Namal University, Mianwali

Department of Electrical Engineering

EE-254– Engineering Drawing

Lab – 10

3D Modelling Basics

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Date: _____

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Document History

Rev.	Date	Comment	Author
1.0	02-2022	Initial Draft	MB
1.1	06-2023	Revision	RS

Course Learning Outcomes

CLO-3: Reproduce 2-D and 3-D sketches using AutoCAD by applying engineering drawing principles.
CLO-4: Present Auto CAD designs effectively through design documentation and reports.

Equipment

- Software
  - AutoCAD 2016 Educational Version

Instructions

The following instructions are to be followed while performing in the labs.

- The manual must be thoroughly read before starting the lab.

- The theoretical concepts related to the lab and experiments must be revised.

- All attempts shall be made to complete the lab during the lab session.
- Any attempt to plagiarize from any source will be reported to the disciplinary committee for further action, so keep the work original.

- Carefully use the laboratory equipment.

Objectives

- To get hands on experience of designing 3D Modeling in AutoCAD software.

Background Information

In AutoCAD, you can create three types of 3D models: surfaces, solids, and meshes. Solids are used to create 3D models of engineering components and assemblies; surfaces are used to create complex shapes such as plastic parts and meshes are used for games and movies. Solids are three-dimensional models of actual objects that possess physical properties such as mass properties, center of gravity, surface area, moments of inertia, and so on. Surfaces are construction features without any thickness. They do not possess any physical properties. Meshes are like solids without mass and volume properties.

3D Modeling Workspaces in AutoCAD

There are two workspaces of 3D modeling: 3D Basics and 3D Modeling. The 3D Basics workspace has commonly used tools, whereas the 3D Modeling workspace includes all the tools required for creating 3D models.

3D Move Tool

The **3D Move** tool is like the **Move** tool. You can use this tool to move objects in 3D space. By default, the **3D Move** tool is activated and the **Move gizmo** is displayed when you select an object. You can use the **Move gizmo** to move the object along a particular axis.

- Select the cylinder to display the **Move gizmo** tool.
- Select the X-axis (**Red arrow**) of the **gizmo** and move the pointer backwards.
- Type **20** and press **ENTER**; the cylinder will be moved through **20 mm** distance along the X-axis.

- Select the Y-axis (Green arrow) of the gizmo and move the pointer toward right.
- Type 20 and press ENTER; the cylinder will be moved towards Y-axis.

Fillet Edge Tool

The Fillet Edge tool is used to create rounds (convex corners) or fillets (concave corners) on solid objects, just as in 2D drawings. When you create a fillet or round, a cylinder is created automatically, and the Boolean operation is performed to subtract or add it to the solid object.

Chamfer Edge Tool

The Chamfer Edge tool is used to bevel the edges of 3D solids and surfaces.

Extract Edges Tool

The Extract Edges tool creates wireframe geometry from the edges of a 3D solid, surface, mesh, region, or sub object.

Slice Tool

The Slice tool is used to create new 3D solids and surfaces by slicing, or dividing, existing objects.

Thicken Tool

The Thicken tool converts a surface into a 3D solid with a specified thickness.

Tapper Faces Tool

The Tapper Faces tool is used to edits the faces and edges of 3D solid objects.

Offset Faces Tool

The Offset Faces tool is used to make a parallel copy of the faces of a 3D object.

Interference Checking Tool

The Interference Checking tool is used to create a temporary 3D solid from the interferences between two sets of selected 3D solids.

Surface Fillet Tool

The Surface Fillet tool creates a filleted surface between two other surfaces.

Surface Trim Tool

The Surface Trim tool is used to trim portions of a surface where it meets another surface or type of geometry.

Surface Untrim Tool

The Surface Untrim tool is used to replace surface areas removed by the Surface Trim command.

Surface Extend Tool

The Surface Extend tool lengthens a surface by a specified distance.

3D Polyline Tool

The 3D Polyline tool is like the Polyline tool, except that you can create a polyline by specifying coordinate points in three dimensions. Also, you can only create straight lines using this tool.

3D Rotate Tool

The 3D Rotate tool is used to rotate objects about an axis. You can define the axis of rotation by using the Rotate Gizmo tool. The Rotate Gizmo tool will be displayed when you invoke the 3D Rotate tool and select an object.

3D Mirror Tool

The 3D Mirror tool creates a mirrored copy of selected 3D objects across a mirroring plane.
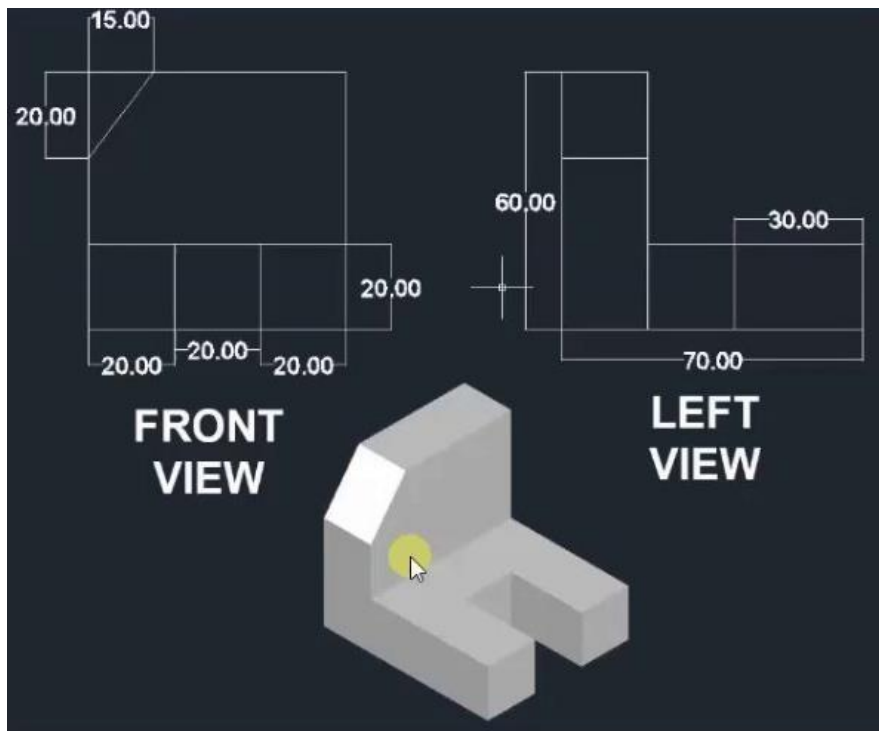
3D Align Tool

The 3D Align tool is used to align objects with other objects in 2D and 3D.
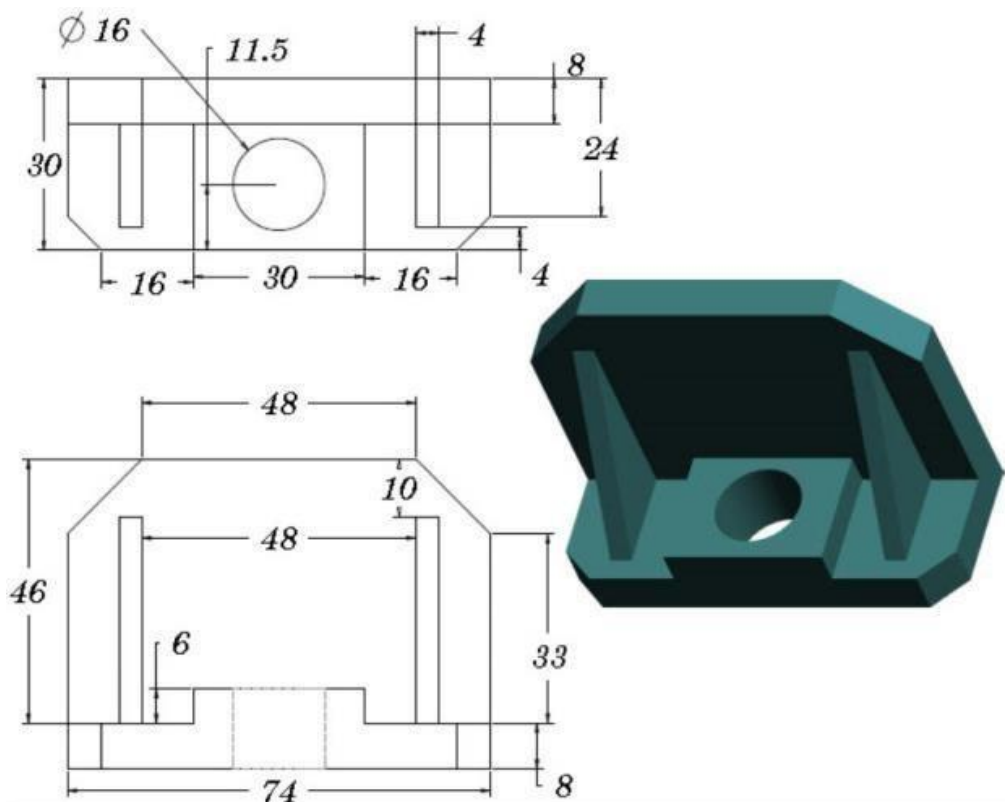
3D Array Tool

The **3D Array** tool is used to create **Rectangular** and **polar** arrays. You can create a **rectangular array** by specifying the item count and distance along the X, Y and Z directions. For creating the **3D polar array**, you must select any 3D axis to rotate about.
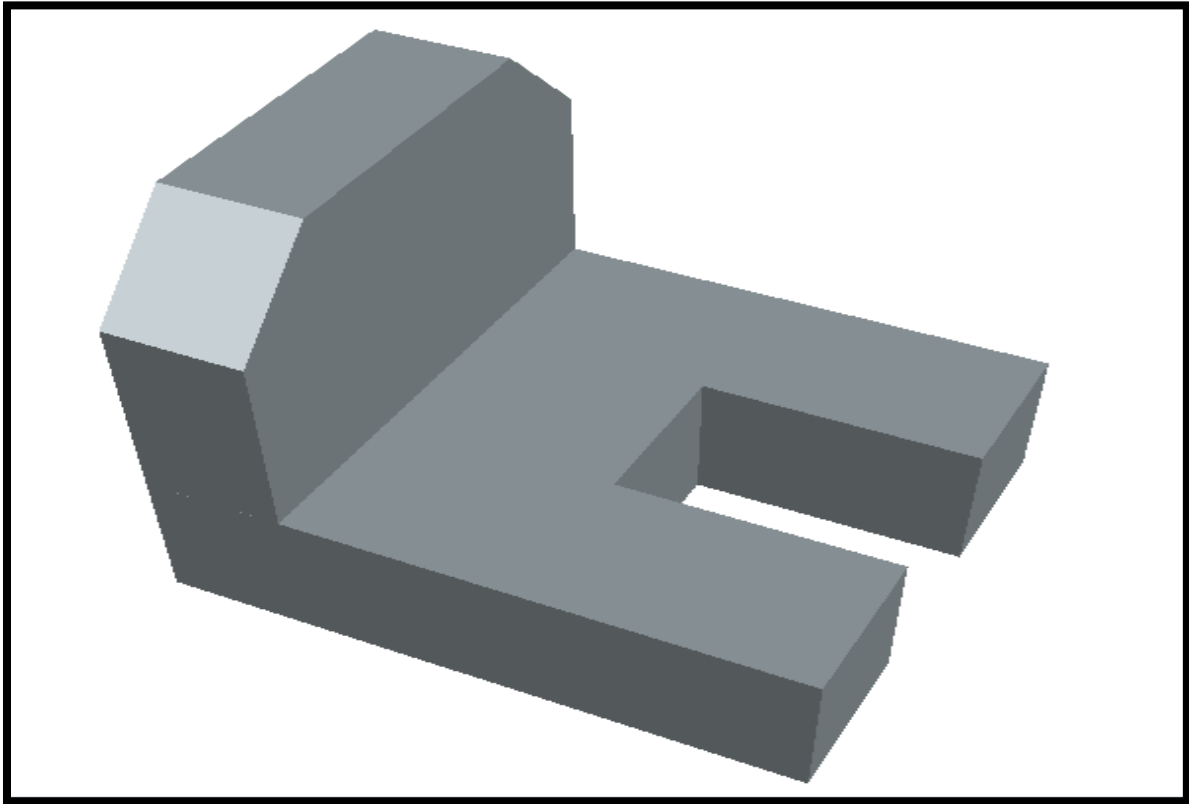
Task:

1. Create 3D models using the drawing views and dimensions.

2. Create 3D models using the drawing views and dimensions.

Task 1 :

Command:	Current settings: Erase source=No Layer=Source
Command:	OFFSETGAPTYPE=0
Command: _pasteclip	Specify offset distance or [Through/Erase/Layer]
Specify insertion point:	<Through>: 15
Command:	Select object to offset or [Exit/Undo] <Exit>:
Command: L	Specify point on side to offset or
LINE	[Exit/Multiple/Undo] <Exit>:
Specify first point:	Select object to offset or [Exit/Undo] <Exit>:
Specify next point or [Undo]: *Cancel*	*Cancel*
Command: LINE	Command: j
Specify first point: <Ortho on> *Cancel*	JOIN
Command: DS	Select source object or multiple objects to join at
DSETTINGS	once: Specify opposite corner: 9 found
Command: DSETTINGS	Select objects to join:
Command: LINE	8 objects converted to 1 polyline, 1 object
Specify first point:	discarded from the operation
Specify next point or [Undo]: <Snap off> 70	Command: *Cancel*
Specify next point or [Undo]: 20	Command: JOIN
Specify next point or [Close/Undo]: 30	Select source object or multiple objects to join at
Specify next point or [Close/Undo]: 20	once: Specify opposite corner: 2 found
Specify next point or [Close/Undo]: 30	Select objects to join:
Specify next point or [Close/Undo]: 20	0 objects joined, 2 objects discarded from the
Specify next point or [Close/Undo]: 70	operation
Specify next point or [Close/Undo]:	Command: *Cancel*

6

Specify next point or [Close/Undo]: *Cancel*
Command: o
OFFSET
Command: EXPLODE
Command: _.erase 1 found
Command: *Cancel*
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]: *Cancel*
Command: REC
RECTANG
Specify first corner point or
[Chamfer/Elevation/Fillet/Thickness/Width]:
Specify other corner point or
[Area/Dimensions/Rotation]: 15
Command: *Cancel*
Command: *Cancel*
Command: _u RECTANG
Command: _u ERASE
Command:
Command:
Command: _mredo
Enter number of actions or [All/Last]: 1 ERASE
Command: REC
RECTANG
Specify first corner point or
[Chamfer/Elevation/Fillet/Thickness/Width]:
Specify other corner point or
[Area/Dimensions/Rotation]: d
Specify length for rectangles <10.0000>: 15
Specify width for rectangles <10.0000>: 60
Specify other corner point or
[Area/Dimensions/Rotation]:
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]: *Cancel*
Command: *Cancel*
Command: EXT
EXTRUDE
Current wire frame density: ISOLINES=4, Closed profiles
creation mode = Solid
Select objects to extrude or [MOde]: 1 found
Select objects to extrude or [MOde]:
Specify height of extrusion or [Direction/Path/Taper
angle/Expression]: 60
Command:
EXTRUDE
Current wire frame density: ISOLINES=4, Closed profiles
creation mode = Solid
Select objects to extrude or [MOde]: *Cancel*
Command: EXTRUDE
Current wire frame density: ISOLINES=4, Closed profiles
creation mode = Solid
Select objects to extrude or [MOde]: 1 found
Select objects to extrude or [MOde]: 1 found, 2 total

Select objects: Specify opposite corner: 2 found
1 was not able to be exploded.
Select objects:
Command:
Select objects to extrude or [MOde]: 1 found, 7
total
Select objects to extrude or [MOde]: 1 found, 8
total
Select objects to extrude or [MOde]: *Cancel*
Command: EXTRUDE
Current wire frame density: ISOLINES=4, Closed
profiles creation mode = Solid
Select objects to extrude or [MOde]: *Cancel*
Command: j
JOIN
Select source object or multiple objects to join at
once: Specify opposite corner: 9 found
Select objects to join:
8 objects converted to 1 polyline, 1 object
discarded from the operation
Command: EXTRUDE
Current wire frame density: ISOLINES=4, Closed
profiles creation mode = Solid
Select objects to extrude or [MOde]: 1 found
Select objects to extrude or [MOde]:
Specify height of extrusion or
[Direction/Path/Taper angle/Expression]
<60.0000>: 20
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]:
Command: *Cancel*
Command:
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Command:
Command: CHAMFEREDGE
Automatic save to
C:\Users\fahim\AppData\Local\Temp\Practice_L_1
0_1_4940_7078d748.sv$ ...CHAMFEREDGE
CHAMFEREDGE
Command: CHAMFEREDGE
Command: CHAMFEREDGE
Distance1 = 1.0000, Distance2 = 1.0000
Select an edge or [Loop/Distance]:
Select another edge on the same face or
[Loop/Distance]: d
Specify Distance1 or [Expression] <1.0000>: 25
Specify Distance2 or [Expression] <1.0000>:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Resuming CHAMFEREDGE command.
Specify Distance2 or [Expression] <1.0000>: _u

Select objects to extrude or [MOde]: 1 found, 3 total
Select objects to extrude or [MOde]: 1 found, 4 total
Select objects to extrude or [MOde]: 1 found, 5 total
Select objects to extrude or [MOde]: 1 found, 6 total
Requires numeric distance, two points, or option
keyword.
Specify Distance2 or [Expression] <1.0000>: _u
Requires numeric distance, two points, or option
keyword.
Specify Distance2 or [Expression] <1.0000>: _u
Requires numeric distance, two points, or option
keyword.
Specify Distance2 or [Expression] <1.0000>: _u
Requires numeric distance, two points, or option
keyword.
Specify Distance2 or [Expression] <1.0000>: *Cancel*
No edges to chamfer.
Command: _u CHAMFEREDGE
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Command: CHAMFEREDGE
Distance1 = 1.0000, Distance2 = 1.0000
Select an edge or [Loop/Distance]:
Select an edge or [Loop/Distance]:
Resuming CHAMFEREDGE command.
Select an edge or [Loop/Distance]:
Resuming CHAMFEREDGE command.
Select an edge or [Loop/Distance]:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Resuming CHAMFEREDGE command.
Select an edge or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Edges must belong to one face.
Select another edge on the same face or [Loop/Distance]:
Edges must belong to one face.
Select another edge on the same face or [Loop/Distance]:
Edges must belong to one face.
Select another edge on the same face or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Chamfering multiple bodies not allowed.
Select another edge on the same face or [Loop/Distance]:
Press Enter to accept the chamfer or [Distance]:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:_u
Invalid option keyword.
Press Enter to accept the chamfer or [Distance]:_u
Invalid option keyword.

Requires numeric distance, two points, or option
keyword.
Specify Distance2 or [Expression] <1.0000>: _u
Command: CHAMFEREDGE
Distance1 = 1.0000, Distance2 = 1.0000
Select an edge or [Loop/Distance]:
Select an edge or [Loop/Distance]:
Select another edge on the same face or
[Loop/Distance]:
Press Enter to accept the chamfer or [Distance]:
>>Specify distance or [eXit]:
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
>>Specify distance or [eXit]:
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
>>Specify distance or [eXit]:
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
>>Specify distance or [eXit]:20
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
>>Specify distance or [eXit]:15
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
Command:
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Command: CHAMFEREDGE
Distance1 = 13.4865, Distance2 = 11.9452
Select an edge or [Loop/Distance]:
Select another edge on the same face or
[Loop/Distance]:
Press Enter to accept the chamfer or [Distance]:
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Command:
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]: *Cancel*

Press Enter to accept the chamfer or [Distance]:*Cancel*
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Automatic save to
C:\Users\fahim\AppData\Local\Temp\Practice_L_10_1_4
940_7078d748.sv$ ...
Command:
Command: *Cancel*
Command:
Command:
Command:
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
Command:
Command: *Cancel*
Command: *Cancel*
Command: <Switching to: Layout1>
Regenerating layout.
Regenerating layout.
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]:
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]:
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]:
Command: *Cancel*
Command: _.MSPACE
Command: <Grid off>
Command: _.PSPACE
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]: *Cancel*
Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut menu.
Command: Specify opposite corner or
[Fence/WPolygon/CPolygon]: *Cancel*
Command: _.MSPACE
Command:
Command:
Press ESC or ENTER to exit, or right-click to display
shortcut-menu.
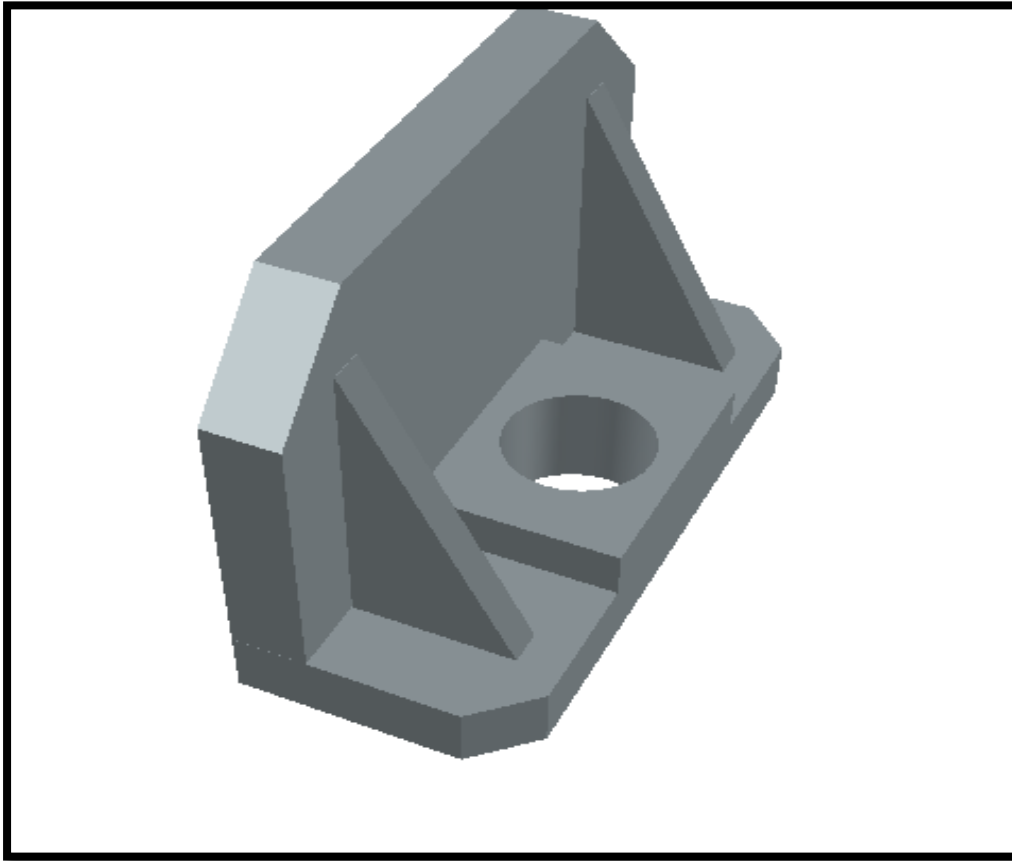Command: _.PSPACE
Command: *Cancel*
Command: *Cancel*
Command: <Switching to: Model>
Restoring cached viewports.
Command:
Automatic save to
C:\Users\fahim\AppData\Local\Temp\Practice_L_10_1_4
940_7078d748.sv$ ...

Task 2 :

Commands :

>>Specify distance or [eXit]:
Modeling Operation Error:
Error Code Number is 12069
Modeling Operation Error:
Error Code Number is 12069
Modeling Operation Error:
Error Code Number is 12069
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command:
Command:
Command: *Cancel*
Command:
Command: *Cancel*
Command: _u INTELLIZOOM
Command: _u '3DORBIT GROUP
Command: _u CHAMFEREDGE
Command:

Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command:
Command: CHAMFEREDGE
Distance1 = 12.7874, Distance2 = 11.3015
Select an edge or [Loop/Distance]:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Resuming CHAMFEREDGE command.
Select an edge or [Loop/Distance]:
Select an edge or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Press Enter to accept the chamfer or [Distance]:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
>>Specify distance or [eXit]:
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
>>Specify distance or [eXit]:
JOIN
Select source object or multiple objects to join at once: Specify opposite corner: 9 found
Select objects to join:
8 objects converted to 1 polyline, 1 object discarded from the operation
Command: EXTRUDE
Current wire frame density: ISOLINES=4, Closed profiles creation mode = Solid
Select objects to extrude or [MOde]: 1 found
Select objects to extrude or [MOde]:
Specify height of extrusion or [Direction/Path/Taper angle/Expression] <60.0000>: 20
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command: *Cancel*
Command:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command:
Command: CHAMFEREDGE
Automatic save to C:\Users\fahim\AppData\Local\Temp\Practice_L_10_1_4940_7078d748.sv$
...CHAMFEREDGE
CHAMFEREDGE
Command: CHAMFEREDGE
Command: CHAMFEREDGE
Distance1 = 1.0000, Distance2 = 1.0000
Select an edge or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]: d
Specify Distance1 or [Expression] <1.0000>: 25
Specify Distance2 or [Expression] <1.0000>:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Resuming CHAMFEREDGE command.
Specify Distance2 or [Expression] <1.0000>: _u
Modeling Operation Error:
Error Code Number is 12069
Modeling Operation Error:

Modeling Operation Error:
Error Code Number is 12069
Modeling Operation Error:
Error Code Number is 12069
Modeling Operation Error:
Error Code Number is 12069
Modeling Operation Error:
Error Code Number is 12069
Select objects to extrude or [MOde]: 1 found, 6 total
Requires numeric distance, two points, or option keyword.
Specify Distance2 or [Expression] <1.0000>: _u
Requires numeric distance, two points, or option keyword.
Specify Distance2 or [Expression] <1.0000>: _u
Requires numeric distance, two points, or option keyword.
Specify Distance2 or [Expression] <1.0000>: _u
Requires numeric distance, two points, or option keyword.
Specify Distance2 or [Expression] <1.0000>: *Cancel*
No edges to chamfer.
Command: _u CHAMFEREDGE
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command: CHAMFEREDGE
Distance1 = 1.0000, Distance2 = 1.0000
Select an edge or [Loop/Distance]:
Select an edge or [Loop/Distance]:
Resuming CHAMFEREDGE command.
Select an edge or [Loop/Distance]:
Resuming CHAMFEREDGE command.
Select an edge or [Loop/Distance]:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Resuming CHAMFEREDGE command.
Select an edge or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Edges must belong to one face.
Select another edge on the same face or [Loop/Distance]:
Edges must belong to one face.
Select another edge on the same face or [Loop/Distance]:
Edges must belong to one face.
Select another edge on the same face or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Chamfering multiple bodies not allowed.
Select another edge on the same face or [Loop/Distance]:
Press Enter to accept the chamfer or [Distance]:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:_u
Invalid option keyword.
Resuming CHAMFEREDGE command.
Press Enter to accept the chamfer or [Distance]:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.

```
Command:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command: CHAMFEREDGE
Distance1 = 36.9964, Distance2 = 17.8949
Select an edge or [Loop/Distance]:
Select another edge on the same face or [Loop/Distance]:
Press Enter to accept the chamfer or [Distance]:
Command:
CHAMFEREDGE
Distance1 = 36.9964, Distance2 = 17.8949
Select an edge or [Loop/Distance]: *Cancel*
No edges to chamfer.
Command: *Cancel*
Command:
C:\Users\fahim\AppData\Local\Temp\Practice_L_10_1_4940_7078d748.sv$ ...
Command:
Command: *Cancel*
Command:
Command:
Command:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command:
Command: *Cancel*
Command: *Cancel*
Command:   <Switching to: Layout1>
Regenerating layout.
Regenerating layout.
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command: *Cancel*
Command: _.MSPACE
Command:  <Grid off>
Command: _.PSPACE
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]: *Cancel*
Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut menu.
Command:
Command:
Command:
Command: _-VIEW Enter an option [?/Delete/Orthographic/Restore/Save/sEttings/Window]: _TOP
Command:
Command: *Cancel*
Command:
Command: _.erase 1 found
Command:
Automatic save to C:\Users\fahim\AppData\Local\Temp\Practice_L_10_1_20851_004bb6ce.sv$ ...
```

```
Command: _.erase 1 found
Command: *Cancel*
Command: *Cancel*
Command:   <Switching to: Layout1>
Regenerating layout.
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]: *Cancel*
Command: _.MSPACE
Command:
Command:
Press ESC or ENTER to exit, or right-click to display shortcut-menu.
Command: _.PSPACE
Command:
Press ESC or ENTER to exit, or right-click to display shortcut menu.
Command: '_navswheelmode
Enter new value for NAVSWHEELMODE <2>: 3
Command: '_navswheel
Right-click to display the shortcut menu. Press ESC or ENTER to exit.
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]: *Cancel*
Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command:
Command:
Command: _qsave
Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:
Command: *Cancel*
Command: *Cancel*
Command: *Cancel*
Command:   <Switching to: Model>
Restoring cached viewports.
```

Engineering Drawing Lab 10

Method of Evaluation: Lab Report and in-lab marking by instructors.
Measured Learning Outcomes
CLO-3: Reproduce 2-D and 3-D sketches using AutoCAD by applying engineering drawing principles.
CLO-4: Present Auto CAD designs effectively through design documentation and reports.

	Excellent (10)	Good (9 to 7)	Satisfactory (6 to 4)	Unsatisfactory (3 to 1)	Poor (0)	Marks Obtained
Assignment (CLO4)	Required document filled-in neatly with meaningful answers to all questions, proper grammar and punctuations with proper conclusion drawn	Required document filled-in neatly with meaningful answers to most questions and proper conclusions drawn with some grammar mistakes	Some correct/meaningful answers and conclusions with some irrelevant ones. Some parts of the document not neat or some grammar mistakes.	Answers not understandable/ not relevant to questions. Conclusions not based on results. Illegible writing with no proper grammar/punctuation	Report/Hand out Not submitted	
Task Completion (CLO3)	All Tasks were completed successfully in the time of the lab	Most of the tasks were completed in the given time of the lab	Some of the tasks were completed in the given lab time	Very few tasks were performed and completed in given lab time	Lab tasks weren't performed at all	
Total						