☒ *to distinguish between front and the baco of a face*

Task 9. *To draw a triangle in OpenGL 2.1 we may use*

☒ `GL_TRIANGLES`

☒ `GL_QUADS` *If 2 points are the same it's possible*

☒ `GL_POLYGON`

Task 10. *If* $p = (1,2,3)$ *and we apply tranfsormation* `glTranslatef(-1, -1, 2)` *to p, then*

☐ *the new position of p is* $(0,1,1)$
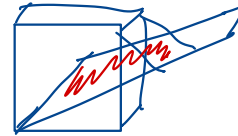
☒ *the new position of p is* $(0,1,5)$

☐ *the distance between new and old positions of p is* $\sqrt{15}$

Task 11. *The following is true*

☒ *we use orthographic projection mainly for 3D graphics*

☐ *we use perspective projection mainly for 2D graphics*

☒ *orthographic projection may project cube to a rectangle*

Task 12. *Consider the following list of vertices: v1 (0,0,0); v2 (1,0,0); v3 (0,1,0); v4 (0,0,1). Then*

☒ *the following list of faces: f1 1 2 3; f2 1 2 4; f3 1 3 4; f4 2 3 4; represents tetrahedron*

☒ *The list: f 1 3 4 made of one face represents a triangle*

☐ *The following list of lines: l1 1 2; l2 1 3; l3 1 4; represents edges of a triangle*

Task 13. *Let T be a translation by a nonzero vector and R a rotation by an angle* 30° *around some vector. Then*

☐ $TR = RT$

☒ *the inverse transformation* T^{-1} *is a translation*

☒ *the inverse transformation* R^{-1} *is a rotation*

Task 14. *If* `DrawCube()` *is a function drawing a cube centered at* $(1,1,1)$, *then*

☒ `glTranslatef(-1,0,2); DrawCube();` *draws a cube centered at* $(0,1,3)$

☐ `glRotatef(30,0,1,1); DrawCube();` *draws a cube centered at* $(0,0,0)$

☐ `glScalef(2,2,2); DrawCube();` *draws a cube centered at* $(1,1,1)$

Task 15. *The following is true*

☒ *In raster graphics image is made of rectangular pixels*

☐ *Scaling changes the quality of an image in vector graphics*

☒ *Rotation may change the quality of an obiect in raster graphics*