

GLOBAL CAD MECHANISM CHALLENGE

DESIGN BRIEF:

You have a minimum of two components, A & B, that rotate relative to each other.

You need to design a mechanism that makes it possible for component A (red) to passively lock into place relative to component B (gray) when rotated in 90 deg increments (i.e. passively locks in four equally spaced rotational positions). The passive lock should be easily overcome (rotated) by a human operator. Tip: You don't have to reinvent the wheel; you may use products around you or the internet as inspiration. Reverse engineering is allowed. You may use different colors and geometries in your solution, you do not have to use the same exact red and gray disks above, they're simply used to illustrate the challenge.

OBJECTIVES:

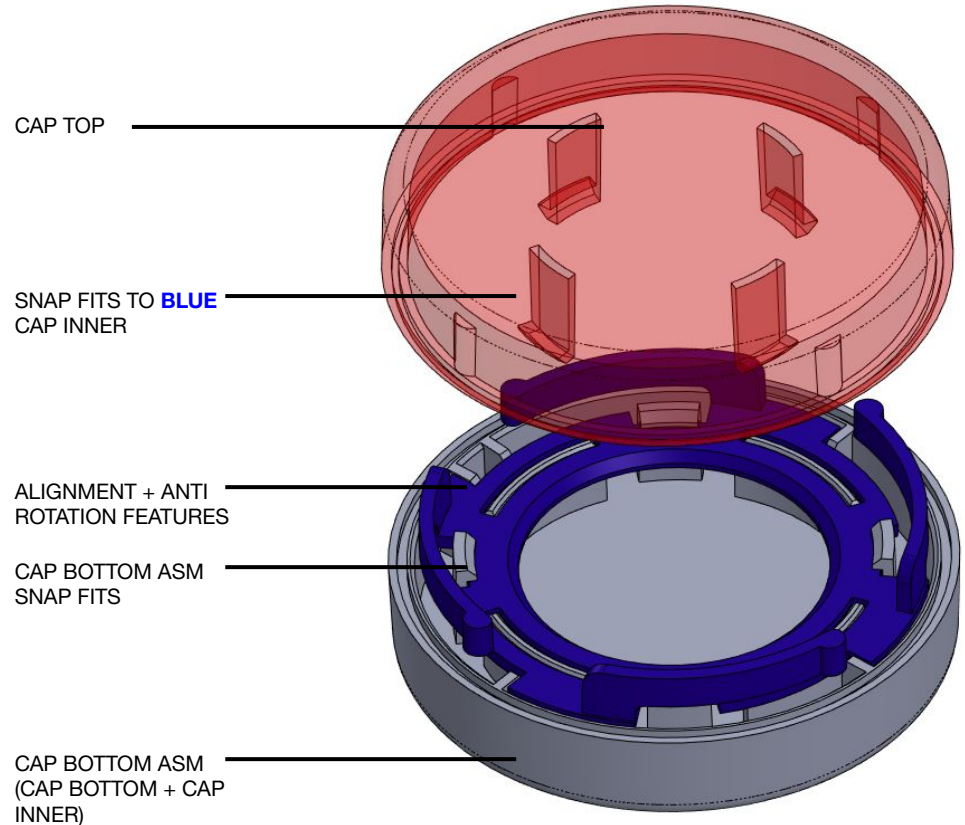
Determine if the participant can translate written requirements into a working mechanism on CAD with motion.

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SOLUTION:

This design proposal consists of a 3 piece assembly of low-cost injection molded plastic components. The design consists of a CAP_TOP and a CAP_BOTTOM. The CAP_BOTTOM is a sub-assembly of the CAP_BOTTOM and CAP_INNER components. This sub-assembly is designed to easily snap together to minimize costs. The CAP_INNER component is also keyed to ensure there is only one assembly orientation (not important for this design, but may future-proof additional product iterations). The CAP_TOP also snaps together with the CAP_BOTTOM allowing for rotation. A touch of pre-load on the plastic snap fits provides a secure fit for the rotating components.

The design is able to index into 4x unique positions situated 90 degrees from each other. This indexing is accomplished through 4x flexible plastic arms on the CAP_INNER that click into detents on the "CAP_TOP". Generous lead-ins in both rotational directions allow the two CAP halves to work in either direction and be easy to rotate out of the 4x fixed locations. The flexible plastic arms have been made as long as possible to ensure an adequate number of cycles and the plastic does not permanently deform over time.



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