```
package gobalkrishnan_v_18_06_1995.dimension3;


import gobalkrishnan_v_18_06_1995.dimension2.gki2Point;



public class gkiOrthogonal {
public double aspectratio,far,near,top,bottom,left,right;

public void aspectRatio(double ar){aspectratio=ar;}
public void far(double f){far=f;}
public void near(double n){near=n;}
public void top(double t){top=t;}
public void bottom(double b){bottom=b;}
public void left(double l){left=l;}
public void right(double r){right=r;}

gki3Point in,out;
gkiMatrix m=new gkiMatrix();
public void perspective(double ar,double n,double f,double b,double t,double l,double r) {

    aspectratio=ar;
    near=n;
    far=f;
    right=r;
    left=l;
    top=t;
    bottom=b;




    p_frustum();
}

public void p_frustum() {
    double[][] m=this.m.m4;
    m[0][0]=2/(double)(right-left);
    m[0][1]=0;
    m[0][2]=0;
    m[0][3]=0;

    m[1][0]=0;
    m[1][1]=2/(double)(top-bottom);
    m[1][2]=0;
    m[1][3]=0;

    m[2][0]=0;
    m[2][1]=0;
    m[2][2]=2/(double)(far-near);
    m[2][3]=0;

    m[3][0]=-(right+left)/(double)(right-left);
    m[3][1]=-(top+bottom)/(double)(top-bottom);
    m[3][2]=-(far+near)/(double)(far-near);
    m[3][3]=-1;
```

```
}

public gki3Point multpoint(gki3Point p) {
    gki3Point o=new gki3Point();
    o.x=p.x*m.m4[0][0]+p.y*m.m4[1][0]+p.z*m.m4[2][0]+ m.m4[3][0];
    o.y=p.x*m.m4[0][1]+p.y*m.m4[1][1]+p.z*m.m4[2][1]+ m.m4[3][1];
    o.z=p.x*m.m4[0][2]+p.y*m.m4[1][2]+p.z*m.m4[2][2]+ m.m4[3][2];
    double w=p.x*m.m4[0][3]+p.y*m.m4[1][3]+p.z*m.m4[2][3]+ m.m4[3][3];

    if(w!=1) {
        o.x/=w;
        o.y/=w;
        o.z/=w;

    }
    return o;
}

public gki2Point screen2d(gki3Point p){
    gki3Point ps=multpoint(p);
    double x=ps.x/(double)ps.z;
    double y=ps.y/(double)ps.z;
    return new gki2Point(x, y);

}
}
```