ME352A - Lab 1

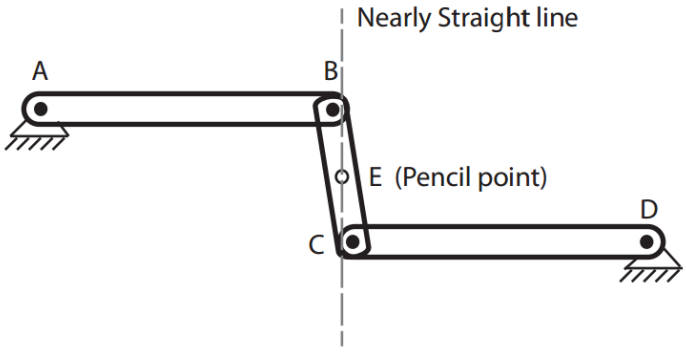
Make following mechanisms using the kit provided

Mechanism 1A: Watts Mechanism

Task: Report the curve traced by the pencil's point E *(get it signed by TA).*

Report:

1. Is the traced curve truly a straight line? Comment and provide a suitable explanation.
2. Draw the complete curve? Is it an open curve or a closed one? This curve has a name.
3. This curve is termed as a _____ curve, because the link BC is a _____ link.
   (Fill in the above two blanks with the same word!)

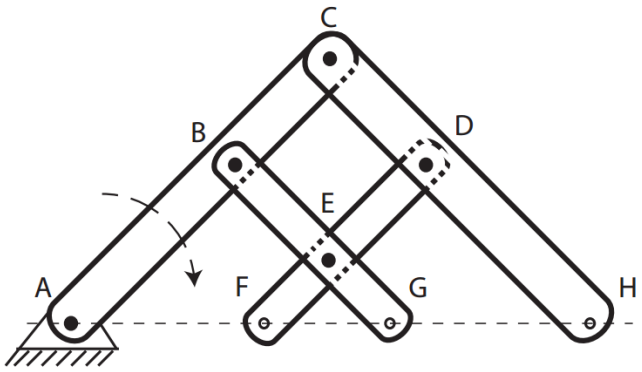


Mechanism 1B: The Multi-bar Pantograph Mechanism

Hold pencil at G and trace a curve of your choice and:-

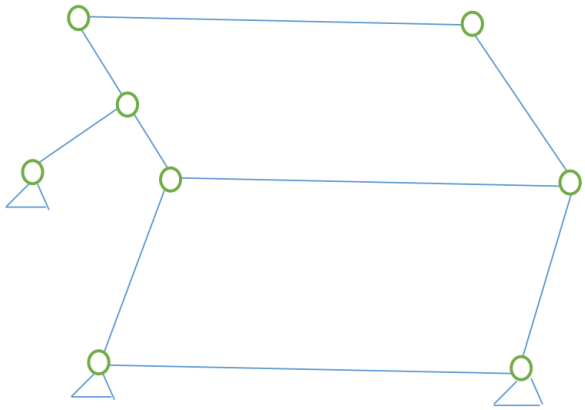
Report:

1. Report the curve traced by the pencil-points F and H *(get it signed by TA).*
2. Are these two curves enlarged, reduced or same as the curve you chose? Explain your observation.
3. How does doubling or halving of a curve depend on the lengths of the links?
4. Why is the second necessary condition given below important?
5. What is the degree of freedom of the mechanism?



Mechanism 1C: Four bar mechanism with a translational link

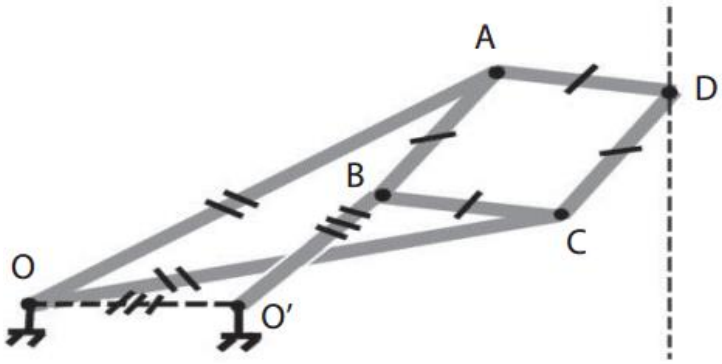
REPORT:



1. How many singular positions does a parallelogram mechanism have?
2. Describe two physical applications where a parallelogram mechanism would be useful.
3. What is the degree of freedom of this mechanism? Report the number of singular, binary and ternary links.
4. After completing one parallelogram comment on the double crank nature of the mechanism. Can you explain the special observation?
5. How will the trajectory of the ternary links' end point look like? How is it linked to the motion of the topmost link?
6. Look at the motion of the topmost link. Observe this motion and comment about it.

Mechanism 1D: Peaucelliar-Lipkin Linkage:

Report:



1. Check that D traces a straight line *(get it signed by TA)*.
2. Write about the link lengths and describe their motions separately.
3. Can you think of potential applications?
4. Is there a crank in the mechanism? If not, then how will you drive the mechanism by a rotational input?
5. Why is this mechanism not used in place of Watt's mechanism? After all this produces an exact straight line.

Hints:

1. *Use SPACERS/WASHERS, along with PINS, to allow free rotary motion in between the connected links.*
2. *Use CIRCLIPS to lock the PINS on both sides of the axis point.*
3. *Use SCREW and WINGNUT to ground a link.*