27.01.2025 r.

Name: .....

Index number: .....

Computer Graphics – Exam

Exam consist of **15 multichoice tasks**, each chaving three questions with answers **Yes (T)** or **No (F)**. 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. *The following is true*

- [x] *In RBG model* $(0, 1, 0)$ *defines a green color*
- [ ] *In RGB model* $(1, 1, 1)$ *is a black color*
- [ ] *In RGB model* $(1, 0, 1)$ *is a green color*

Task 2. *The following is true*

- [x] *In HSV model, H stands for hue*
- [ ] *In CMY model* $(1, 0, 0)$ *represents red colr*
- [x] *RGB model is an additive color model*

Task 3. *The following is true*

- [ ] *Depth sort is an algorithm with image precision*
- [ ] *Z-buffer algorithm finds for each pixel the color of the closest object* ? face ??
- [ ] *In image precision algorithms we compare objects with themselves*

Task 4. *Consider the homogeneous coordinetes* $((0, 2, -6, 2)$ *of some 3D point* P*. Then*

- [x] $P = (0, 1, -3)$
- [ ] $P = (0, 2, -6)$
- [x] *homogeneous coordinates of* P *are also given by* $(0, 3, -9, 3$

Task 5. *In homogeneous coordinates:*

- [x] *translation is a linear transformation*
- [x] *scaling is a linear transformation*
- [x] *perspective projection is a linear transformation*

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

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

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

- [ ] *equations define the move along a circle*
- [ ] *equations define the move along a line*
- [x] *if* $a = 0$*, then the position does not change*

Task 7. *The following is true*

- [x] *There are three types of light in computer graphics: ambient, diffuse and specular*
- [x] *Ambient light is sourceless*
- [ ] *Diffuse light is sourceless*

Task 8. *In Phong shading*

- [x] *the intensity of the light depends on the distance of the source of the light*
- [x] *we need to know the normal vector to faces of all object in the scene*
- [x] *the specular component is important*

Task 9. *To draw a (filled) square in OpenGL 2.1 we may use*

- [x] `GL_TRIANGLES` We use 2 triangles
- [x] `GL_QUADS`
- [x] `GL_POLYGON`

Task 10. *If T is a translation by a nonzero vector, S is scaling by non-unit factors, then*

- [ ] $TS = ST$
- [x] S^{-1} *is also a scaling*
- [x] T^{-1} *is also a translation*

Task 11. *The following is true*

- [x] *mapping* $(x, y, z) \mapsto (x, y)$ *defines an orthographic projection*
- [x] *in perspective projection objects closer to the camere look bigger*
- [x] *in orthographic projection a triangle may project to a line segment*

Task 12. *The following is true*

- [x] *Scan line algorithm in an algorithm with image precission*
- [ ] *Z-buffer is an algorithm with object precission*
- [x] *Depth sort is an algorithm with object precission*

Task 13. *The matrix of translation by a vector* $3, 2$ *in 2D space in homogeneous coordinates*

- [ ] *is a 2 by 2 matrix*
- [x] *is a 3 by 3 matrix of the form* $\begin{pmatrix} 1 & 0 & 3 \\ 0 & 1 & 2 \\ 0 & 0 & 1 \end{pmatrix}$
- [ ] *cannot be represented by a matrix*

Task 14. *If* `DrawCube()` *is a function drawing a cube centered at* $(0,0,0)$*, then*

- [ ] `glTranslatef(-1,0,2); DrawCube();` *draws a cube centered at* $(1,0,-2)$
- [x] `glRotatef(30,0,1,1); DrawCube();` *draws a cube centered at* $(0,0,0)$
- [ ] `glScalef(2,1,3); DrawCube();` *draws a cube centered at* $(2,1,3)$

Task 15. *The following is true*

- [x] *In raster graphics image is made of pixels*
- [x] *Scaling changes the quality of an image in raster graphics*
- [ ] *Rotation may change the quality of an object in vector graphics*