ME370: ADAMS LAB

Department of Mechanical Engineering,
IIT Bombay

Session 5 Report

Name: Kavan Vavadiya
Roll Number: 210100166

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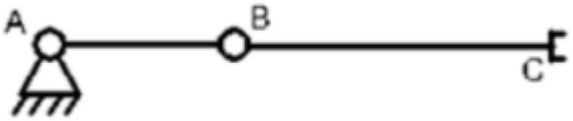
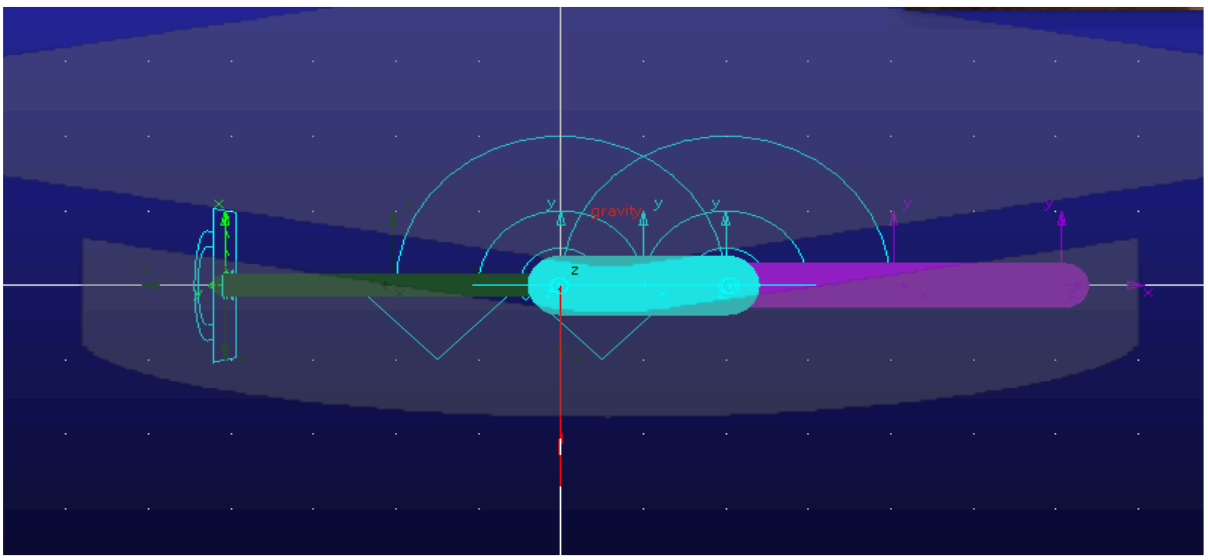
Given Information

	Lengths	
Roll Number	x	y
210100166	2.036	2.425

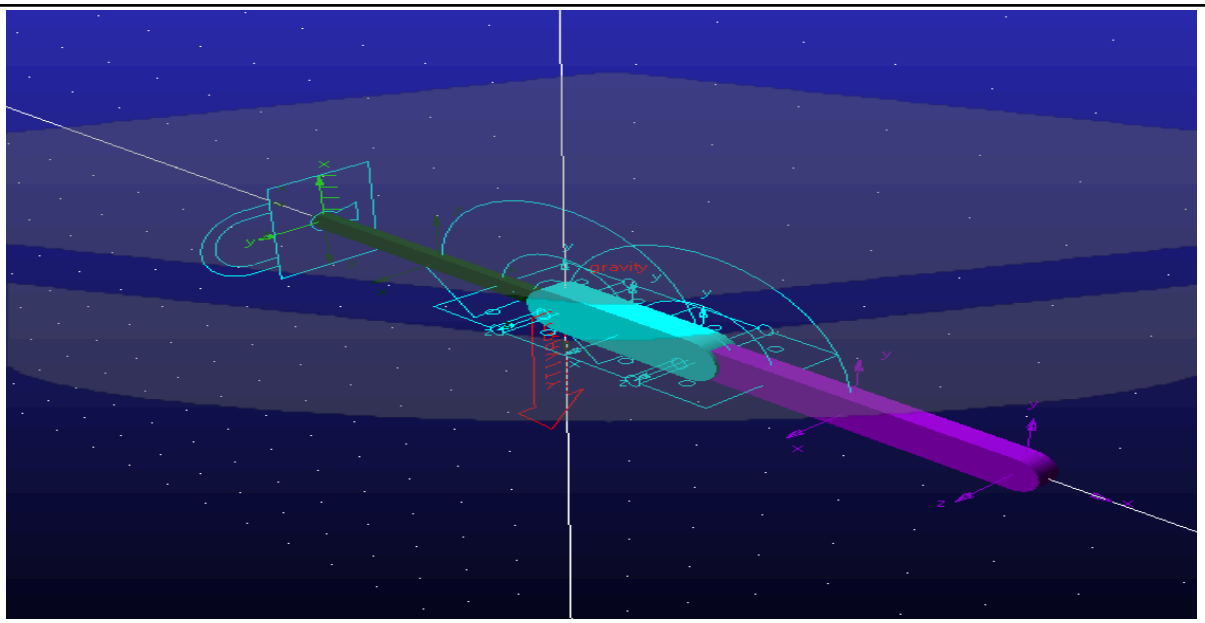
let assume AB = 10
BC = 20.36



(a) *Trace the workspace boundary*



Front View

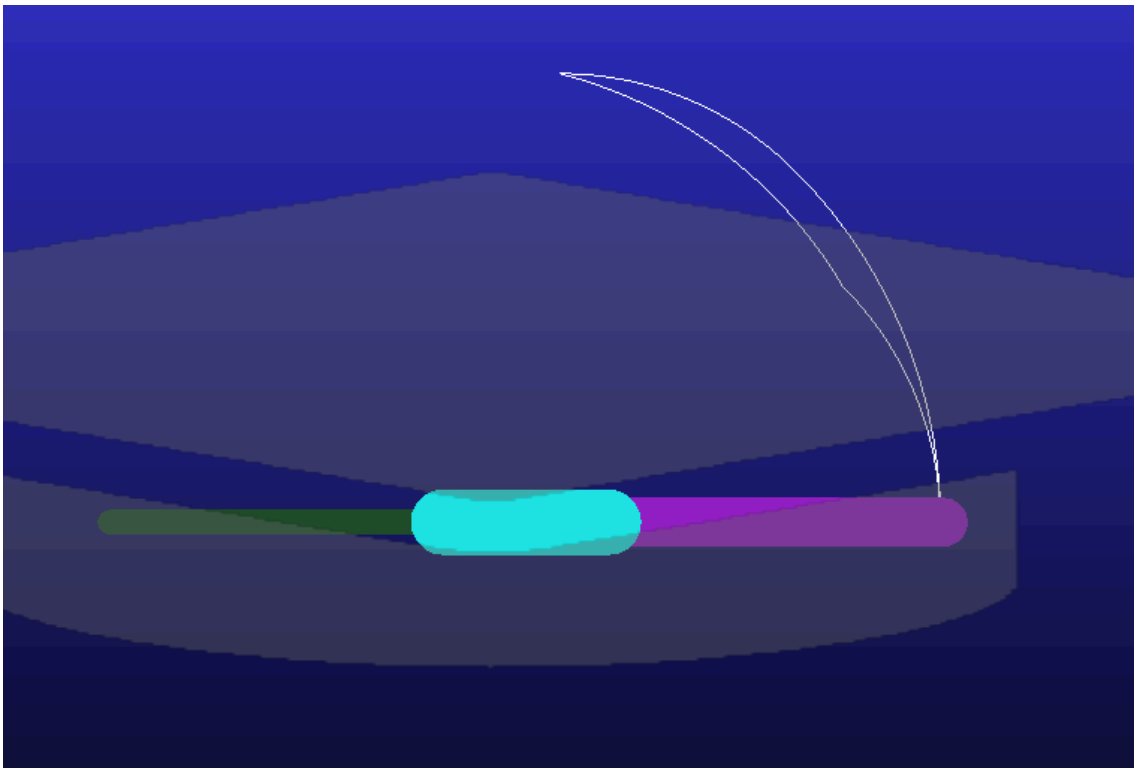


Isometric View

Two Ways:

1. Using nested IF loops:

JOINT MOTION TYPE	Velocity
JOINT A	IF(time-1.5: 30.0d,0,IF(time-3: 0,-30.0d,IF(time-4.5: -30.0d, 0,0)))
JOINT B	IF(time-1.5: 0,30.0d,IF(time-3: 30.0d,0, IF(time-4.5: 0, -30d,IF(time-6: -30d,0,0))))

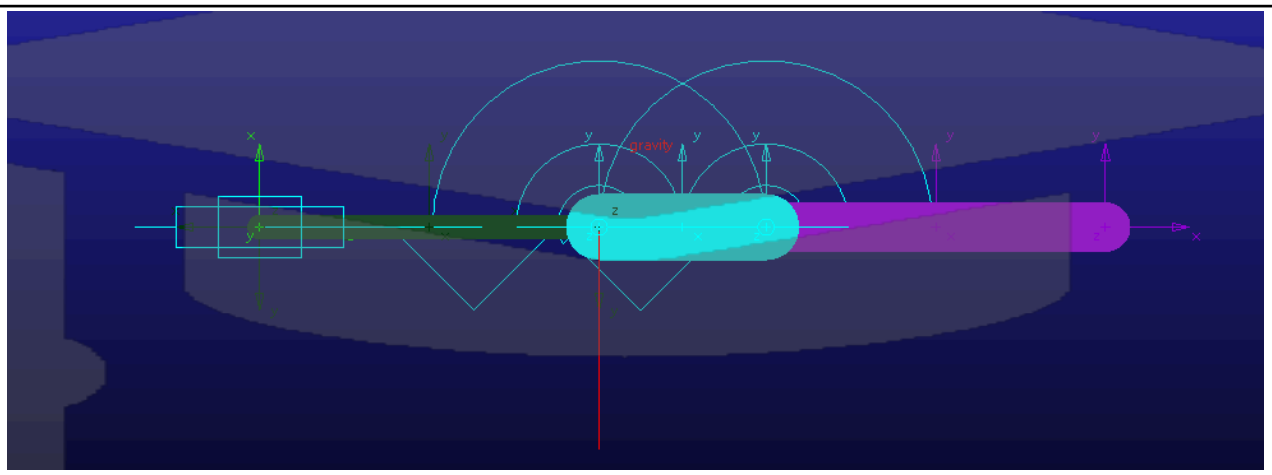


Workspace Boundary Trace Without Translation Of Ground Pivot

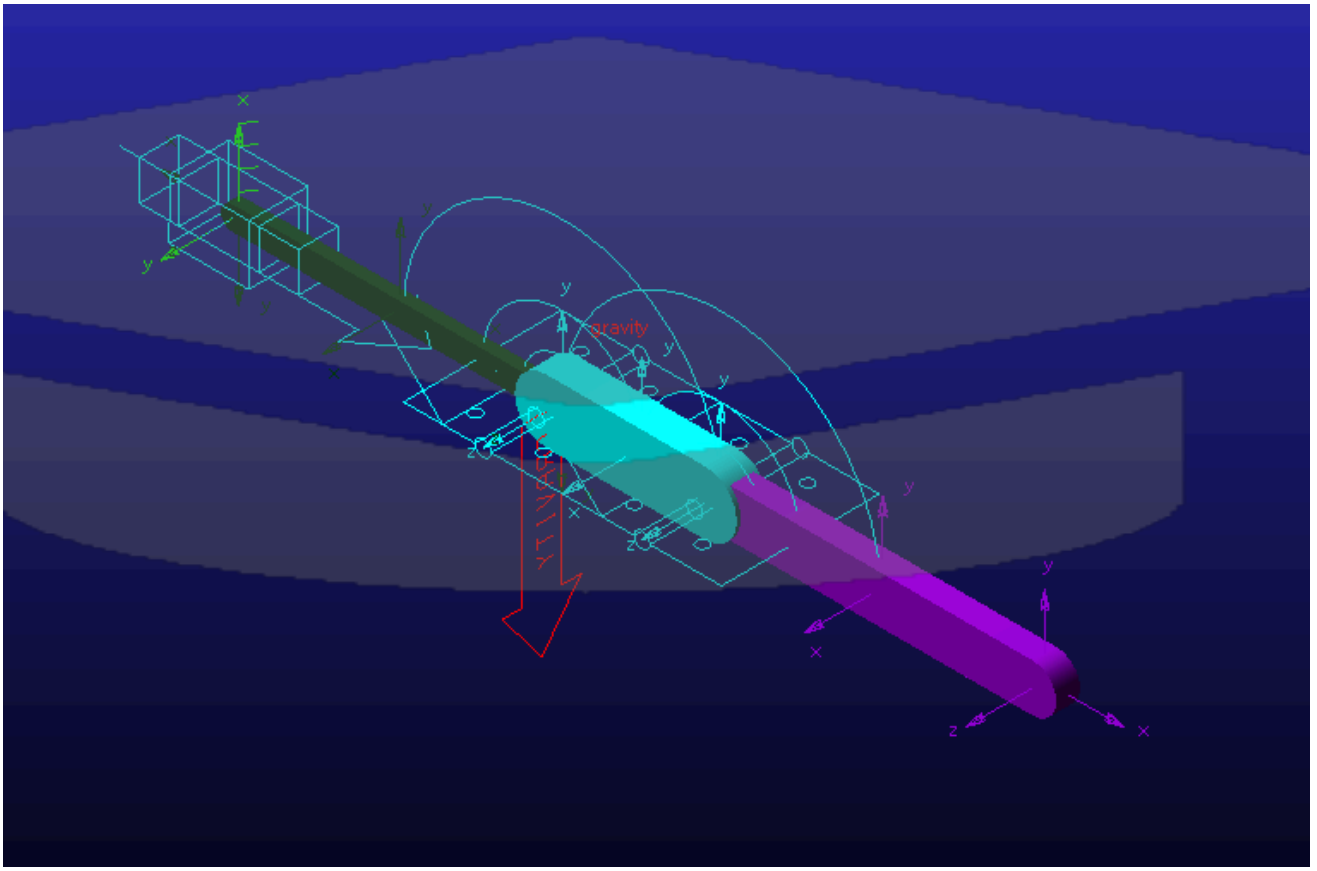
2. Using STEP function:

JOINT MOTION TYPE	Displacement
JOINT A	STEP(time, 0.0, 0.0d, 1.5, 45.0d) + STEP(time, 3.0, 0.0d, 4.5, -45.0d)
JOINT B	STEP(time, 1.5, 0.0d, 3.0, 45.0d) + STEP(time, 4.5, 0.0d, 6.0, -45.0d)

(b) ***Trace the workspace boundary if the ground pivot is allowed to move by 2.425 times the length of AB towards the right.***



Front View

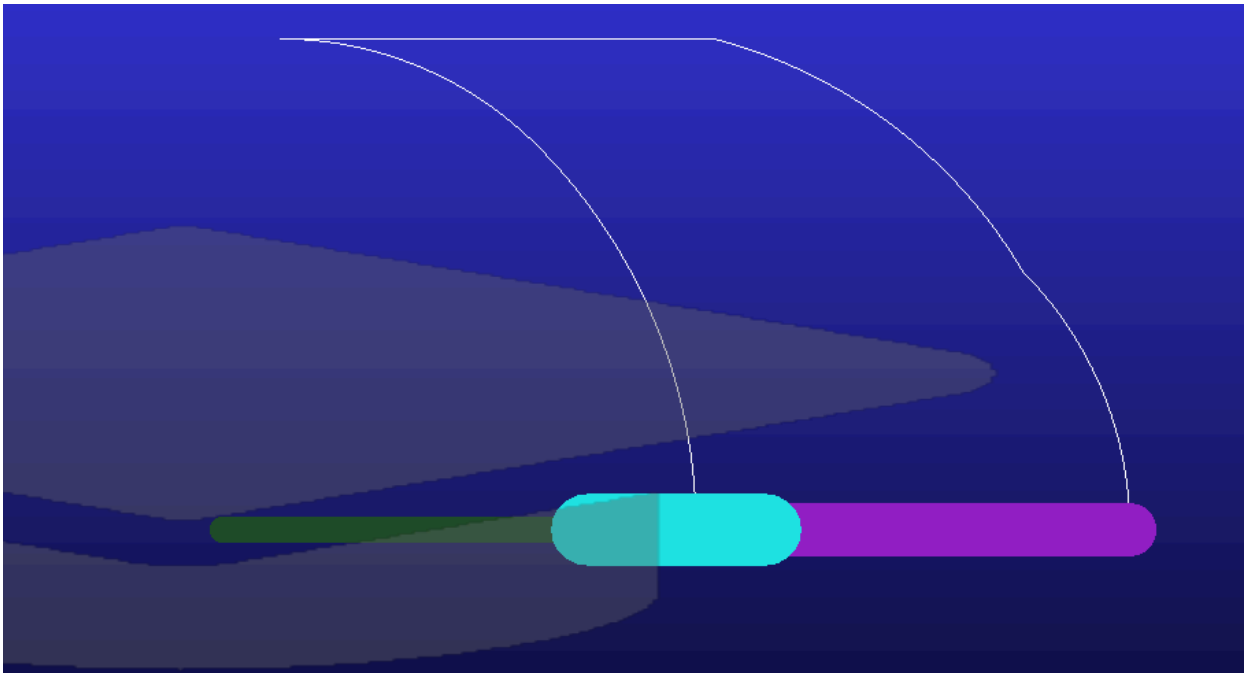


Isometric View

Two Ways:

1. Using nested IF loops:

JOINT MOTION TYPE	Velocity
JOINT A	IF(time-1.5: 30.0d,0,IF(time-3: 0,0,IF(time-4.5: 0,-30.0d, IF(time-6: -30.0d, 0,IF(time-7.5: 0,0,0)))))
JOINT B	IF(time-1.5: 0,30.0d,IF(time-3: 30.0d,0,IF(time-4.5: 0,0,IF(time-6: 0,-30.0d,IF(time-7.5: -30.0d,0,0)))))
Translation Joint	IF(time-3: 0, 161.7,IF(time-4.5: 161.7, 0, 0))



Workspace Boundary Trace With Translation Of Ground Pivot

2. Using STEP function:

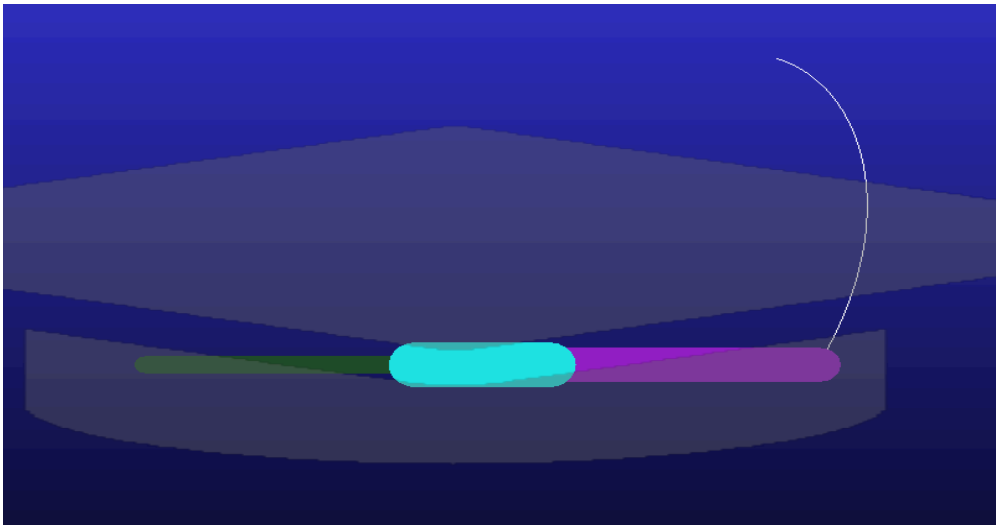
JOINT MOTION TYPE	Displacement
JOINT A	STEP(time, 0.0, 0.0d, 1.5, 45.0d)+ STEP(time, 4.5, 0.0d, 6.0, -45.0d)
JOINT B	STEP(time, 1.5, 0.0d, 3.0, 45.0d) + STEP(time, 6.0, 0.0d, 7.5, -45.0d)
Translation Joint	STEP(time, 3.0, 0.0, 4.5, 242.5) + STEP(time, 7.5, 0.0, 9.0, -242.5)

(c) *Trace the position of the end effector if all three actuators begin and end their motion simultaneously.*

Two Ways:

1. Using nested IF loops:

JOINT MOTION TYPE	Velocity
JOINT A	IF(time-1.5: 30.0d,-30.0d, IF(time-3: -30.0d,0,0))
JOINT B	IF(time-1.5: 30.0d,-30.0d, IF(time-3: -30.0d,0,0))
Translation Joint	IF(time-1.5: 161.7,-161.7, IF(time-3: -161.7,0,0))



Position Of End Effector For Simultaneous Motion Of All Actuators

3. Using STEP function:

JOINT MOTION TYPE	Displacement
JOINT A	STEP(time, 0.0, 0.0d, 1.5, 45.0d) + STEP(time, 1.5, 0.0d, 3.0, -45.0d)
JOINT B	STEP(time, 0.0, 0.0d, 1.5, 45.0d) + STEP(time, 1.5, 0.0d, 3.0, -45.0d)
Translation Joint	STEP(time, 0.0, 0.0, 1.5, 242.5)+ STEP(time, 1.5, 0.0, 3.0, -242.5)

—X—X—X—X— X—X—X — X—**END**— X—X— X—X— X—X— X—X—