

Instead of Key *Frames*, I Like Specifying Key *Times* Better

And, so, I created a C++ class to do it all for you

```
class Keytimes:
```

```
    void AddTimeValue( float time, float value );  
    float GetFirstTime( );  
    float GetLastTime( );  
    int GetNumKeytimes( );  
    float GetValue( float time );  
    void PrintTimeValues( );
```



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```
Keytimes Xpos;

int
main( int argc, char *argv[ ] )
{
    Xpos.AddTimeValue( 0.0, 0.000 );
    Xpos.AddTimeValue( 2.0, 0.333 );
    Xpos.AddTimeValue( 1.0, 3.142 );
    Xpos.AddTimeValue( 0.5, 2.718 );
    fprintf( stderr, "%d time-value pairs:\n", Xpos.GetNumKeytimes( ) );
    Xpos.PrintTimeValues( );

    fprintf( stderr, "Time runs from %8.3f to %8.3f\n", Xpos.GetFirstTime( ), Xpos.GetLastTime( ) );

    for( float t = 0.; t <= 2.01; t += 0.1 )
    {
        float v = Xpos.GetValue( t );
        fprintf( stderr, "%8.3ft%8.3f\n", t, v );
    }
}
```



Oregon State
University

Computer Graphics

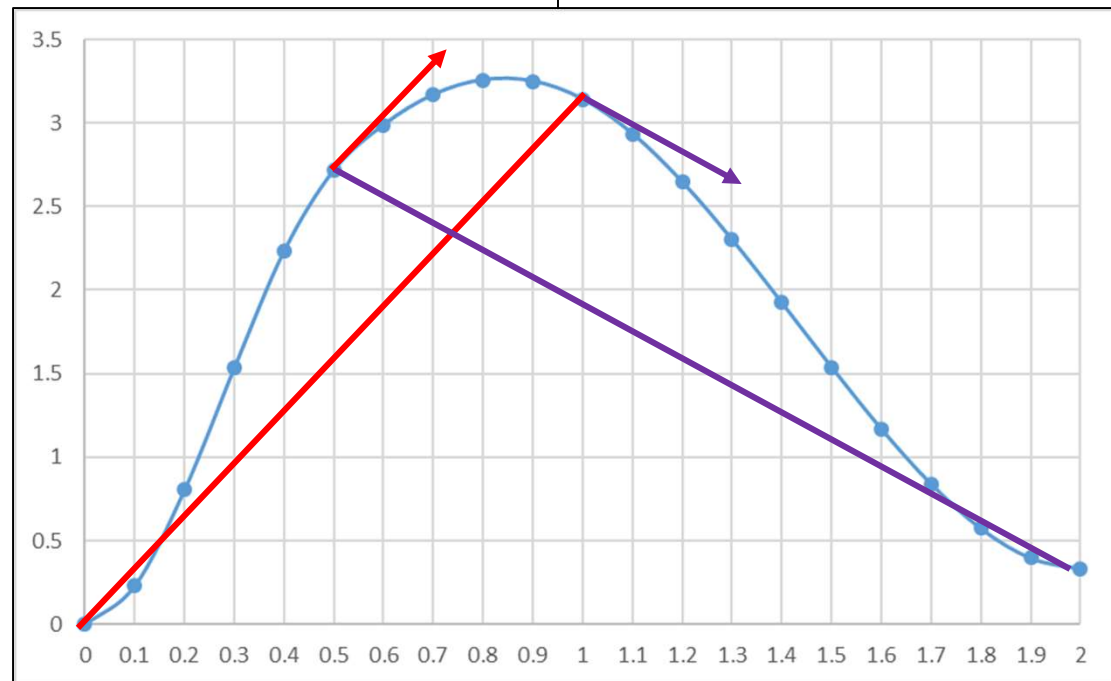
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(0.00, 0.000)
 (0.00, 0.000) (2.00, 0.333)
 (0.00, 0.000) (1.00, 3.142) (2.00, 0.333)
 (0.00, 0.000) (0.50, 2.718) (1.00, 3.142) (2.00, 0.333)

4 time-value pairs

Time runs from 0.000 to 2.000

0.000	0.000
0.100	0.232
0.200	0.806
0.300	1.535
0.400	2.234
0.500	2.718
0.600	2.989
0.700	3.170
0.800	3.258
0.900	3.250
1.000	3.142
1.100	2.935
1.200	2.646
1.300	2.302
1.400	1.924
1.500	1.539
1.600	1.169
1.700	0.840
1.800	0.574
1.900	0.397
2.000	0.333



Using the System Clock in Display() for Timing

```

#define MSEC    10000           // i.e., 10 seconds
Keytimes Xpos, Ypos, Zpos;
Keytimes ThetaX, ThetaY, ThetaZ;

...

if( AnimationIsOn )
{
    // # msec into the cycle ( 0 - MSEC-1 ):
    int msec = glutGet( GLUT_ELAPSED_TIME ) % MSEC;

    // turn that into a time in seconds:
    float nowTime = (float)msec / 1000.;
    glPushMatrix( );
        glTranslatef( Xpos.GetValue( nowTime ), Ypos.GetValue( nowTime ), Zpos.GetValue( nowTime ) );
        glRotatef( ThetaX.GetValue( nowTime ), 1., 0., 0. );
        glRotatef( ThetaY.GetValue( nowTime ), 0., 1., 0. );
        glRotatef( ThetaZ.GetValue( nowTime ), 0., 0., 1. );
        << draw the object >>
    glPopMatrix( );
}

```

Number of msec in the animation cycle

