

Erio's 3D Mesh Metafile format

This is the 3D metafile used by MeshDemo 0.5.2. The file consists of lines which each line contains values separated by tabs or spaces. The file contains object specification of the 3D world in terms of polygon mesh, coordinate system, transformation, and light objects.

The file format was originally specified by Erio Prihastono <erio197@puspa.cs.ui.ac.id> , modified by Edison Tie <edson198@puspa.cs.ui.ac.id> and implemented (with several assumptions covering vague details) by Sasmito Adibowo <sas199@puspa.cs.ui.ac.id> in April-May 2001.

3DInput:

Header \n Data \n END ;

Header:

Window \n View \n Mode ;

Window:

xmin ymin xmax ymax ;

View:

Position LookAt VUP ;

Position:

x-value y-value z-value ;

LookAt:

x-value y-value z-value ;

VUP:

x-value y-value z-value ;

Mode:

ViewMode RenderMode ;

ViewMode:

PERSPECTIVE | PARALLEL ;

RenderMode:

WIREFRAME | FLAT | GOURAUD | PHONG ;

Data:

Object \n + ;

Object:

Name Type \n Data ;

Type:

MESH | TRANSFORMATION | COORSYS | LIGHT ;

For **MESH** object type:

Data:

PolHead Point \n+ Polygon \n+ SameSurface+\n ;

PolHead:

CoorName NumberOfPoints NumberOfPolygons |

NumberOfPoint NumberOfPolygons NumberOfSameSurface ;

CoorName:

the name of the coordinate system. When none specified, assume **RealWorld** is specified.

Point:

X Y Z ;

each (x,y,z) coordinate value is specified with a double (64-bit IEEE floating point) in human-readable decimal format.

Polygon:

numberOfPointsInPolygon pointIndices color K N (+) ;

PointIndices:

a list of integers separated by spaces or tabs which are 0-based indices to the points specified earlier.

K:

K-ambient K-diffuse K-specular ;

These are the ambient, diffuse, and illumination constants for the object, respectively. Each value are specified by three single precision (32-bit IEEE) floating-point value which ranges 0-1, where each value specifies the red, green, and blue channel for the constant. That is:

K-ambient, K-diffuse, K-specular:

red green blue ;

N:

the exponent for $\cos \alpha$, it is specified as a single precision floating-point value.

SameSurface:

NumberOfPolygons PolygonIndexes ;

for **TRANSFORMATION** object type:

Data:

TransHead \n TransData ;

TransHead:

NumberOfTransformations ;

TransData:

Transformation \n + ;

Transformation:

TransformationType TransformationData ;

TransformationType:

**TRANSLATE | ROTATEX | ROTATEY | ROTATEZ | SCALE |
ALREADYDEFINE ;**

for *TransformationType* = **TRANSLATE | SCALE :**

TransformationData:

X Y Z ;

each (x,y,z) value is specified with a double (64-bit IEEE floating point) in human-readable decimal format.

for *TransformationType* = **ROTATEX | ROTATEY | ROTATEZ**

TransformationData:

RotationAngle ;

The rotation angle is specified in degrees.

for *TransformationType* = **ALREADYDEFINE**

TransformationData:

TransformationName ;

The transformation data is a name of a transformation defined earlier in the file.

For **COORSYS** object type:

Data:

TransformationName RelCoorSys ;

RelCoorSys:

CoorSysName | RealWorld ;

For **LIGHT** object type:

Data:

Position Color | CoordSysName Position Color ;

Position:

X Y Z ;

Color:

ColorName | #RRGGBB | 0xRRGGBB | 24-bit-integer ;

ColorName:

**black | blue | cyan | darkgray | gray | green | lightgray | magenta | orange |
pink | red | white | yellow ;**

Note:

- MeshDemo 0.5.2 does not support binding LIGHT objects with a COORSYS object. That is, once specified, the LIGHT objects cannot be moved. This is a feature which was specified late in the project, so that I didn't incorporate the change.
- MeshDemo 0.5.2 does not implement the SameSurface feature, although it will read the data file containing it.; it merely ignores the SameSurface specification. The reason that because this was an optional feature.

Examples

The following metafile displays a yellow box, which are located parallel to the viewplane, thus looks like a square unless rotated.

```
-310 -310 310 310
0 0 100 0 0 0 0 1 0
PARALLEL GOURAUD
kotak1 MESH
8 6
-50 -50 -50
50 -50 -50
50 50 -50
-50 50 -50
-50 -50 50
50 -50 50
50 50 50
-50 50 50
4 3 2 1 0 yellow .8 .8 .8 .8 .8 .8 .8 .8 .8 2
4 0 1 5 4 yellow .8 .8 .8 .8 .8 .8 .8 .8 .8 2
4 1 2 6 5 yellow .8 .8 .8 .8 .8 .8 .8 .8 .8 2
4 2 3 7 6 yellow .8 .8 .8 .8 .8 .8 .8 .8 .8 2
4 0 4 7 3 yellow .8 .8 .8 .8 .8 .8 .8 .8 .8 2
4 4 5 6 7 yellow .8 .8 .8 .8 .8 .8 .8 .8 .8 2
sender LIGHT
0 0 300 white
END
```

The following metafile displays two boxes, red and blue, viewed from upper-left.

```
-310 -310 310 310
200 200 200 0 0 0 0 1 0
PARALLEL PHONG
t1 TRANSFORMATION
1
TRANSLATE 60 0 0
t2 TRANSFORMATION
```

```

1
TRANSLATE -60 0 0
biru COORSYS
t1
merah COORSYS
t2
kotak1 MESH
biru 8 6
-50 -50 -50
50 -50 -50
50 50 -50
-50 50 -50
-50 -50 50
50 -50 50
50 50 50
-50 50 50
4 3 2 1 0 blue .8 .8 .8 .8 .8 .8 .8 .8 2
4 0 1 5 4 blue .8 .8 .8 .8 .8 .8 .8 .8 2
4 1 2 6 5 blue .8 .8 .8 .8 .8 .8 .8 .8 2
4 2 3 7 6 blue .8 .8 .8 .8 .8 .8 .8 .8 2
4 0 4 7 3 blue .8 .8 .8 .8 .8 .8 .8 .8 2
4 4 5 6 7 blue .8 .8 .8 .8 .8 .8 .8 .8 2
kotak2 MESH
merah 8 6
-50 -50 -50
50 -50 -50
50 50 -50
-50 50 -50
-50 -50 50
50 -50 50
50 50 50
-50 50 50
4 3 2 1 0 red .8 .8 .8 .8 .8 .8 .8 .8 2
4 0 1 5 4 red .8 .8 .8 .8 .8 .8 .8 .8 2
4 1 2 6 5 red .8 .8 .8 .8 .8 .8 .8 .8 2
4 2 3 7 6 red .8 .8 .8 .8 .8 .8 .8 .8 2
4 0 4 7 3 red .8 .8 .8 .8 .8 .8 .8 .8 2
4 4 5 6 7 red .8 .8 .8 .8 .8 .8 .8 .8 2
lampu1 LIGHT
300 100 100 gray
lampu2 LIGHT
200 0 0 gray
lampu3 LIGHT
-300 0 0 gray
lampu4 LIGHT
0 300 0 gray
END

```

Cheers,
 Sasmito Adibowo
adibs@yahoo.com