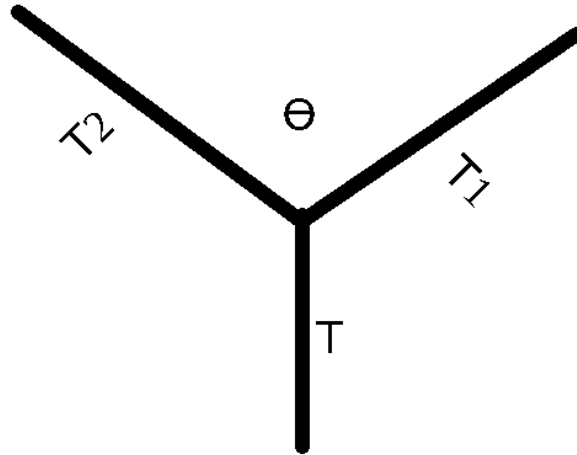


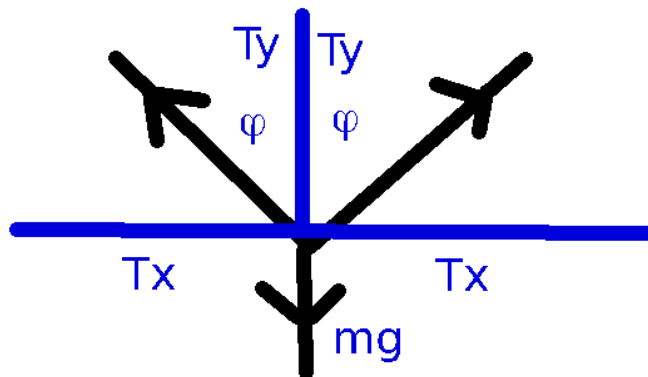
Sample Calculation for Lab 04

Repeat in great detail the following derivation. Both strings have the same length and the 3rd string is in the center of the two strings. Work this out on paper and include in your report.



In the image above, we have the following tensions
 $T = mg : T_2 = mg : T_1 = mg$.

We assume that the angle Θ is equally divided up the bisector. So that in fact the angle we will use is divided by 2, and I will call that ϕ .



$$\text{along } x : T_x = -T \sin \phi + T \sin \phi = 0$$

$$\text{along } y : 2 T_y - mg = 0 \Rightarrow T_y = \frac{mg}{2} = T \cos \phi \Rightarrow \cos \phi = \frac{mg}{2T}$$

But we know that

$$T = mg$$

because the strings on either side are holding up the same mass m . So:

$$\cos \phi = \frac{mg}{2mg} = \frac{1}{2} \Rightarrow \phi = 60^\circ$$

This gives us the expected angle between the two strings to be a total of

$$\theta = 2\phi = 120^\circ$$