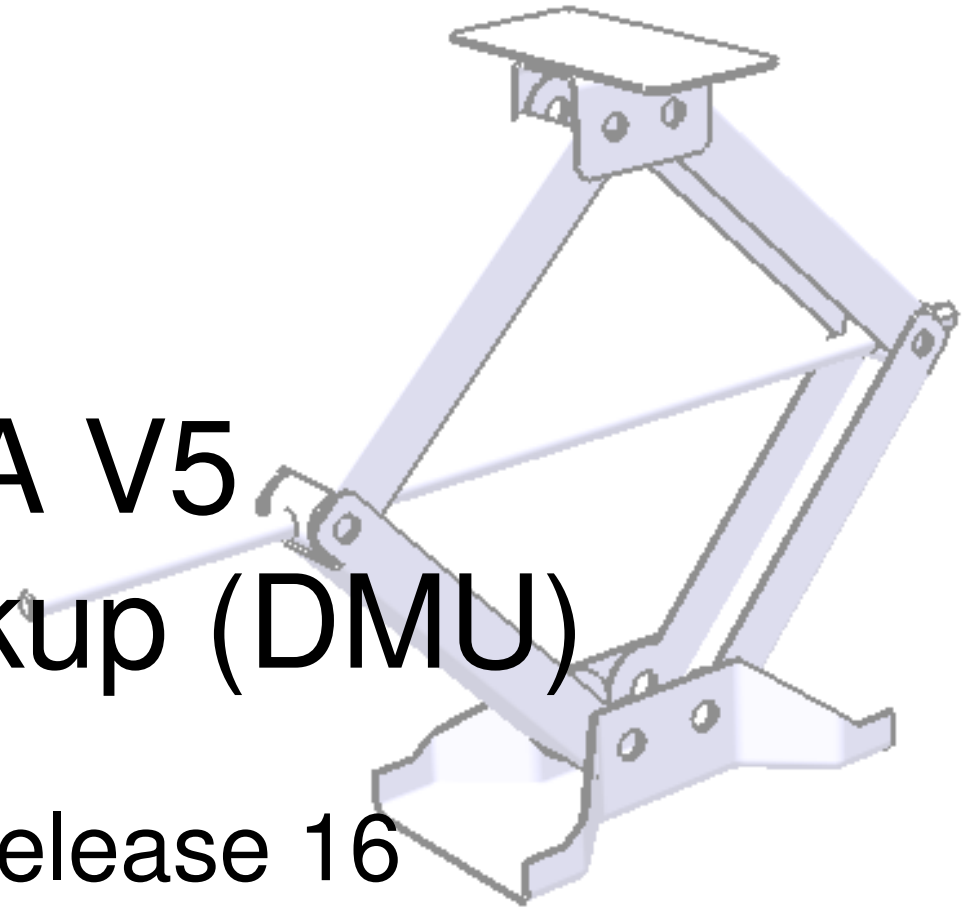# CATIA V5
Digital Mockup (DMU)

Version 5 Release 16
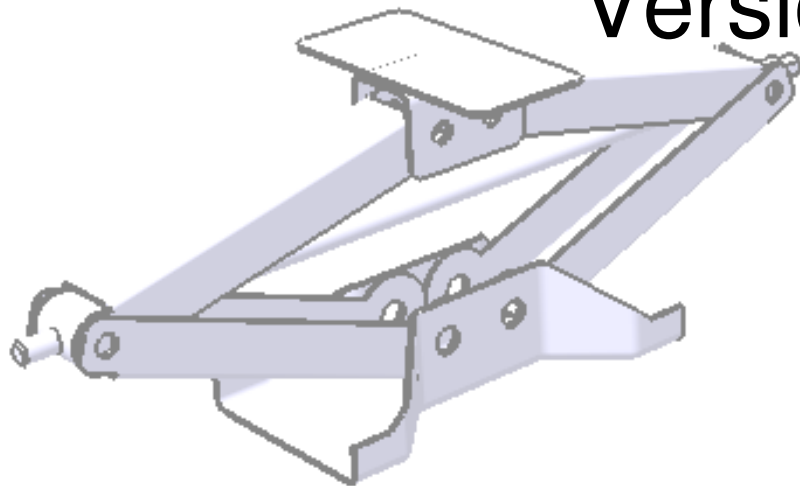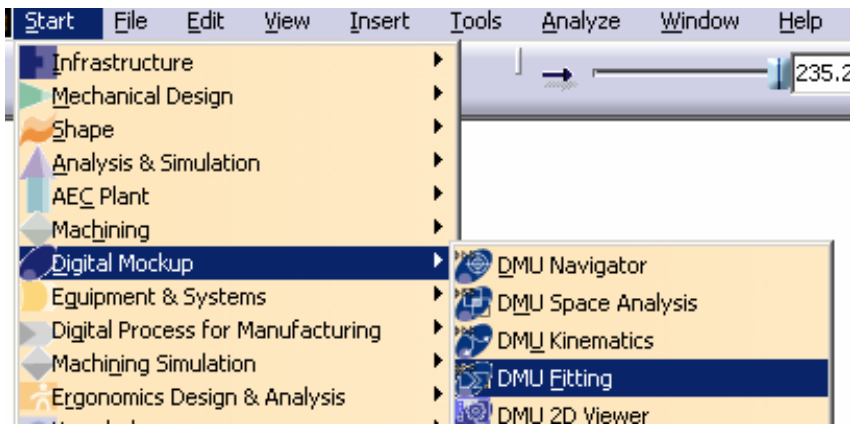
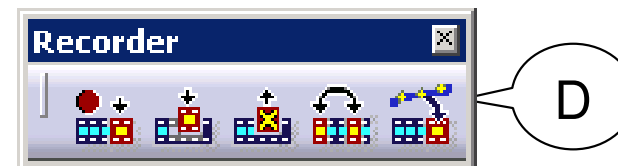DMU Fitting

DMU Kinematics

A- 1

Written By Dickson Sham

DMU Fitting

Simulate part motions for assembly and maintainability issues

Toolbars

A. **DMU Simulation**: Key tools for DMU Fitting

B. **DMU Check**: Measure Interference, distance, detect Clash while moving

C. **Manipulation**: Manipulate model or Compass while creating a track

D. **Recorder**: Record or modify the track

E. **Player:** Play the track

A- 2

Written By Dickson Sham

General Process

Open an Assembly Document

Create a Track

Move a Component

Record the Track

Repeat creating tracks for other components
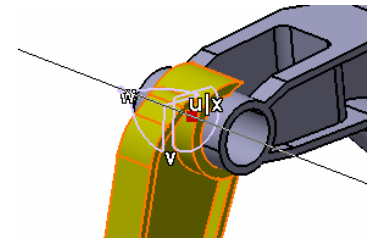
Create a Sequence of Tracks

Create a Simulation

Analyze the results and modify the design if necessary

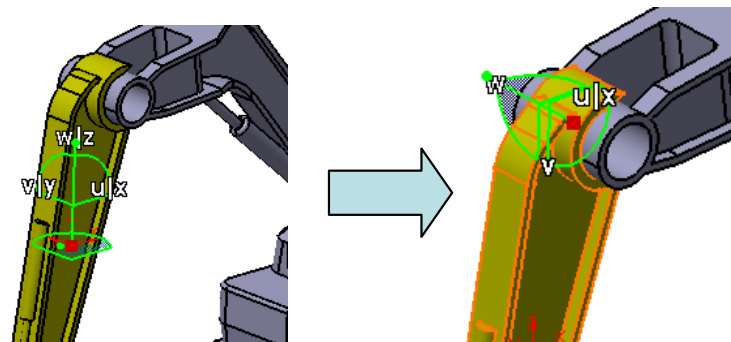Using DMU Manipulation Toolbar to change the position of the Compass:-

1) "Detach" the Compass from the selected Part (it will be gray)

2) "Snap" the Compass onto a new position

3) "Attach" the Compass again (it will be Green)

A- 3

DMU Fitting Simulator

Detect Clashes automatically during the part movement:-
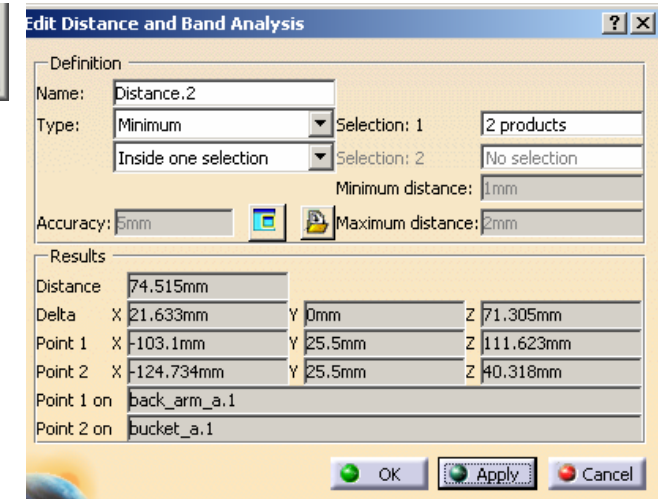
Three modes are available:

(1)   **On** (default mode), which deactivates clash detection

(2)   **Off**, which highlights in the geometry area products in collision while playing a simulation

(3)   **Stop**, which stops the simulation when the first clash is detected.
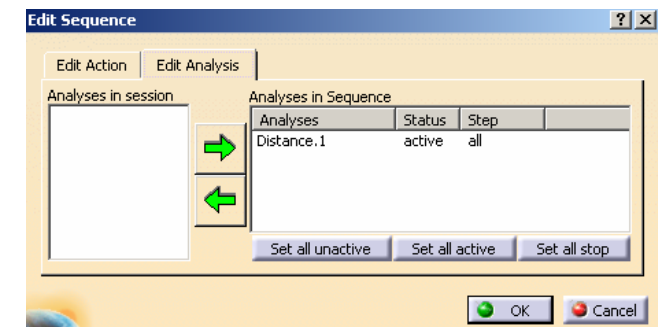
On/ Off/ Stop

Measure distances AFTER a simulation:-

-    Click "Distance" icon

-    Select two components

-    Click "Apply" to get the minimum distance

Edit Distance and Band Analysis

Definition
Name: Distance.2
Type: Minimum   Selection: 1   2 products
Inside one selection   Selection: 2   No selection
Minimum distance: 1mm
Accuracy: 5mm   Maximum distance: 2mm

Results
Distance   74.515mm
Delta   X 21.633mm   Y 0mm   Z 71.305mm
Point 1   X -103.1mm   Y 25.5mm   Z 111.623mm
Point 2   X -124.734mm   Y 25.5mm   Z 40.318mm
Point 1 on   back_arm_a.1
Point 2 on   bucket_a.1
OK   Apply   Cancel

Measure distances DURING a simulation:-

-    After "Distance.1" is created, double-click "Sequence.1" on the tree

-    Select the Tab Page " Edit Analysis"

-    Put "Distance.1" on the list called "Analyses in Sequence"

-    Set it Active

Edit Sequence

Edit Action   Edit Analysis

Analyses in session   Analyses in Sequence

Analyses	Status	Step
Distance.1	active	all

Set all unactive   Set all active   Set all stop

OK   Cancel

A- 4
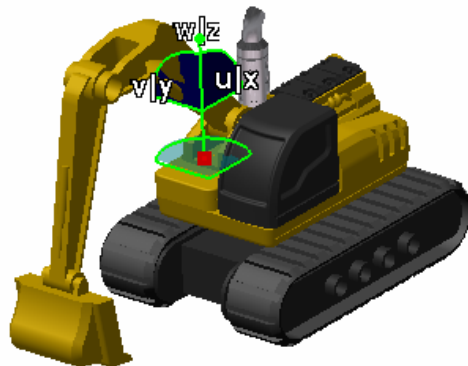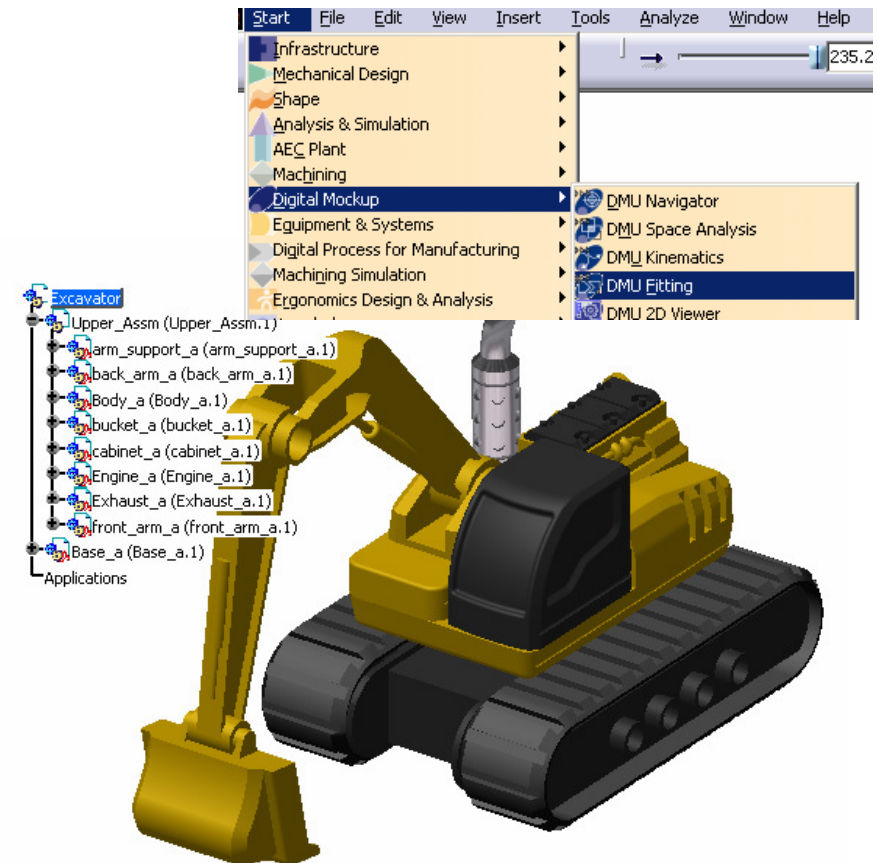
Exercise 1

(1) File Open:-

• File/Open/Excavator_a.CATProduct

(2) Change workbench to DMU Fitting:-

• If the current workbench is not "DMU Fitting", select "**Start/Digital Mockup/ DMU fitting**" on the top menu to change. (otherwise, it needn't change)

(3) Make the 1st Film:-

• Click **"Track"** icon

• Select Upper_Assm(Upper_Assm.1) on tree

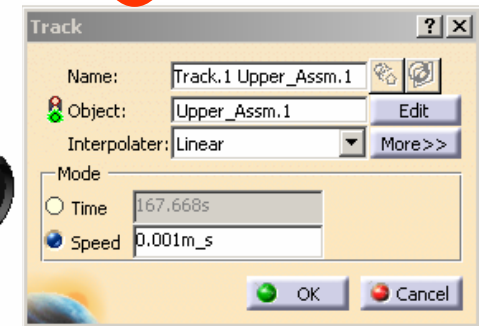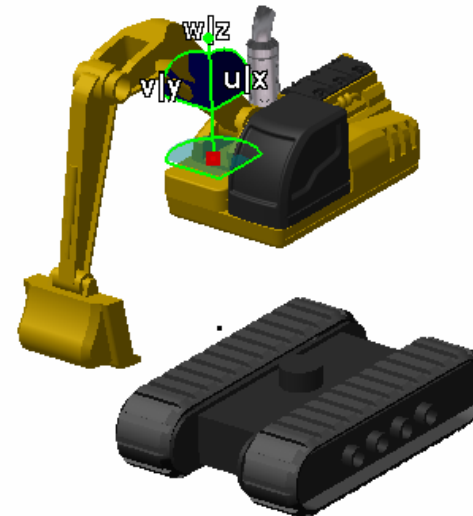• (The Compass will be snapped onto the assembly and it will turn GREEN)
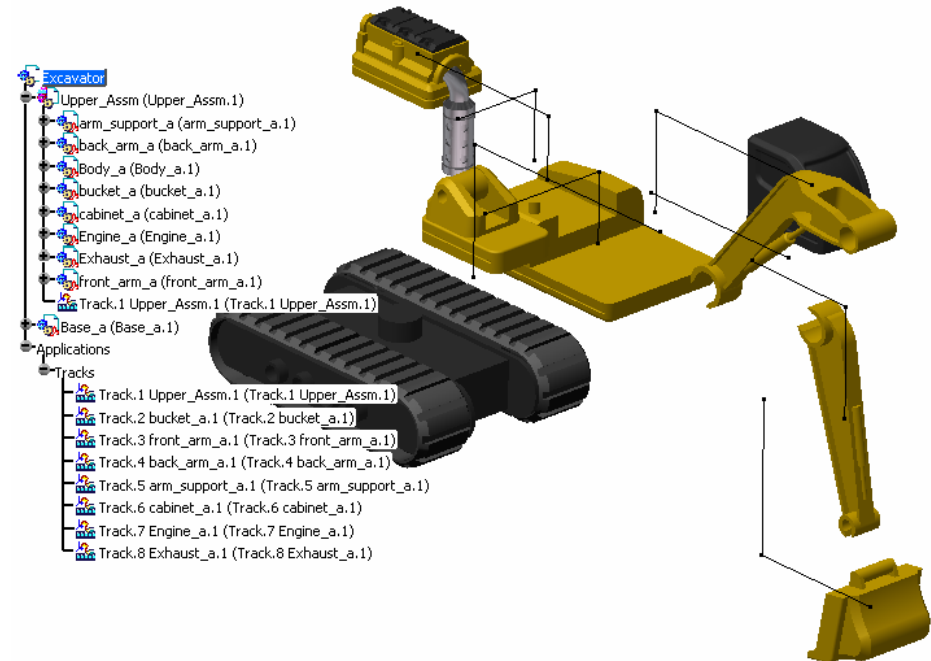
A- 5

Exercise 1

(3) Cont':-

- Drag the upper assembly out by Compass
- Then Click "Record(Insert)" icon to record the new position
- Drag the assembly to another position
- Click "Record(Insert)" icon again
- Click ok complete

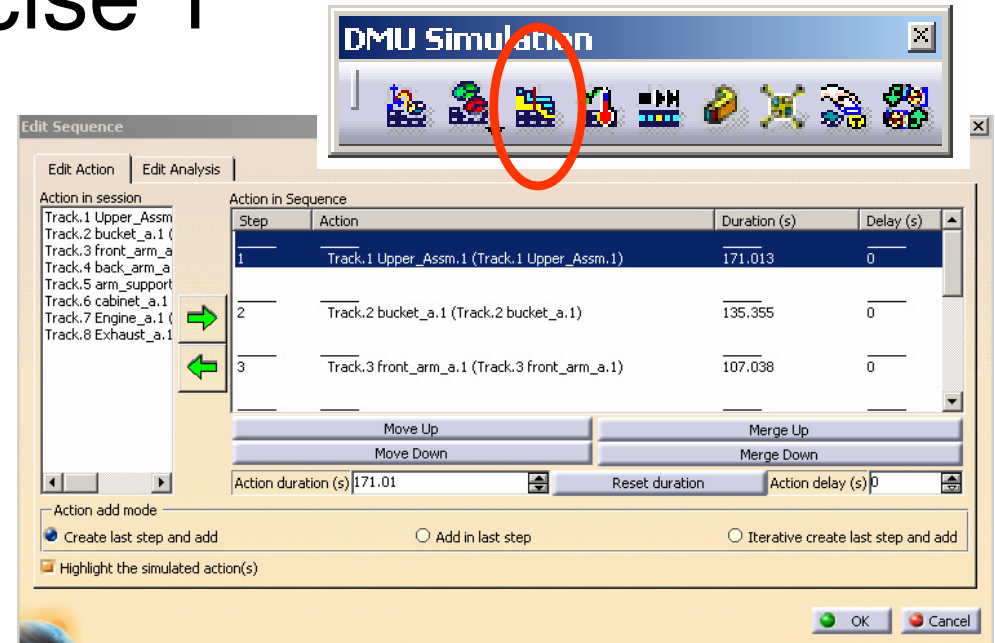## (4) Repeat Step 3 to make the remaining Films for the below components:-

- Bucket
- Front_Arm
- Back_Arm
- Arm_Support
- Cabinet
- Engine
- Exhaust

A- 6

Exercise 1

(5) Create a Play Sequence of the films:-

• Click "**Edit Sequence**" icon

• Select Track.1 under the list of "Action in session"

• Click ➡️

• Select Track.2, then ➡️

• …Repeat the steps until all Tracks are inserted

(6) Play the Sequence of films:-

• Click "**Simulation Player**" icon

• Select Sequence.1

• (The Player is activated on top of the screen)

• Click "**Parameters**" icon

• Enter 5s as Sampling Step (Run the simulation faster)

• Click ▶️

A- 7

DMU Fitting Simulator
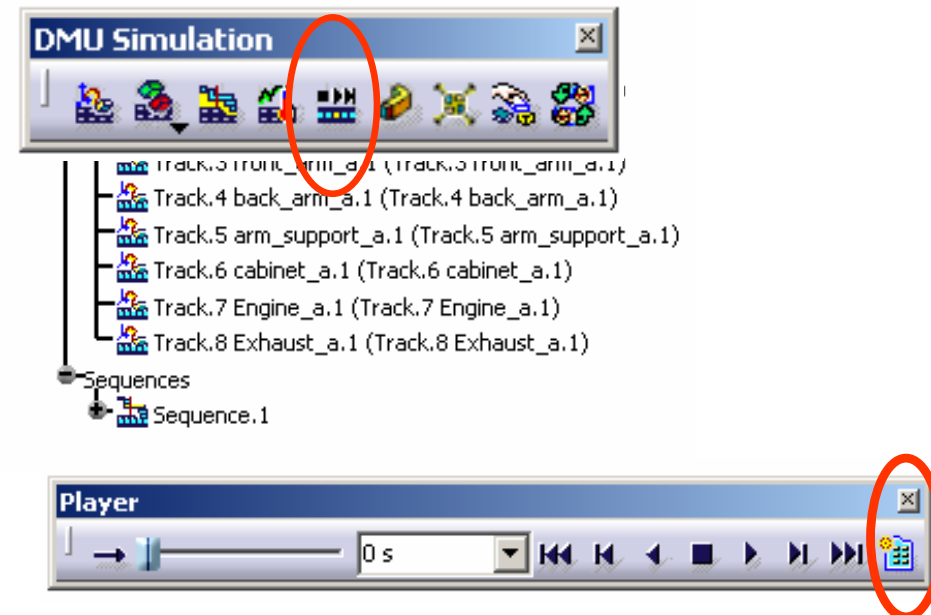
Exercise 1

(6) Cont':-

• Click "**Change Loop Mode**" icon to run the simulation continuously

• Click "Stop" icon to stop
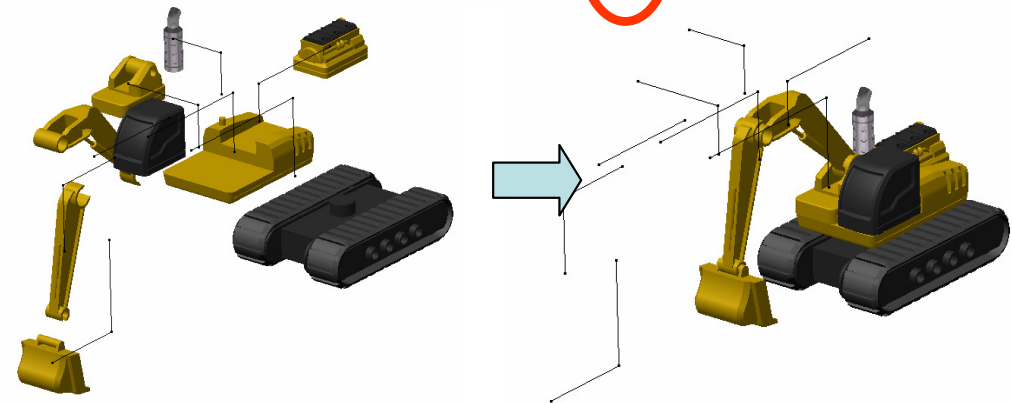
• Click "**Simulation Player**" icon again to exit
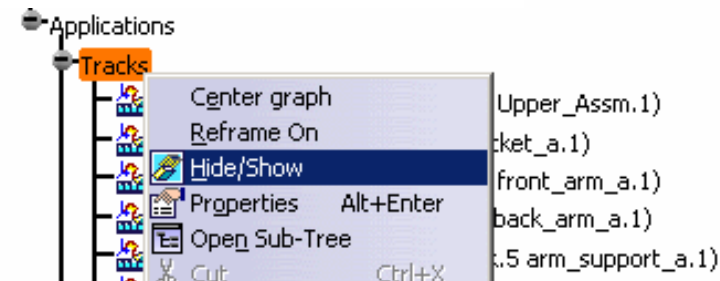
Change Loop Mode · · · · · · · · Stop

(7) Reset the positions:-

• Click "**Reset Position**" icon

• (all components will be back to their original positions)

(8) Hide all Track Lines on screen:-

• Right-Click "Tracks" on the tree

• Select "Hide/Show"

A- 8

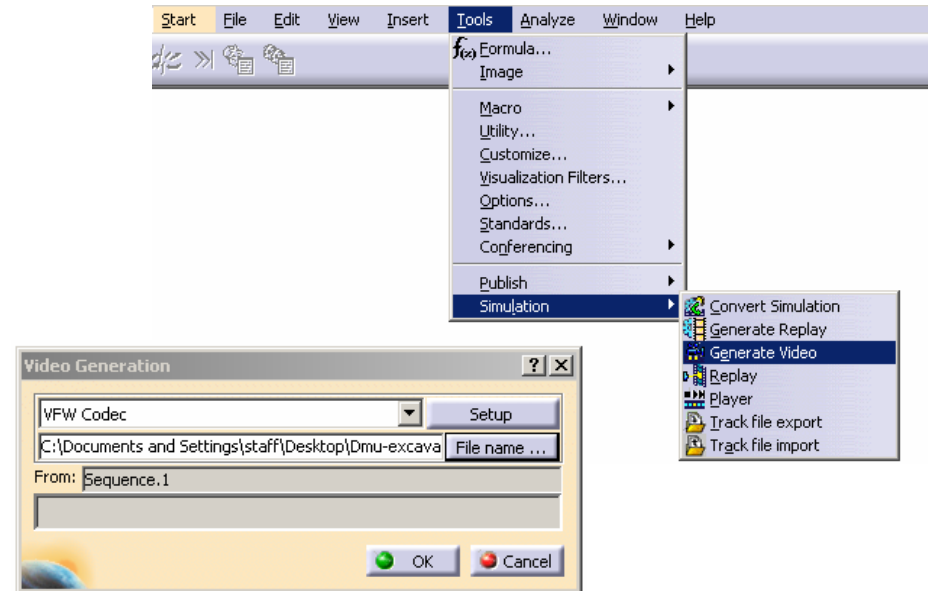# Exercise 1

(9) Refine Environment Settings (optional):-

- To improve the resolution, select "**Tools/options…/General/Display/Performances/3D Accuracy/Fixed**" on the top menu and change it to 0.01(smallest value)

- Change the shading mode to "**Shading with Material**"

- Select "**View/Render Style/Perspective**" on the menu

- Select "**View/ Lighting…**" and then select "Two Lights"

- To Hide Compass, Deselect "**View/ Compass**" on the top menu

- To Hide Tree, Deselect "**View/ Specifications**" on the top menu

A- 9

Written By Dickson Sham
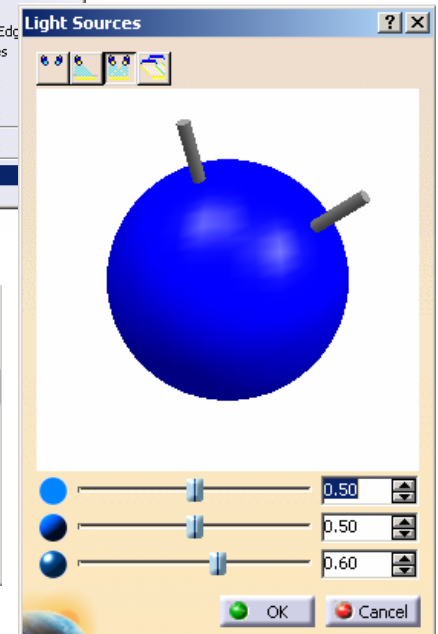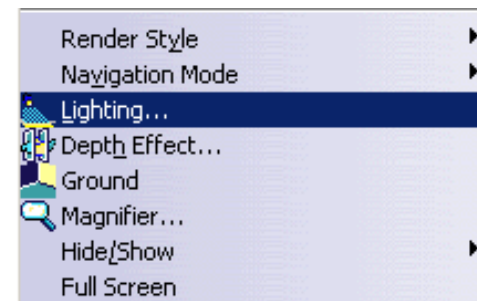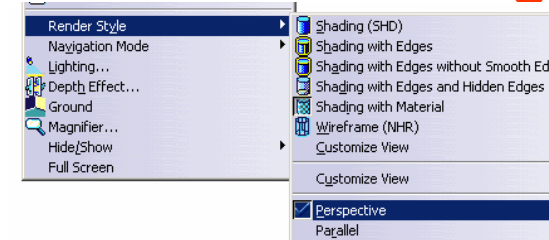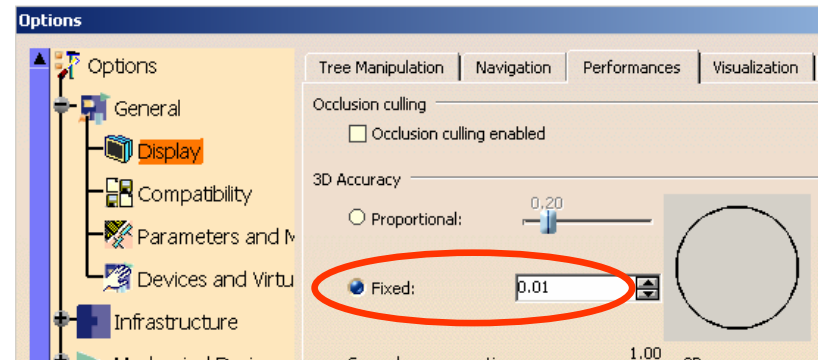
Exercise 1

(10) Export Simulation into AVI format

- Click "**Tools/Simulation/Generate Video**" on the top menu

- Select Sequence.1 on tree

- Select "**VFW Codec**" as default

- Click "**Setup**" button and select "**Cinepak Codec by Radius**" as Compressor

- Click "**File name…**" to define the destination of the exported file and the file name

- Click ok to complete

(Remark: During the conversion, we can manipulate the geometry by mouse)

END of Exercise 1

Written By Dickson Sham