

## Pro/Assembly

An assembly is a collection of parts oriented and positioned together. Creating an assembly involves telling Pro/E how the various components fit together. To do this, we specify **assembly constraints**. A component that is fully constrained in the assembly is called placed or assembled. Components in a movable assembly (**a mechanism**) are joined together by **connections**. This is a special type of constraint that allows motion along specific degrees of freedom.

In the tutorial, we will create a four bar mechanism as shown in figure 1. The mechanism is an assembly composed of three components: PART1 (red), PART2 (green) and PART3 (yellow). First, we will place components using constraints and then connections.

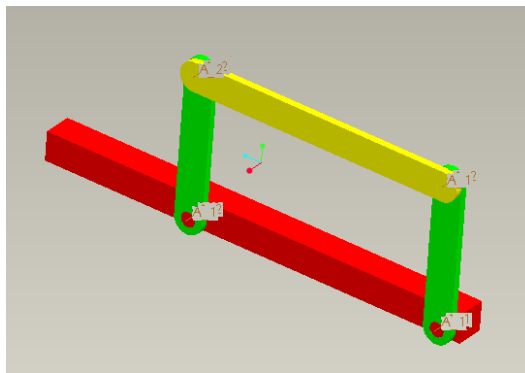



Figure 1

### A. Creating a Four-Bar Mechanism Using Constrains:

1. Placing the first part:
  - a) Create a new assembly called Tutorial2a. Accept the default template.
  - b) Click  or **Insert > Component > Assemble**. The **Open** dialog box opens.
  - c) Select part1.prt. The **Component Placement** dashboard appears as shown in figure 2.

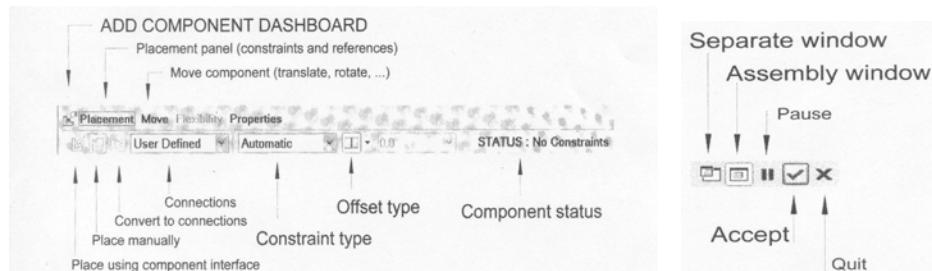


Figure 2





- d) Choose  **Default** from the **Constraint Type** list to assemble the part at the default location. This defines part1 as the ground body as shown in figure 3.



Figure 3

- e) Click .
2. Placing the second part:
- a) Click  or **Insert > Component > Assemble**.
- b) Choose part2.prt. The **Component Placement** dashboard appears.
- c) Accept default **Automatic** from the **Constraint**.
- d) Choose axis A-1 on part1.prt and A-1 on part2.prt to define axis alignment
- e) Choose Surface F8 on part1 and surface F6 on part2 for alignment as shown in figure 4 and click .

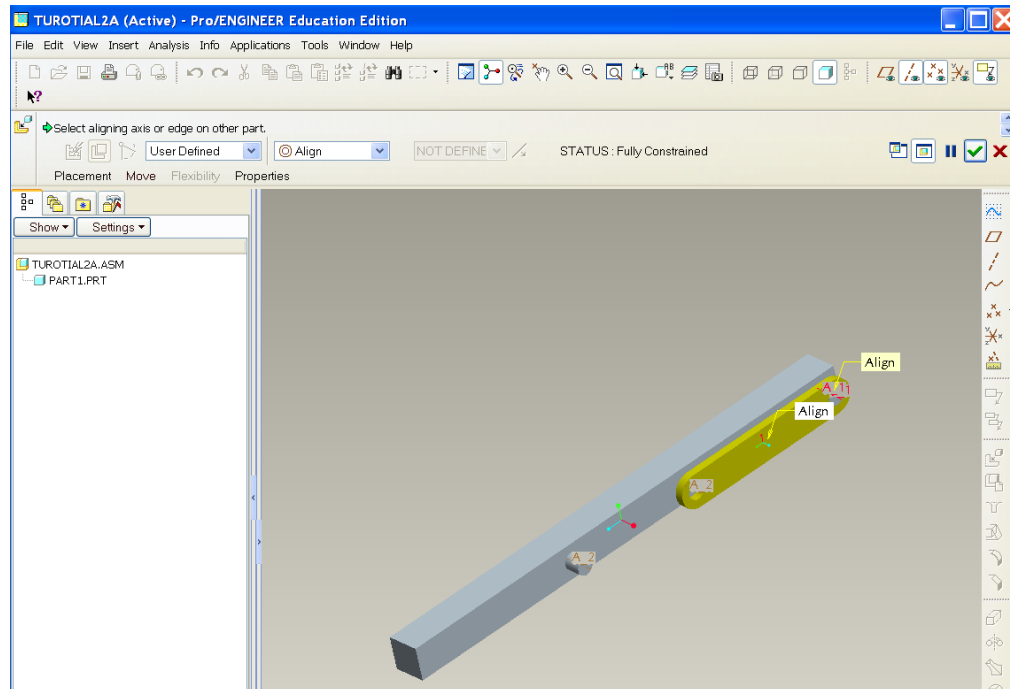


Figure 4

- f) Add one more constraint to make part2 perpendicular to part1 though the assembly is fully constraint. Open Placement panel and click on New Constraint. Pick 2 surfaces highlighted as shown in figure 5 for Align Angle Offset equal to zero as shown in figure 5.

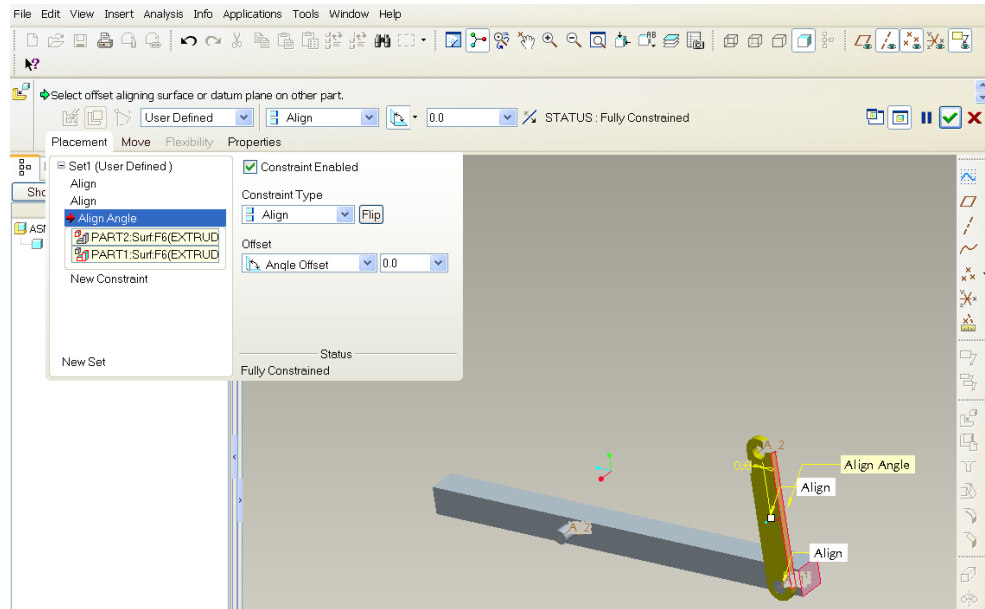


Figure 5

3. Placing the second again as shown in figure 6 using the same instructions outlined in 2.

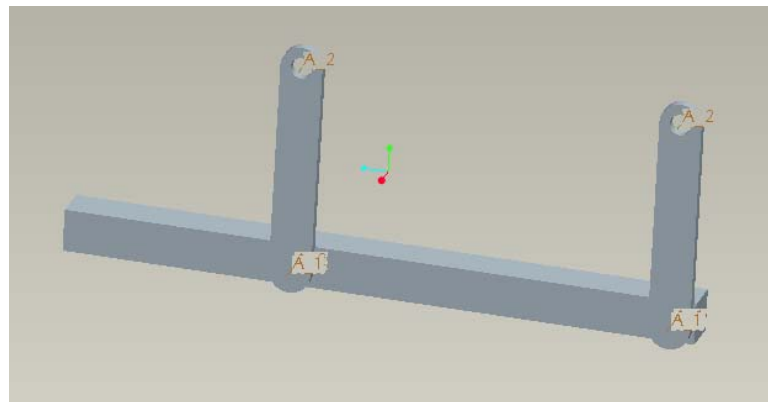




Figure 6

4. Closing the Loop on the Four-Bar Mechanism
  - a) Click  or **Insert > Component > Assemble**.
  - b) Choose part3.prt. The **Component Placement** dashboard appears.
  - c) Accept default **Automatic** from the **Constraint**.
  - d) Choose axis A-2 on part3 and A-1 on part2 to define axis alignment
  - e) Choose Surface F6 on part3 and surface F6 on part2 for mate as shown in figure 7 and click . The mechanism is fully constrained.

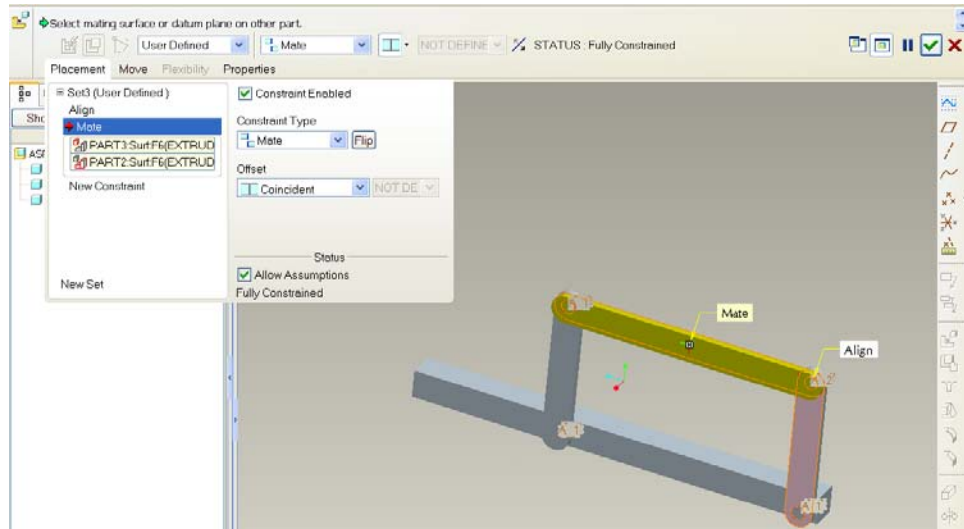


Figure 7

### B. Assigning appearances to Components:

View → Color and Appearance. The appearance Editor window will open as shown in figure 8. Pick red color and selection component part1 and click apply to change the color. Pick green for part2 and yellow for part3. The final mechanism is shown in figure 9.

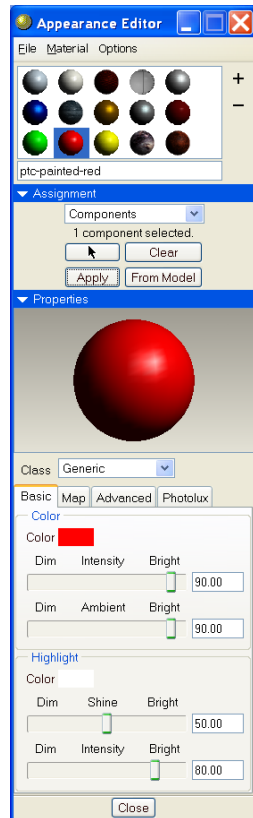


Figure 8

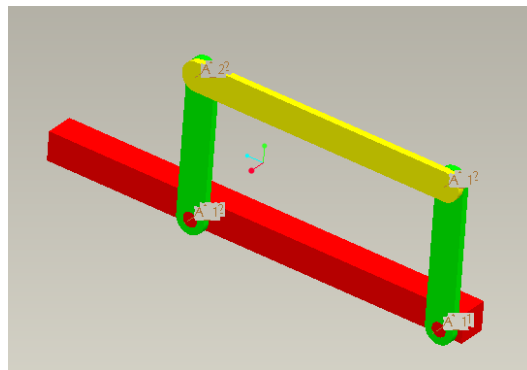







Figure 9

### C. Creating a Four-Bar Mechanism Using Joint Connections:

1. Placing the first part
  - a) Create a new assembly called Tutorial2b. Accept the default template.
  - b) Click  or **Insert > Component > Assemble**. The **Open** dialog box opens.
  - c) Select part1.prt. The **Component Placement** dashboard appears.
  - d) Choose  **Default** from the **Constraint Type** list to assemble the part at the default location. This defines part1 as the ground body.
  - e) Click .
2. Creating the first pin joint
  - a) Click  or **Insert > Component > Assemble**.
  - b) Choose part2.prt. The **Component Placement** dashboard appears.
  - c) Choose **Pin** from the **User Defined Connection Set** list.
  - d) Choose axis A-1 on part1.prt and A-1 on part2.prt to define axis alignment
  - e) Choose Surface F8 on part1 and surface F6 on part2 for translation as shown in figure 10 and click .

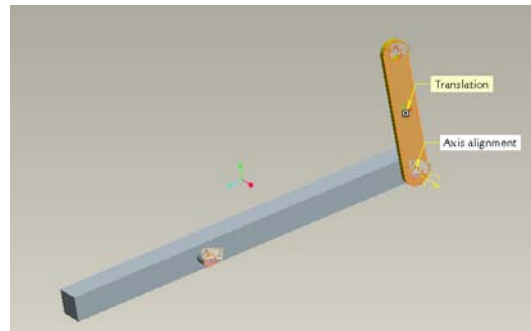




Figure 10

3. Creating the Second Pin Connection
  - a) Click  or **Insert > Component > Assemble** and choose part2.prt again. The **Component Placement** dashboard appears.
  - b) Choose **Pin** from the **User defined Connection Set** list.
  - c) Choose axis A-2 on part1.prt and A-1 on part2.prt to define axis alignment
  - d) Choose Surface F8 on part1 and surface F6 on part2 for translation as shown in figure 11 and click .

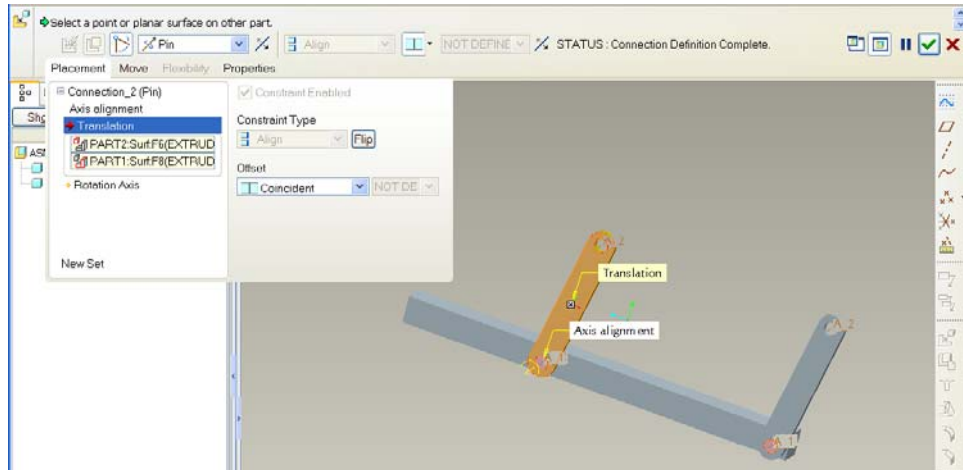




Figure 11

#### 4. Closing the Loop on the Four-bar Mechanism

- Click  or **Insert > Component > Assemble** and choose part3.prt. The **Component Placement** dashboard box appears.
- Choose **Pin** from the **User Defined Connection Set** list. Select axis A2 on part2.prt and axis A2 on part3.prt for Axis alignment.
- Choose Surface F8 on part3 and surface F6 on part2 for translation
- In the Placement slide-up panel, click **New Set** to add another pin connection. Select axis A2 on part2.prt and axis A1 on part3.prt for Axis alignment
- Choose Surface F8 on part3 and surface F6 on part2 for translation as shown in figure 12 and click . The mechanism is fully connected.
- Change components color using previous instruction outlined in B.

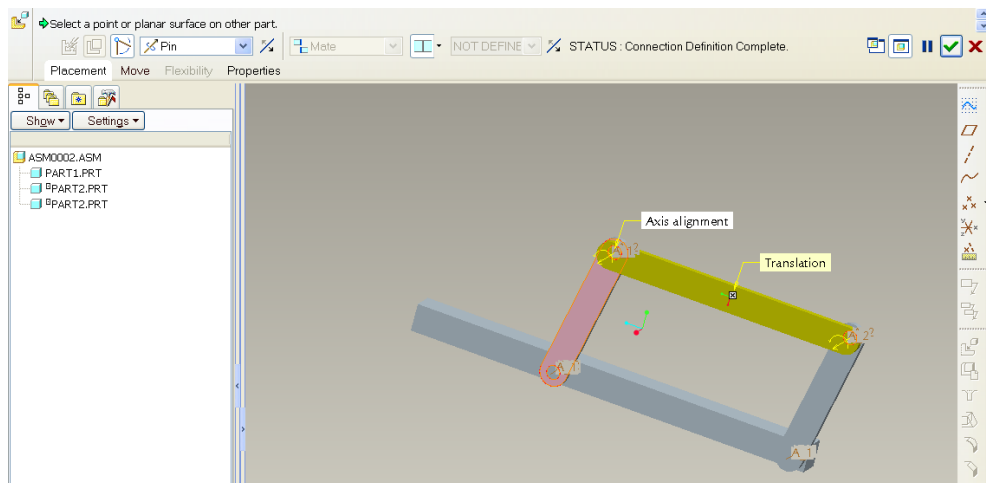


Figure 12