

# Project 1 report format

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## **1 Introduction**

The report will be your opportunity to describe your design approach and to motivate design decisions with analysis and synthesis strategies, and show how you went from concept to design. Each group will turn in one report digitally via blackboard. Reports should be typed and professional, have a title, your group name and individual names, the date, and the course/instructor.

## **2 State original design problem**

Summarize the significant details of the original design problem posed to you. What are the client needs? Perform a needs assessment.

## **3 Engineering specifications**

Formulate engineering specifications from the original design problem.

## **4 Concept generation**

Describe your concept generation process. What strategies from the class did you use to refine down to your final concept?

## **5 Synthesis and Analysis**

Here you will use synthesis to build up the 4-bar linkage design, or at least to describe how you did it, and then analyze the results to show what path it follows. Did the analysis change your design?

## **5.1 Graphical synthesis**

Use two or three position synthesis to put together the intended motion for your 4-bar linkage.

## **5.2 Position analysis**

We described equations to determine the angles and thus positions of each link given the input angle and link lengths. Use these equations to analyze the actual motion of your four bar linkage, generating plots, and write down the equation for each joint's position.

Does the design satisfy your engineering specifications? Is it different from what you originally synthesized graphically or analytically?

## **5.3 Optional: Analytical position synthesis**

You can use analytical (equation-based) methods to synthesize the motion as well, but we spent most time on graphical synthesis and analytical position analysis, so this method is not required.

## **5.4 EXTRA CREDIT: Velocity analysis**

Compute the velocity of each link motion, and from that determine the speed that robbie can move, given your estimated input link angle velocity.

## **6 Drawings of final design and specifications**

## **7 EXTRA CREDIT: of course, making the physical 'robot'**

## **8 EXTRA CREDIT: Animation**

Animate your linkage in matlab, freemat or similar (programming). You can also animate in solidworks but to get this you have to write a piece of code to animate.