AP2

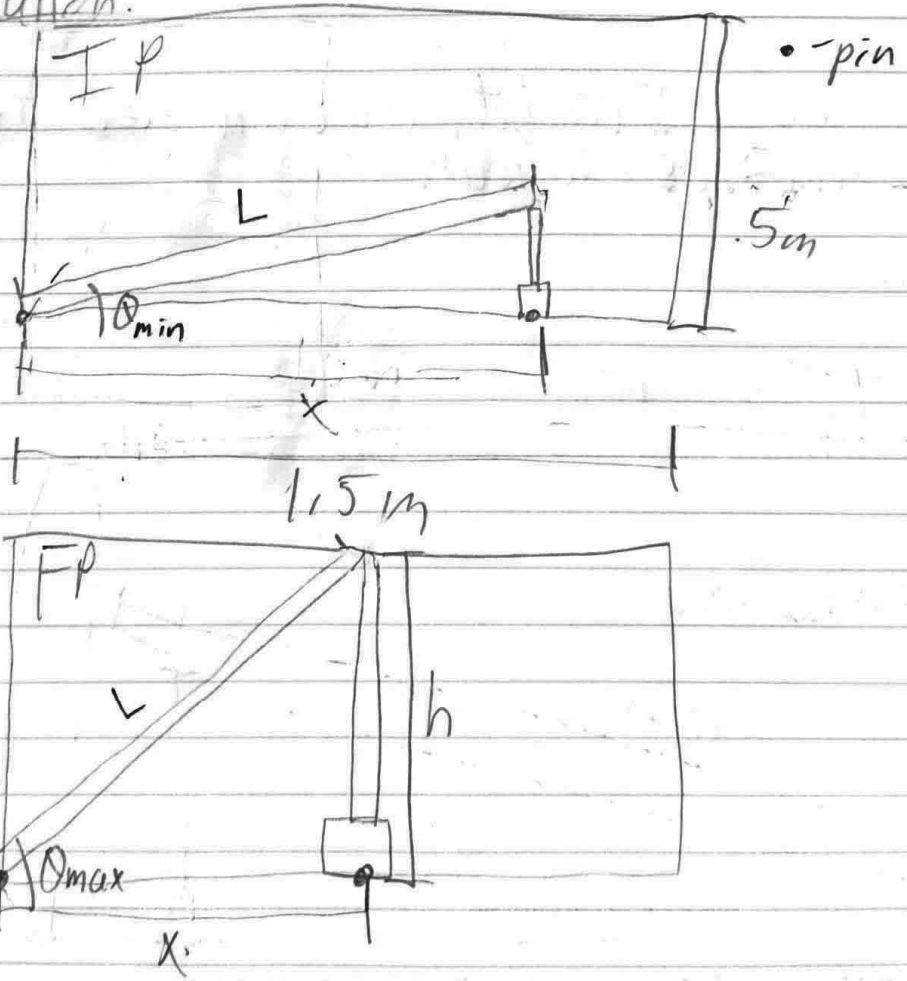
Given:
1.5m x .5m 2D space
list of actuators

Find:
Design to lift max weight to .5m

Plan:
1) Set up triangle design and pick actuator
2) Display in Excel
3) Sketch final design

Solution:

1)




Actuator: RSX bc strongest Force, 294kN, and stroke length, 1.5m, > than necessary .5m.

2)

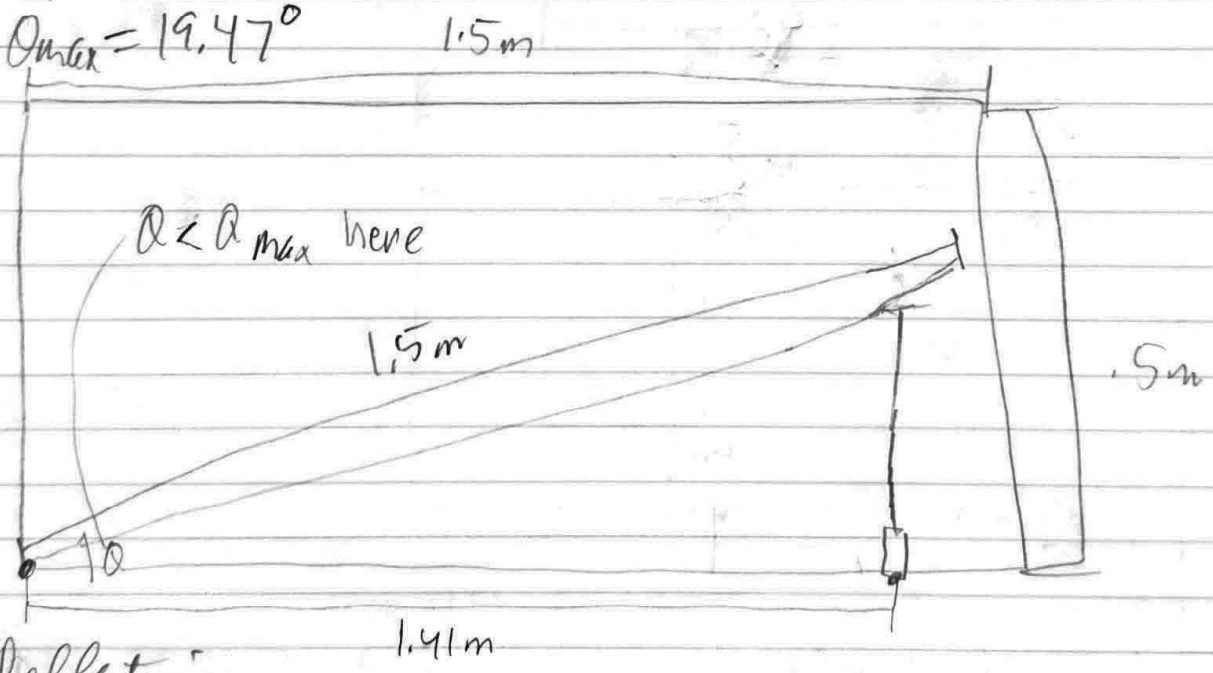
| L (length of bar) | Angle (bar/ground angle @ h) | x (x position of acctuator) | Tmax (max torque) | Wmax (max weight) | h (max lift height) |
|---|---|---|---|---|---|
| (m) 0.5 | (°) 90 | (m) 0 | (Nm) 0 | (N) 294 | (m) 0.5 |
| 0.6 | 56.44269024 | 0.331662479 | 97.50876884 | 294 | 0.5 |
| 0.7 | 45.5846914 | 0.4898979486 | 144.0299969 | 294 | 0.5 |
| 0.8 | 38.68218745 | 0.6244997998 | 183.6029412 | 294 | 0.5 |
| 0.9 | 33.7489886 | 0.7483314774 | 220.0094543 | 294 | 0.5 |
| 1 | 30 | 0.8660254038 | 254.6114687 | 294 | 0.5 |
| 1.1 | 27.03569179 | 0.9797958971 | 288.0599938 | 294 | 0.5 |
| 1.2 | 24.62431835 | 1.090871211 | 320.7161362 | 294 | 0.5 |
| 1.3 | 22.61986495 | 1.2 | 352.8 | 294 | 0.5 |
| 1.4 | 20.92483243 | 1.307669683 | 384.4548868 | 294 | 0.5 |
| 1.5 | 19.47122063 | 1.414213562 | 415.7787873 | 294 | 0.5 |

3) From the above data we can see the ideals are as follows.

$x - 1.41m$

$L - 1.5m$

$\theta_{max} = 19.47°$




Reflection:

I trust this design is best, because it makes sense that the acuator should be close to the load