Homework – Ratchets, Drives and Gearing

1. Fill in the blanks for the following (20%)

   A. Cams turn _____ motion into an upward and downward motion
   B. _____ is difference between a cam's minimum and maximum radii
   C. Eccentricity means to be _____
   D. Unlike cranks, cams have the ability to store _____
   E. Cams are the _____ version of computer programs
   F.A _____ crank converts up-down motion to side-to-side motion
   G. A 3-bar (linkage) is for _____ motion
   H. A slider-crank with a _____ increases lever sway
   I. Levers move in a _____ arc
   J. A _____ can be used to keep the lever against the cam so it follows the profile
   K. Springs in cam-followers increase _____, so tensioners are used

2. Refer to the lecture notes on Cams; Springs, and Linkages. When giving explanations, use bullets from these notes (no need to reference external materials). **Provide your own sketches**; don't cut-and-paste from the lecture notes or external sources (10%).

   A. List, sketch and give examples of the 4 types of springs
   B. Explain how cams examples of memory and storage

3. Refer to the lecture notes on Cams; Springs, and Linkages. Define (1 to 2 sentences), describe (with bullets) and **provide your own sketches** to support you definitions and descriptions for the following. When giving explanations, use bullets from these notes (no need to reference external materials). **Provide your own sketches**; don't cut-and-paste from the lecture notes or external sources (10%)

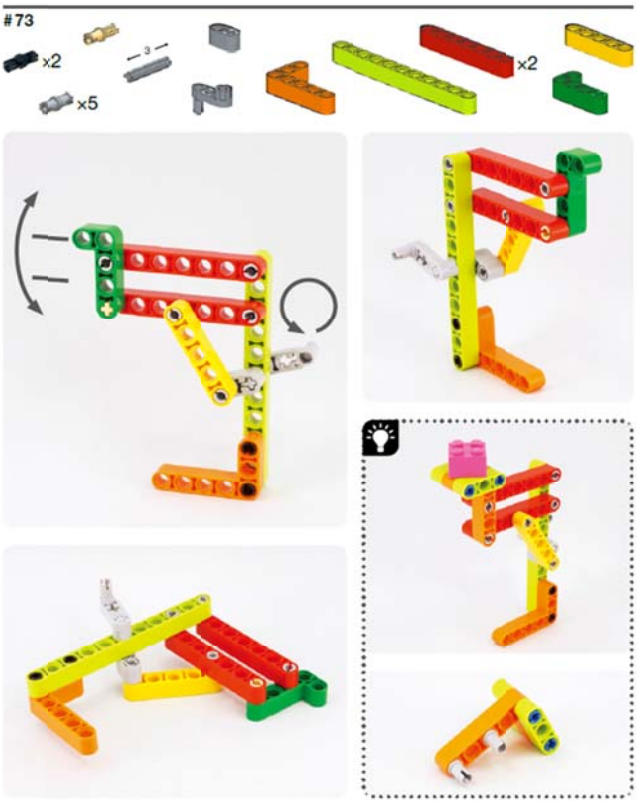
   A. Lobe Cams
   B. Dwell (or Pause)
   C. 3-bar linkages

4. Refer to the lecture notes on Cams; Springs, and Linkages. Sketch and describe (with bullets) the 4 cycles of a 3-bar linkage. In your sketch show where the straight line motion is and in your description, explain how the straight motion arises **Provide your own sketches**; don't cut-and-paste from the lecture notes or external sources (10%)

5. Studio exercise. Pick 2 oscillating mechanisms. Create: (1) the step-by-step build plan and BOM; (2) physically build the mechanism and provide a YouTube video (URL) demonstrating it working; and (3) search for real-world mechanisms that mimic and/or are similar to the motions of the mechanisms you constructed - include a photo and/or video demonstrating the real-world mechanism you found (50%).

   Note: to improve your Build Plan, use Studio's Page Layout options. This allows one to align 2 or more steps in a single page. One can also change the resize the graphic as well as the perspective (e.g. angle view). For the BOM, use Studio's feature: hover over left pane which has the pages of your build-plan, and right click to insert a New Page. Then below the ribbon bar, click Insert – Bill of Materials).

Oscillating Mechanisms



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