

Transformation Problem

Imagine we wanted a program to draw a clock face
Would the following do the job:

```
// 30 degrees between each number !  
int angleBetweenNumbers = 360/12;  
g.translate(canvas.getWidth()/2, canvas.getHeight()/2);  
for(int i=1; i<=12; i++) {  
    g.rotate(angleBetweenNumbers * i);  
    g.fillText(""+i, 0, -100);  
}
```

ClockFaceBadJFX

Transformation History

To help manage transformations

JavaFX provides "save" and "restore" methods

These allow us to remember a "backup" state

That we can return to at a later date

("undoing" any transforms that took place)

Correct Implementation

```
// 30 degrees between each number !
int angleBetweenNumbers = 360/12;
g.translate(canvas.getWidth()/2, canvas.getHeight()/2);
for(int i=1; i<=12; i++) {
    g.save();
    g.rotate(angleBetweenNumbers * i);
    g.fillText(""+i, 0, -100);
    g.restore();
}
```

ClockFaceGoodJFX