

Lab Manual

CS602 – Computer Graphics



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Lab 10

Mathematical concept of 2D transformation, and equations of three basic transformations i.e. translation, rotation and scaling will be discussed.

Mechanism to Conduct Lab:

Lab Session will be communicated through Skype / Adobe Connect session.

Lab 11

Write the C program that will draw the table and perform all three. transformation i.e. translation, scaling and rotation.

/******

Table is designed with considering pivot point and taking all other points with respect to that pivot point.

Therefore, translation of table involves translation of only pivot point, all other points will change respectively.

Scaling and Rotation will be done directly no translation or other transformation is required.

*****/

```
#include <graphics.h>
```

```
#include <iostream.h>
```

```
#include <conio.h>
```

```
#include <math.h>
```

```
float round(float x)
```

```
{
```

```
return x+0.5;
```

```
}
```

```
class Table
```

```

{
private:
int xc, yc;//Center of the figure
int xp, yp;//Pivot point for this figure
int x1, x2, x3, x4;
int y1, y2, y3, y4;
int legLength;
int sfx, sfy; //Scaling factor
public:
Table()
{
xc=320, yc=240;//Center of the figure
xp=0; yp=0;//Pivot point for this figure
x1=-10, x2=10, x3=10, x4=-10;
y1=-7, y2=-7, y3=7, y4=7;
legLength=10;
sfx=1, sfy=1;
}
void translate(int tx, int ty)
{
xp+=tx;
yp+=ty;
}
void rotate (float angle)
{
int tempx=x1;
x1=tempx*cos(angle)-y1*sin(angle);
y1=tempx*sin(angle)+y1*cos(angle);
tempx=x2;
x2=tempx*cos(angle)-y2*sin(angle);
y2=tempx;
tempx=x3;
x3=tempx*cos(angle)-y3*sin(angle);
y3=tempx*sin(angle)+y3*cos(angle);
tempx=x4;
x4=tempx*cos(angle)-y4*sin(angle);
y4=tempx*sin(angle)+y4*cos(angle);
}
void scale(int sx, int sy)
{

```

```

x1=x1*sx;
x2=x2*sx;
x3=x3*sx;
x4=x4*sx;
y1=y1*sy;
y2=y2*sy;
y3=y3*sy;
y4=y4*sy;
legLength=legLength*sy;
}
void draw()
{
int xc=this->xc+xp;
int yc=this->yc+yp;
line (xc+x1, yc+y1, xc+x2, yc+y2);
line (xc+x2, yc+y2, xc+x3, yc+y3);
line (xc+x3, yc+y3, xc+x4, yc+y4);
line (xc+x4, yc+y4, xc+x1, yc+y1);
line (xc+x1, yc+y1, xc+x1, yc+y1+legLength);
line (xc+x2, yc+y2, xc+x2, yc+y2+legLength);
line (xc+x3, yc+y3, xc+x3, yc+y3+legLength);
line (xc+x4, yc+y4, xc+x4, yc+y4+legLength);
}};
int main()
{

int gdriver = DETECT, gmode, errorcode;
initgraph(&gdriver, &gmode, "");
Table table;
table.draw();
setcolor(CYAN);
table.translate(15, 25);
table.draw();
table.translate(50, 0);
table.scale(3,2);
table.draw();
table.translate(-100, 0);
table.rotate(3.14/4);
table.draw();
getch();

```

```
closegraph();  
return 0;  
}
```

Mechanism to Conduct Lab:

Lab Session will be communicated through Skype / Adobe Connect session. As in computer graphics all the programs are implemented through Dev C++. During lab session students programming question are incorporated either through direct answers or through some sort of tutorials that are already uploaded at VULMS.

For 64-bit windows install the following version of Dev-CPP.

<https://vulms.vu.edu.pk/Courses/CS602/Downloads/Dev-Cpp%205.9.2%20TDM-GCC%204.8.1%20Setup.rar>

For adding graphics library in 64-bit version of Dev-CPP see the link that illustrates the steps.

<https://vulms.vu.edu.pk/Courses/CS602/Downloads/Adding%20graphics%20library%20in%20Dev%20CPP%20For%20Windows%2010%20Tutorial.docx>

For 32-bit windows you can install the following version of Dev-CPP.

https://vulms.vu.edu.pk/Courses/CS602/Downloads/devcpp-4.9.9.2_setup.exe

In case you have 32 windows, you are required to follow the instruction as given in the following document.

<https://vulms.vu.edu.pk/Courses/CS602/Downloads/Add%20graphics%20in%20Dev%20cpp.doc>

Furthermore for 32-bit platform, you can download the graphics library from following link.

<https://vulms.vu.edu.pk/Courses/CS602/Downloads/graphics%20library.zip>

Lab 12

Understand the basic concept of line clipping.

Mechanism to Conduct Lab:

Lab Session will be communicated through Skype / Adobe Connect session.