

## Lab 2: Parts Assembling

### Submission Instructions:

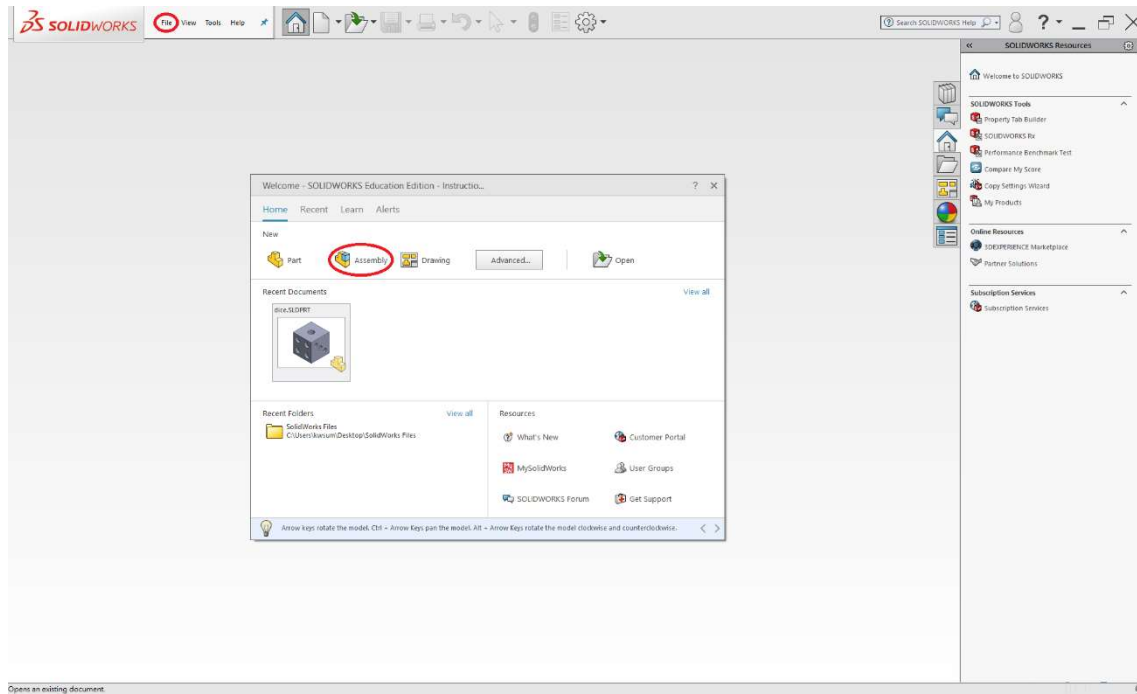
- Save all the files which you created in the lab
- Compress the files to one single zip/rar file
- Upload the zip/rar file **on or before 15:30** on the lab day
- Marks will be deducted for late submission, deduct 10 marks per every 10-minute interval (e.g. deduct 20 marks for 11 minutes late).

### 1. Getting Started with Parts Assembling

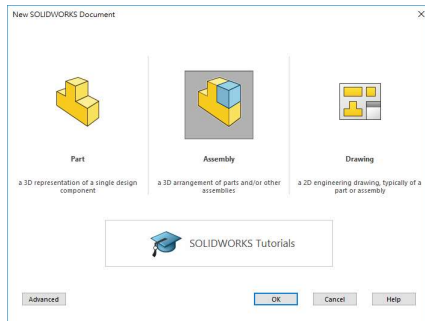
- 1.1. Double click the SolidWorks icon at the Desktop of your computer (it takes about 10 minutes to start)



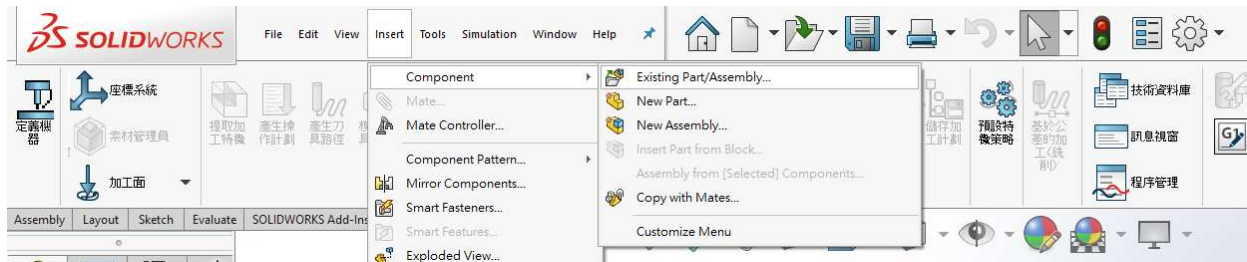
- 1.2. SolidWorks will start up as shown below.



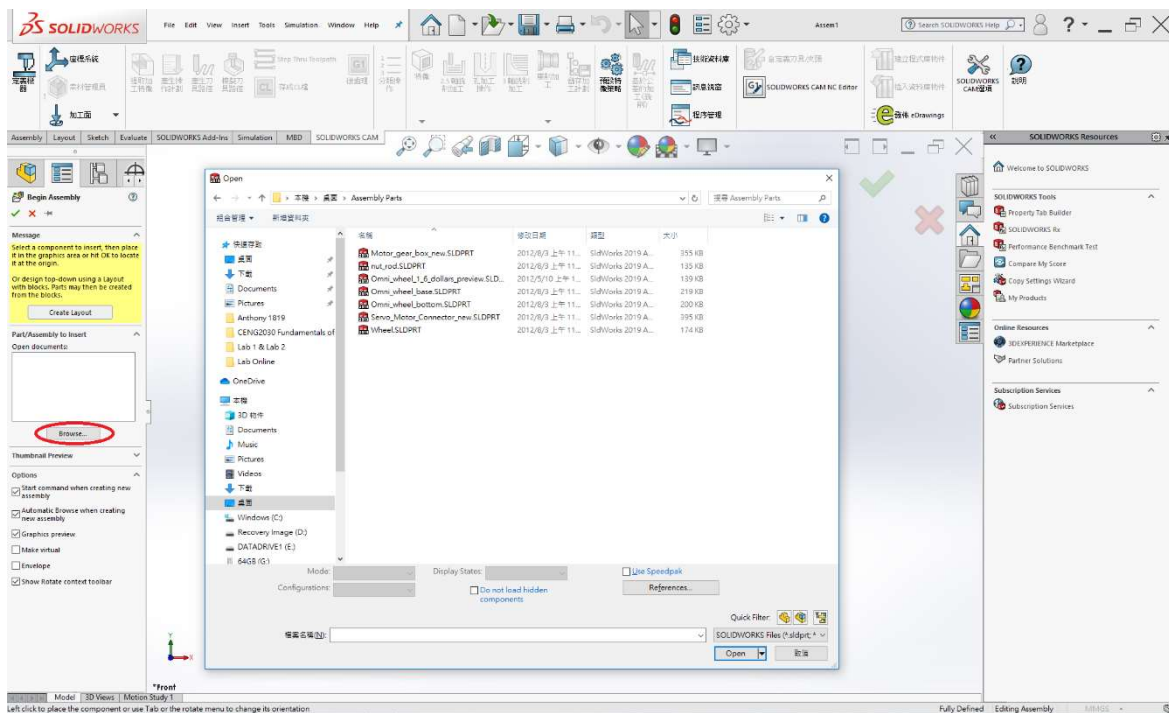
1.3. To create a new assembly, click **File > New** at the menu bar



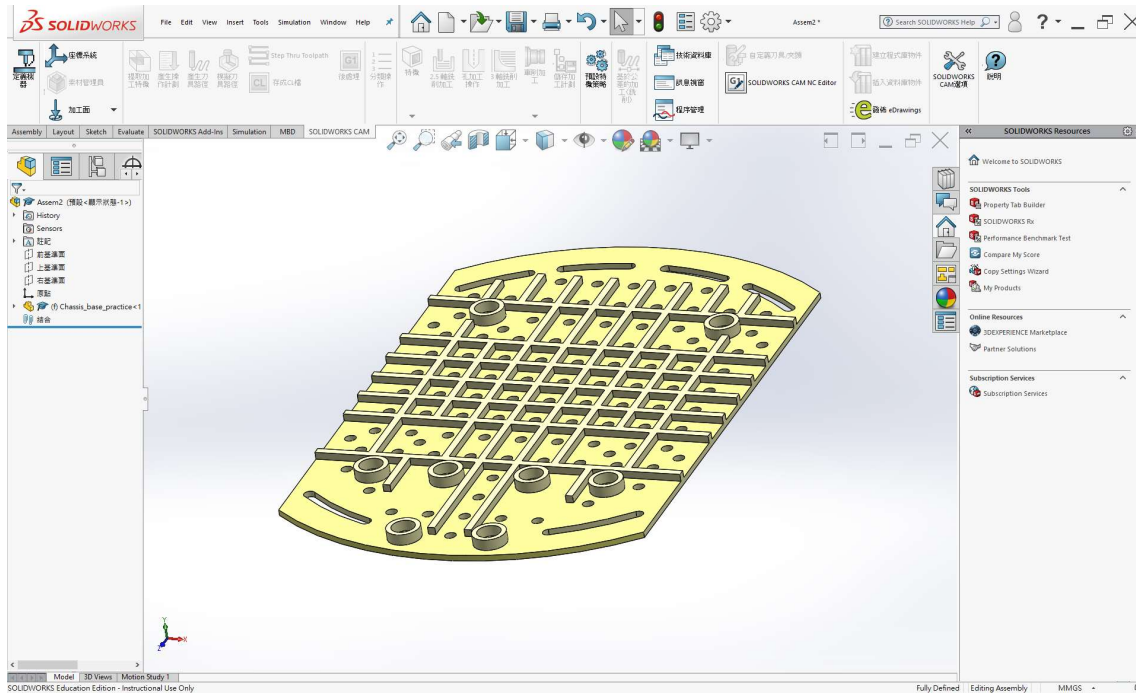
1.4. Click the **Assembly** icon, and **OK**



1.5. If there is no pop up window for inserting components, click **Insert > Component > Existing Part/Assembly**

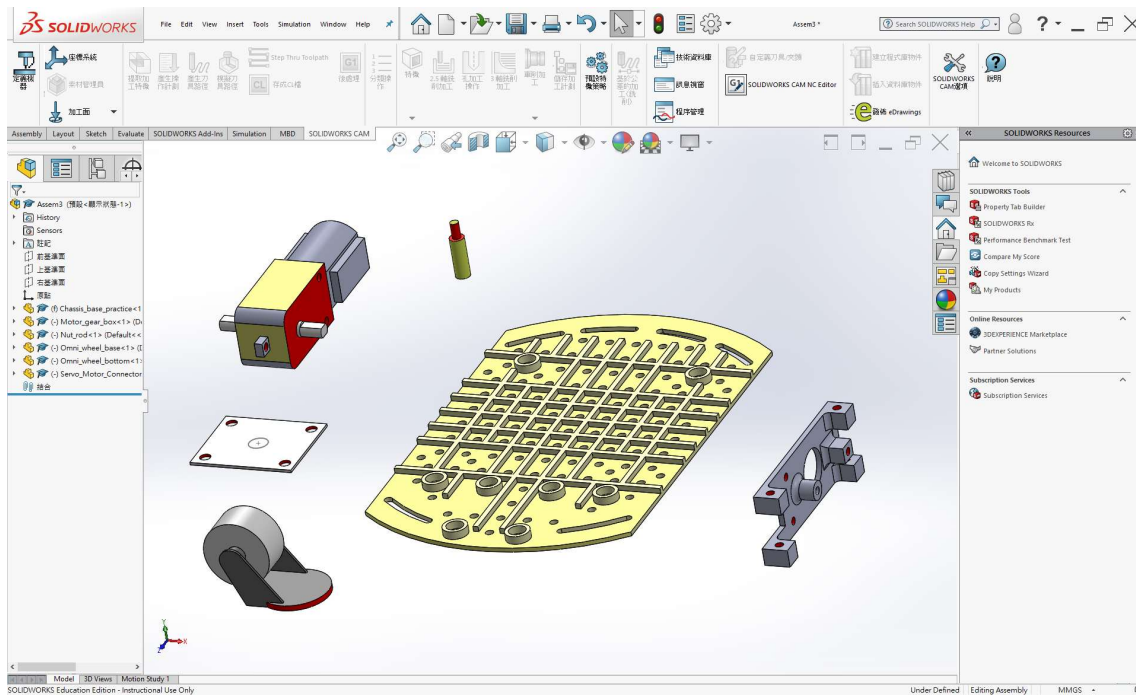


1.6. Browse to the folder where containing the parts/assembly files. Select **Chassis\_base\_practice.SLDPRT**, and click **Open**.

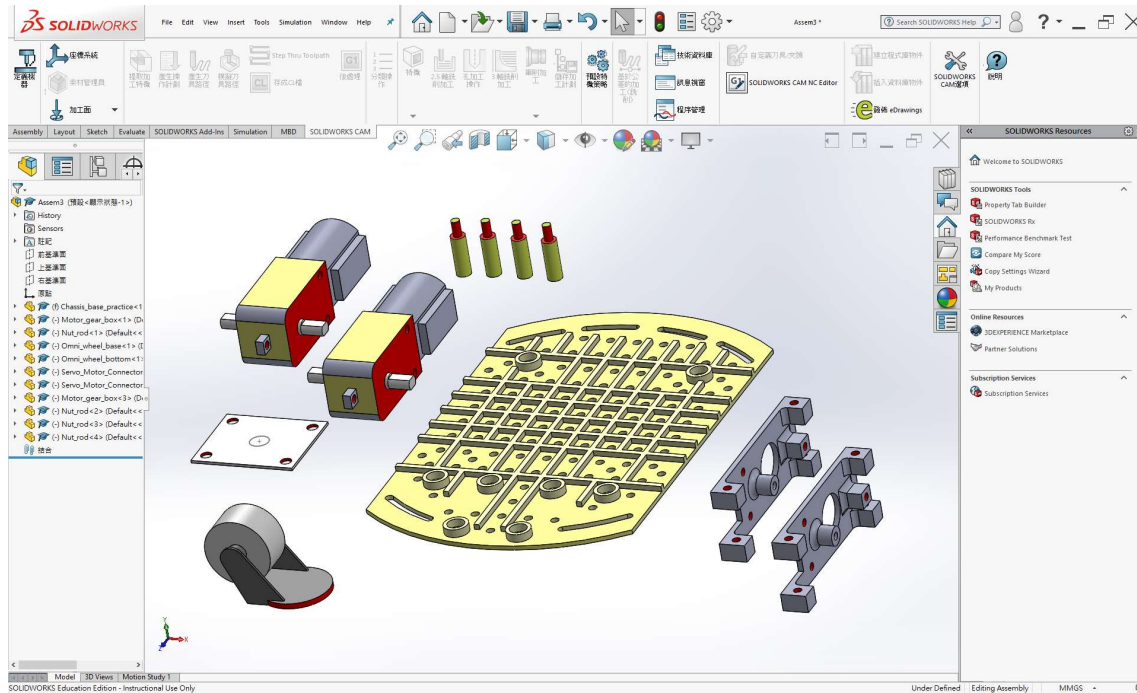


1.7. The first parts is in place. Repeat Step 1.6 to insert the following components as listed below:

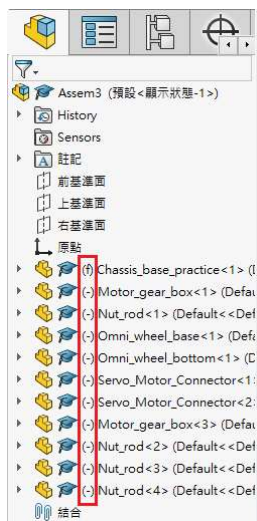
- Motor\_gear\_box.SLDPRT
- Nut\_rod.SLDPRT
- Omni\_wheel\_base.SLDPRT
- Omni\_wheel\_bottom.SLDPRT
- Servo\_Motor\_Connector.SLDPRT



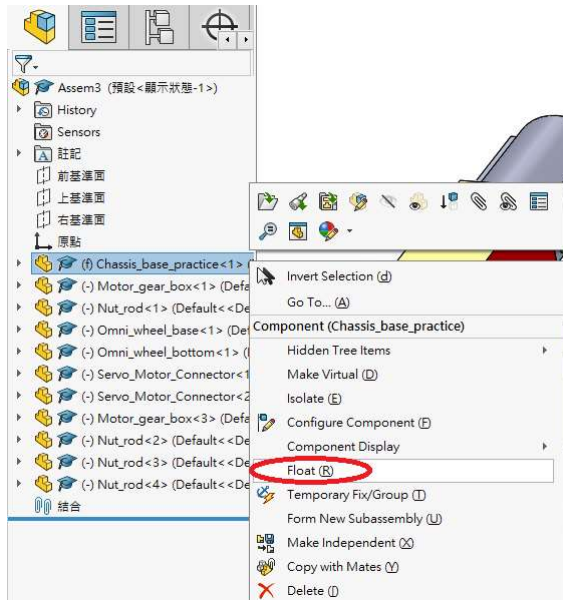
1.8. To duplicate a component, move the mouse onto the required component, press Ctrl+Mouse Left Button, and pull out.



1.9. At the left menu, you can see a list of inserted components. The prefix **(f)** or **(-)** of each component indicates that the position of the component is either fixed or floating respectively.



1.10. You can **right click** a component, and set it to **Float/Fix** if necessary.



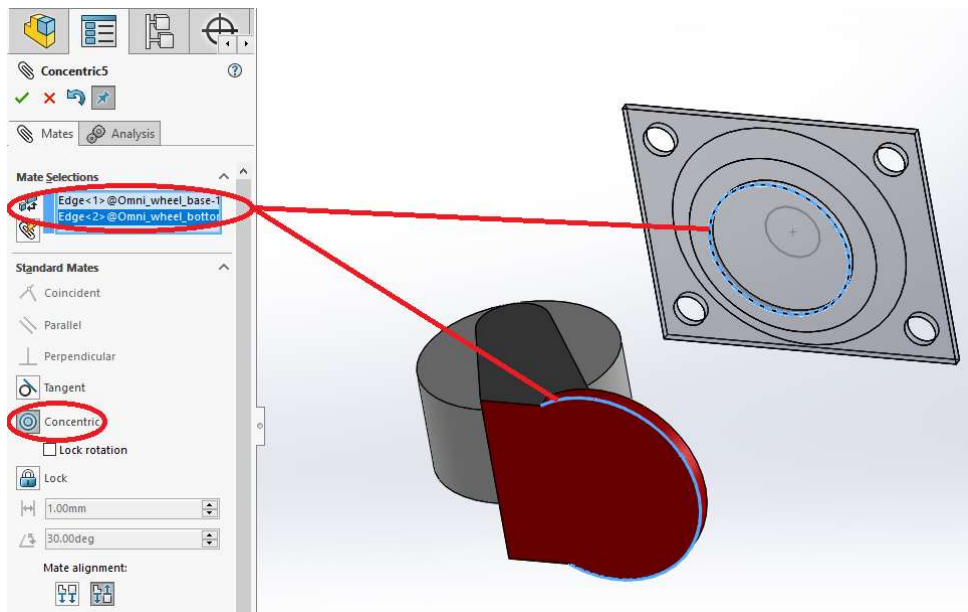
## 2. Assembling

- 2.1. To assembly parts together, use **Mate** to create the relations on the positions of two components relative to one another.
- 2.2. Most commonly used mates are:
  - Coincident: configure two items (faces, edges, or planes) so that they touch each other
  - Parallel: configure two items so that they remain a specified distance from one another
  - Concentric: configure two items so that they share the same center axis
- 2.3. In the **Assembly** tab, click **Mate**

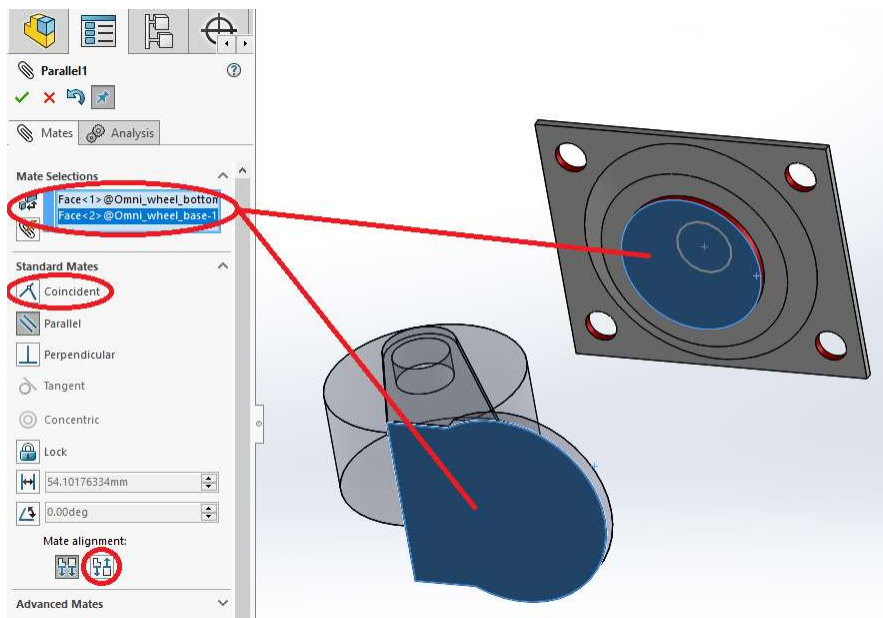




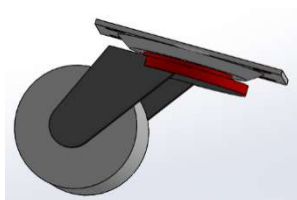
- 2.4. Select two items (faces, edges, or planes), choose their relation at **Standard Mates**.
- 2.5. For example, to align the omni wheel base and omni wheel bottom about the same axis, select one edge on the Omni\_wheel\_base, and another edges on the Omni\_wheel\_bottom and choose **Concentric**, and click the **Green tick** to confirm.



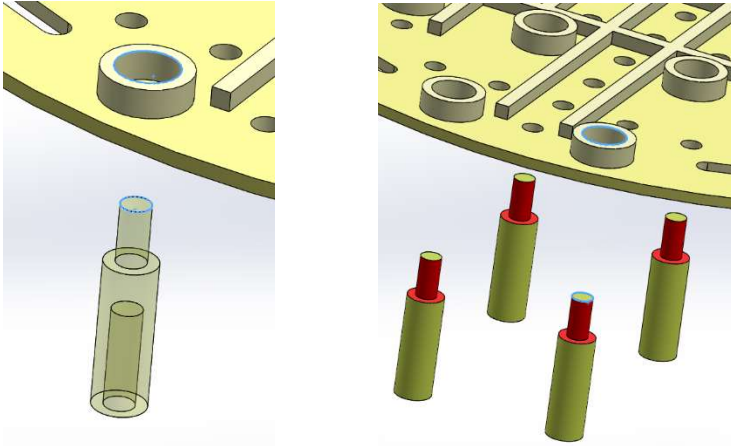
- 2.6. To place these two parts together, click **Mate** again, select two faces as shown below, choose **Coincident**.



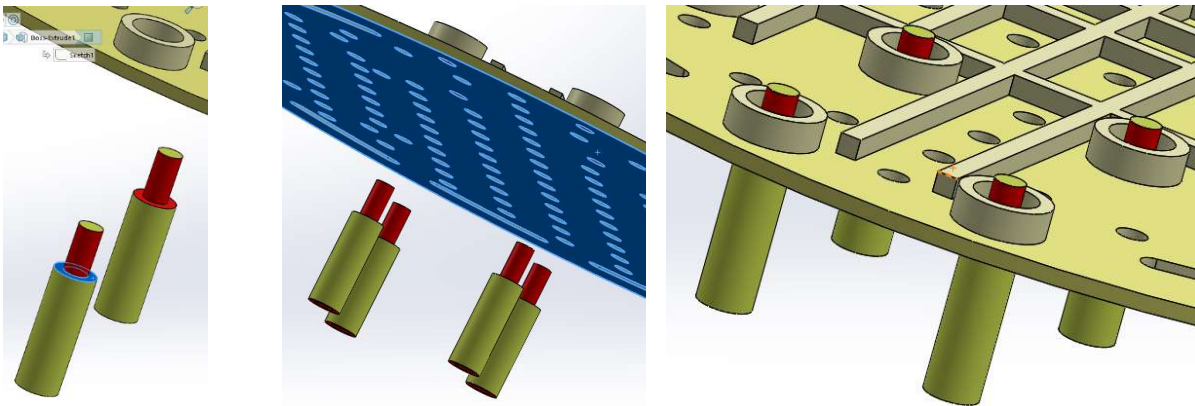
- 2.7. Since the omni wheel base and omni wheel bottom are oriented in different directions, press the **Mate alignment:Anti-aligned** button to flip the omni wheel base over, and click the **Green tick** to confirm.



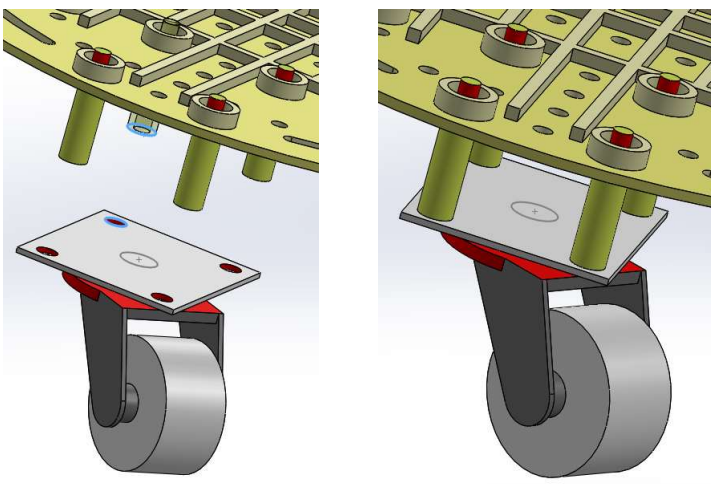
- 2.8. By using the similar ways from the Steps 2.3 to 2.7, we can also assemble the nut rod, the omni wheel and the chassis together.
- 2.9. **Mate > Concentric** for rod edge and chassis edge as below.



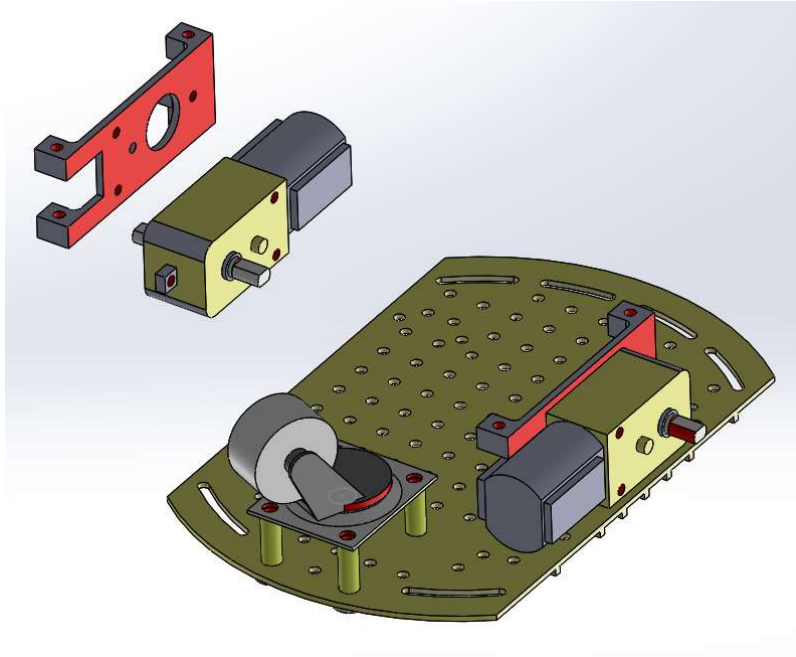
- 2.10. **Mate > Coincident** for rod surface and chassis surface as below:



- 2.11. **Mate > Concentric** for omni wheel base edge and rod edge, and **Mate > Coincident** for omni wheel base surface and rod surface.



2.12. The assembling of motor gear box and the motor connector is left for your own exercise. One side of the gear box is assembled as shown below for your reference.



THE END