**CG PRACTICAL 6: Transformation**

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**CODE:**

**#include <stdio.h>**

**#include <math.h>**

**#include <graphics.h>**

**void RotateTriangle(int *x1*, int *y1*, int *x2*, int *y2*, int *x3*, int *y3*, float *angle*)**

**{**

**int a1, b1, a2, b2, a3, b3;**

***// rotation occurs from x2, y2;***

**int anchorX = x2, anchorY = y2;**

**float radianAngle = angle \* 3.14 / 180.0;**

**a1 = anchorX + (int)((x1 - anchorX) \* cos(radianAngle) - (y1 - anchorY) \* sin(radianAngle));**

**b1 = anchorY + (int)((x1 - anchorX) \* sin(radianAngle) + (y1 - anchorY) \* cos(radianAngle));**

**a2 = anchorX + (int)((x2 - anchorX) \* cos(radianAngle) - (y2 - anchorY) \* sin(radianAngle));**

**b2 = anchorY + (int)((x2 - anchorX) \* sin(radianAngle) + (y2 - anchorY) \* cos(radianAngle));**

**a3 = anchorX + (int)((x3 - anchorX) \* cos(radianAngle) - (y3 - anchorY) \* sin(radianAngle));**

**b3 = anchorY + (int)((x3 - anchorX) \* sin(radianAngle) + (y3 - anchorY) \* cos(radianAngle));**

**setcolor(YELLOW);**

**line(a1, b1, a2, b2);**

**line(a2, b2, a3, b3);**

**line(a3, b3, a1, b1);**

**}**

**int main()**

**{**

**int gd = DETECT, gm;**

**int x, y, x1, y1, x2, y2, tx, ty;**

**int sx, sy;*// scaling factor***

**float angle;**

**initgraph(&gd, &gm, "");**

**printf("Enter 1st coordinate of the triangle: ");**

**scanf("%d %d", &x, &y);**

**printf("Enter 2nd coordinate of the triangle: ");**

**scanf("%d %d", &x1, &y1);**

**printf("Enter 3rd coordinate of the triangle: ");**

**scanf("%d %d", &x2, &y2);**

***//intial triangle***

**line(x, y, x1, y1);**

**line(x1, y1, x2, y2);**

**line(x2, y2, x, y);**

***// translated triangle***

**printf("Enter the translation vector (tx ty): ");**

**scanf("%d %d", &tx, &ty);**

**setcolor(YELLOW);**

**line(x + tx, y + ty, x1 + tx, y1 + ty);**

**line(x1 + tx, y1 + ty, x2 + tx, y2 + ty);**

**line(x2 + tx, y2 + ty, x + tx, y + ty);**

***// scaled triangle***

**printf("Enter the scaling factor for x and y (sx sy): ");**

**scanf("%d %d", &sx, &sy);**

***// changing the og coordinates to the scaled coordinates***

**x = x \* sx;**

**x1 = x1 \* sx;**

**x2 = x2 \* sx;**

**y = y \* sy;**

**y1 = y1 \* sy;**

**y2 = y2 \* sy;**

**setcolor(YELLOW);**

**line(x, y, x1, y1);**

**line(x1, y1, x2, y2);**

**line(x2, y2, x, y);**

***// rotated and scaled triangle***

**printf("Enter the angle for rotation (in degrees): ");**

**scanf("%f", &angle);**

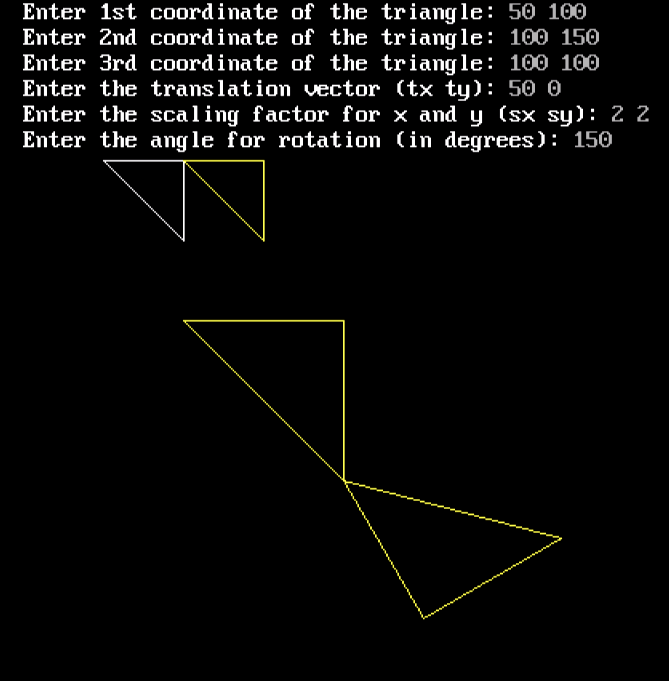
**RotateTriangle(x, y, x1, y1, x2, y2, angle);**

**getch();**

**closegraph();**

**return 0;**

**}**

**OUTPUT:  
**