**/\*WAP to implement 3D Transformation.\*/**

**/\***

**choice=1 , Translation, set t\_x,t\_y,t\_z**

**choice=2 , Rotation about z axis (XY plane), set thitha**

**choice=3 , Rotation about x axis (YZ plane), set thitha**

**choice=4 , Rotation about y axis (XZ plane), set thitha**

**choice=5 , Scaling about a fixed point, set s\_x,s\_y,s\_z,x\_f,y\_f,z\_f**

**choice=6 , Refletion about z axis (XY plane)**

**choice=7 , Reflection about x axis (YZ plane)**

**choice=8 , Reflection about y axis (XZ plane)**

**choice=9 , Shearing about z axis keeping z same (XY plane), set sh\_x,sh\_y**

**choice=10, Shearing about x axis keeping x same (YZ plane), set sh\_y,sh\_z**

**choice=11 , Shearing about y axis keeping y same (ZX plane), set sh\_x,sh\_z**

**\*/**

**int choice=5;**

**float t\_x=100,t\_y=-150,t\_z=-300;//Translation**

**float thitha=60;//Rotation thitha in degree**

**float s\_x=2,s\_y=2,s\_z=2,x\_f=20,y\_f=-30,z\_f=40 ;//Scaling**

**float sh\_x=2,sh\_y=-1,sh\_z=-1.333;//Shearing**

**float a=400,b=-150,c=-150,d=300,e=-100,f=100,i=-50,j=100,k=120,l=-100,m=-230,n=10;**

**float ac=400,bc=-150,cc=200,dc=300,ec=-100,fc=150,ic=-50,jc=100,kc=200,lc=-100,mc=-230,nc=90;**

**void setup()**

**{**

**size(1300,700,P3D);**

**draw();**

**jump();**

**endShape();**

**}**

**void draw()**

**{**

**translate(width/2, height/2, 0);**

**rotateX(PI/2);**

**rotateZ(-PI/6);**

**noFill();**

**beginShape();**

**strokeWeight(3);**

**stroke(0,0,255);**

**vertex(a,b,c);**

**vertex(d,e,f);**

**vertex(i,j,k);**

**vertex(i,j,k);**

**vertex(l,m,n);**

**vertex(d,e,f);**

**vertex(l,m,n);**

**vertex(a,b,c);**

**vertex(i,j,k);**

**vertex(a,b,c);**

**vertex(l,m,n);**

**vertex(d,e,f);**

**endShape();**

**beginShape();**

**stroke(0,0,0);**

**vertex(ac,bc,cc);**

**vertex(dc,ec,fc);**

**vertex(ic,jc,kc);**

**vertex(ic,jc,kc);**

**vertex(lc,mc,nc);**

**vertex(dc,ec,fc);**

**vertex(lc,mc,nc);**

**vertex(ac,bc,cc);**

**vertex(ic,jc,kc);**

**vertex(ac,bc,cc);**

**vertex(lc,mc,nc);**

**vertex(dc,ec,fc);**

**endShape();**

**strokeWeight(0.5);**

**stroke(0,255,0);**

**line(a,b,c,ac,bc,cc);**

**line(d,e,f,dc,ec,fc);**

**line(i,j,k,ic,jc,kc);**

**line(l,m,n,lc,mc,nc);**

**}**

**void jump()**

**{**

**if (choice==1) translation();**

**if (choice==2) rotation\_z();**

**if (choice==3) rotation\_x();**

**if (choice==4) rotation\_y();**

**if (choice==5) scaling();**

**if (choice==6) reflection\_z();**

**if (choice==7) reflection\_x();**

**if (choice==8) reflection\_y();**

**if (choice==9) shearing\_z();**

**if (choice==10) shearing\_x();**

**if (choice==11) shearing\_y();**

**}**

**void translation()//choice=1**

**{**

**ac=a+t\_x;**

**bc=b+t\_y;**

**cc=c+t\_z;**

**dc=d+t\_x;**

**ec=e+t\_y;**

**fc=f+t\_z;**

**ic=i+t\_x;**

**jc=j+t\_y;**

**kc=k+t\_z;**

**lc=l+t\_x;**

**mc=m+t\_y;**

**nc=n+t\_z;**

**}**

**void rotation\_z()//choice=2**

**{**

**thitha =thitha \* 3.1415 /180;**

**ac=a\*cos(thitha)-b\*sin(thitha);**

**bc=a\*sin(thitha)+b\*cos(thitha);**

**cc=c;**

**dc=d\*cos(thitha)-e\*sin(thitha);**

**ec=d\*sin(thitha)+e\*cos(thitha);**

**fc=f;**

**ic=i\*cos(thitha)-j\*sin(thitha);**

**jc=i\*sin(thitha)+j\*cos(thitha);**

**kc=kc+t\_z;**

**lc=l\*cos(thitha)-m\*sin(thitha);**

**mc=l\*sin(thitha)+m\*cos(thitha);**

**nc=n;**

**}**

**void rotation\_x()//choice=3**

**{**

**thitha =thitha \* 3.1415 /180;**

**ac=a;**

**bc=b\*cos(thitha)-c\*sin(thitha);**

**cc=b\*sin(thitha)+c\*cos(thitha);**

**dc=d;**

**ec=e\*cos(thitha)-f\*sin(thitha);**

**fc=f\*sin(thitha)+f\*cos(thitha);**

**ic=i;**

**jc=j\*cos(thitha)-k\*sin(thitha);**

**kc=j\*sin(thitha)+k\*cos(thitha);**

**lc=l;**

**mc=m\*cos(thitha)-n\*sin(thitha);**

**nc=m\*sin(thitha)+n\*cos(thitha);**

**}**

**void rotation\_y()//choice=4**

**{**

**thitha =thitha \* 3.1415 /180;**

**ac=c\*sin(thitha)+a\*cos(thitha);**

**bc=b;**

**cc=c\*cos(thitha)-a\*sin(thitha);**

**dc=f\*sin(thitha)+d\*cos(thitha);**

**ec=e;**

**fc=f\*cos(thitha)-d\*sin(thitha);**

**ic=k\*sin(thitha)+i\*cos(thitha);**

**jc=j;**

**kc=k\*cos(thitha)-i\*sin(thitha);**

**lc=n\*sin(thitha)+l\*cos(thitha);**

**mc=m;**

**nc=n\*cos(thitha)-l\*sin(thitha);**

**}**

**void scaling()//choice=5**

**{**

**ac=a\*s\_x+(1-s\_x)\*x\_f;**

**bc=b\*s\_y+(1-s\_y)\*y\_f;**

**cc=c\*s\_z+(1-s\_z)\*z\_f;**

**dc=d\*s\_x+(1-s\_x)\*x\_f;**

**ec=e\*s\_y+(1-s\_y)\*y\_f;**

**fc=f\*s\_z+(1-s\_z)\*z\_f;**

**ic=i\*s\_x+(1-s\_x)\*x\_f;**

**jc=j\*s\_y+(1-s\_y)\*y\_f;**

**kc=k\*s\_z+(1-s\_z)\*z\_f;**

**lc=l\*s\_x+(1-s\_x)\*x\_f;**

**mc=m\*s\_y+(1-s\_y)\*y\_f;**

**nc=n\*s\_z+(1-s\_z)\*z\_f;**

**}**

**void reflection\_z()//choice=6**

**{**

**ac=a;**

**bc=b;**

**cc=-c;**

**dc=d;**

**ec=e;**

**fc=-f;**

**ic=i;**

**jc=j;**

**kc=-k;**

**lc=l;**

**mc=m;**

**nc=-n;**

**}**

**void reflection\_x()//choice=7**

**{**

**ac=-a;**

**bc=b;**

**cc=c;**

**dc=-d;**

**ec=e;**

**fc=f;**

**ic=-i;**

**jc=j;**

**kc=k;**

**lc=-l;**

**mc=m;**

**nc=n;**

**}**

**void reflection\_y()//choice=8**

**{**

**ac=a;**

**bc=-b;**

**cc=c;**

**dc=d;**

**ec=-e;**

**fc=f;**

**ic=i;**

**jc=-j;**

**kc=k;**

**lc=l;**

**mc=-m;**

**nc=n;**

**}**

**void shearing\_z()//choice=9**

**{**

**ac=a+sh\_x\*c;**

**bc=b+sh\_y\*c;**

**cc=c;**

**dc=d+sh\_x\*f;**

**ec=e+sh\_y\*f;**

**fc=f;**

**ic=i+sh\_x\*k;**

**jc=j+sh\_y\*k;**

**kc=k;**

**lc=l+sh\_x\*n;**

**mc=m+sh\_y\*n;**

**nc=n;**

**}**

**void shearing\_x()//choice=10**

**{**

**ac=a;**

**bc=b+sh\_y\*a;**

**cc=c+sh\_z\*a;**

**dc=d;**

**ec=e+sh\_y\*d;**

**fc=f+sh\_z\*d;**

**ic=i;**

**jc=j+sh\_y\*i;**

**kc=k+sh\_z\*i;**

**lc=l;**

**mc=m+sh\_y\*l;**

**nc=n+sh\_z\*l;**

**}**

**void shearing\_y()//choice=11**

**{**

**ac=a+sh\_x\*b;**

**bc=b;**

**cc=c+sh\_z\*b;**

**dc=d+sh\_x\*e;**

**ec=e;**

**fc=f+sh\_z\*e;**

**ic=i+sh\_x\*j;**

**jc=j;**

**kc=k+sh\_z\*j;**

**lc=l+sh\_x\*m;**

**mc=m;**

**nc=n+sh\_x\*m;**

**}**