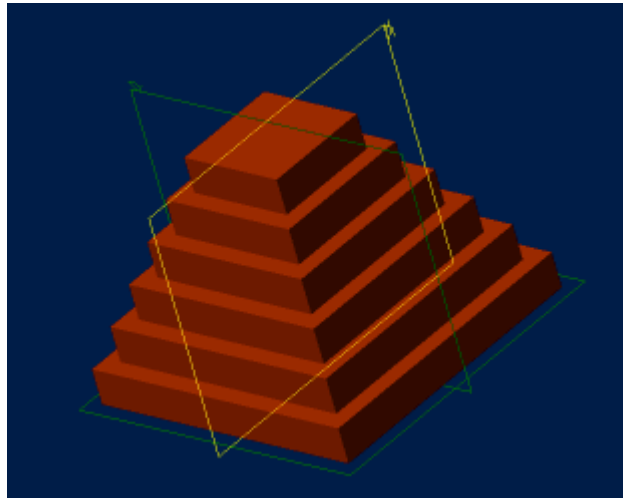


Alibre Design Tutorial - Simple Extrude Step-Pyramid-1



Part Tutorial

Exercise 4: Step-Pyramid-1 [text version]

**In this Exercise, We will set System Parameters first.
Then, in sketch mode, outline the Step Pyramid with Rectangles and Straight Lines.
Then we will use the Extrude Feature to create the Step.
These two processes will be used 6 times to create the steps,
This will be followed by feature Mirroring to create the Whole Step Pyramid.**

Launch **Alibre Design**.

From the Home window - select **File, Work Offline**.

Open a **New Part** workspace. From the Home window - click on the **New Part** icon.

Maximise the Part Workspace Window.

Set Design Properties.

Select **File, Properties**.

A) Select the Tab Marked "**General**"

- In **Description**: insert the information: 'Step-Pyramid-1'.
- In **Curve Smoothness**, Select the Radio Button marked 'Automatic'.

B) Select the Tab Marked "**Units**"

- Check (check mark in box is showing) the Box **Show Units for Dimensions**.
- On **Display Units** - confirm **Unit: Inches**, **Format: Decimals** and **Precision: 3**.
- On **Angle** - Confirm **Angle: Degrees** and **Precision: 3**. Adjust if not.
- On **Spinner Increment** - for **Length**: enter .1000 " and for **Angle**: enter 1.0000 degrees. Adjust to these parameters if not. Press 'Tab' to move after editing them.

C) Select the Tab Marked "**Physical**"

- Change **Accuracy**: to **High**. Click on the **Calculate** Button. Notice the results.

D) Select the Tab Marked "**Apply Options**"

- On **Apply Changes to** - Click the Radio Button beside **The Current Document**.
- Click **Apply**, then Click **Close**.

Set Part Options.

From Top Text Menu - Select - **Tools > Options >**

General Tab > Selected or checked off (*check off = check mark in box*) are:

Global - Show popup on errors,

Hints - All

Design

- Prompt for newer versions, - Snap to working plane, - Prompt to edit sketch,
- Prompt on detecting parameters with missing external link, - Reorient on extrude,
- Keep model in View, - Prompt when not sketching on face.

Show as Default - Planes, Annotations, and Sketches.

Number of stored previous/next views: 64

Grid Tab > **Spacing:** Make X: 0.1000" and Y: 0.1000", check off **Display grid**, and **Snap to grid**.

Color Scheme Tab > For **Scheme:** - confirm - Dark Background Scheme. Click '**OK**'.

Start the Profile Sketch.

From the Sketch Icons > Click **Activate Sketch**.

From the Top Text Menu - Select **Sketch > Figures > Rectangle > Two Corners**.

- Locate the cursor on the Origin, click, release and drag Up and Right until above the X-Axis, and right of the Y-Axis, click.
- Notice the lower right hand corner of the workspace - you will see two numbers. Use this as a guide to finish at 2.00, 2.00.

Create the First Step on the Pyramid from the Profile Sketch.

Select - from the Top Text Menu - **Feature > Boss > Extrude**.

(Alternative: Click **Extrude Boss** from the Feature Icons)

- **Sketch** - should already be selected as Sketch<1>, if not - click in the sketch selection area, and on sketch<1> in design explorer, or in the workspace.
- **Type** - is defaulted at To Depth, - this can be left as is.
- **Current Depth** - is defaulted at 5.000 " - You may set this at any figure easily by picking up or down selections beside the dimension display, or entering a correct number and pressing 'Tab'. For now, set it at 0.500 ". End images move out to reflect the new length.
- Leave the **Direction** as Checked - Along Normal.
- For this - leave the **Draft Angle** at 0 degrees.
- Edit the **Label** - Pyramid-Step<1>.
- Click **OK**.

Create the Second Step Sketch on the Pyramid from the First Step Extrude.

Click on the top of the newly created Solid Surface.

- From The Sketching Icons, Click **Project to Sketch**.
- From the Pop-up, leave the Selection at the default - **Create Sketch Figure**, and Click - **OK**
- Select the top and right-side lines.
(Shift+Click for multiple selections. They turn Yellow when selected).
- From The Sketching Icons, Click **Offset**. Set the Distance for .250 ".
- Select **Flip direction** if lines are outside of selected lines.
- Confirm **Distance** at .250 " , and new lines (blue) are inside of the selected yellow lines,
- Click **OK**.
- Press the **Delete** Key - to remove the two selected lines.
- Select **Trim** Figure - either from the Sketch Icons, or Trim from the Sketch Menu.
- **Click** once on each of the two .250" tails left outside of the new lines to Trim them away.

Create the Second Step on the Pyramid from the Profile Sketch.

Click **Extrude Boss** from the Feature Icons

- **Sketch** - should already be selected as Sketch<2>, if not - click in the sketch selection area, and on sketch<2> in design explorer, or in the workspace.
- **Type** - is defaulted at To Depth, - this can be left as is.
- **Current Depth** - is defaulted at 5.000 " - You may set this at any figure easily by picking up or down selections beside the dimension display, or entering a correct number and pressing 'Tab'. For now, set it at 0.500 ". End images move out to reflect the new length.
- Leave the **Direction** as Checked - Along Normal.
- For this - leave the **Draft Angle** at 0 degrees.
- Edit the **Label** - Pyramid-Step<2>.
- Click **OK**.

These two processes (*Sketch, Extrude*) will be used 6 times to create the steps, (*Along with Project to Sketch, Offset and Trim*) which you can proceed with on your own, if you like, or simply follow the steps below, as I walk you through them.

Create the Third Step Sketch on the Pyramid from the Second Step Extrude.

Click on the top of the newly created Solid Surface.

- From The Sketching Icons, Click **Project to Sketch**.
- From the Pop-up, leave the Selection at the default - **Create Sketch Figure**, and Click - **OK**
- Select the top and right-side lines.
(Shift+Click for multiple selections. They turn Yellow when selected).
- From The Sketching Icons, Click **Offset**. Set the Distance for .250 ".
- Select **Flip direction** if lines are outside of selected lines.
- Confirm **Distance** at .250 " , and new lines (blue) are inside of the selected yellow lines,
- Click **OK**.
- Press the **Delete** Key - to remove the two selected lines.
- Select **Trim** Figure - either from the Sketch Icons, or Trim from the Sketch Menu.
- **Click** once on each of the two .250" tails left outside of the new lines to Trim them away.

Create the Third Step on the Pyramid from the Profile Sketch.

Click **Extrude Boss** from the Feature Icons

- **Sketch** - should already be selected as Sketch<3>, if not - click in the sketch selection area, and on sketch<3> in design explorer, or in the workspace.
- **Type** - is defaulted at To Depth, - this can be left as is.
- **Current Depth** - is defaulted at 5.000 " - You may set this at any figure easily by picking up or down selections beside the dimension display, or entering a correct number and pressing 'Tab'. For now, set it at 0.500 ". End images move out to reflect the new length.
- Leave the **Direction** as Checked - Along Normal.
- For this - leave the **Draft Angle** at 0 degrees.
- Edit the **Label** - Pyramid-Step<3>.

Click **OK**.

Create the Fourth Step Sketch on the Pyramid from the Third Step Extrude.

Click on the top of the newly created Solid Surface.

- From The Sketching Icons, Click **Project to Sketch**.
- From the Pop-up, leave the Selection at the default - **Create Sketch Figure**, and Click - **OK**
- Select the top and right-side lines.
(Shift+Click for multiple selections. They turn Yellow when selected).
- From The Sketching Icons, Click **Offset**. Set the Distance for .250 ".
- Select **Flip direction** if lines are outside of selected lines.
- Confirm **Distance** at .250 " , and new lines (blue) are inside of the selected yellow lines,
- Click **OK**.
- Press the **Delete** Key - to remove the two selected lines.
- Select **Trim** Figure - either from the Sketch Icons, or Trim from the Sketch Menu.
- **Click** once on each of the two .250" tails left outside of the new lines to Trim them away.

Create the Fourth Step on the Pyramid from the Profile Sketch.

Click **Extrude Boss** from the Feature Icons

- **Sketch** - should already be selected as Sketch<4>, if not - click in the sketch selection area, and on sketch<4> in design explorer, or in the workspace.
- **Type** - is defaulted at To Depth, - this can be left as is.
- **Current Depth** - is defaulted at 5.000 " - You may set this at any figure easily by picking up or down selections beside the dimension display, or entering a correct number and pressing 'Tab'. For now, set it at 0.500 ". End images move out to reflect the new length.
- Leave the **Direction** as Checked - Along Normal.
- For this - leave the **Draft Angle** at 0 degrees.
- Edit the **Label** - Pyramid-Step<4>.

Click **OK**.

Create the Fifth Step Sketch on the Pyramid from the Fourth Step Extrude.

Click on the top of the newly created Solid Surface.

- From The Sketching Icons, Click **Project to Sketch**.
- From the Pop-up, leave the Selection at the default - **Create Sketch Figure**, and Click - **OK**
- Select the top and right-side lines.
(Shift+Click for multiple selections. They turn Yellow when selected).
- From The Sketching Icons, Click **Offset**. Set the Distance for .250 ".
- Select **Flip direction** if lines are outside of selected lines.
- Confirm **Distance** at .250 " , and new lines (blue) are inside of the selected yellow lines,
- Click **OK**.
- Press the **Delete** Key - to remove the two selected lines.
- Select **Trim** Figure - either from the Sketch Icons, or Trim from the Sketch Menu.
- **Click** once on each of the two .250" tails left outside of the new lines to Trim them away.

Create the Fifth Step on the Pyramid from the Profile Sketch.

Click **Extrude Boss** from the Feature Icons

- **Sketch** - should already be selected as Sketch<5>, if not - click in the sketch selection area, and on sketch<5> in design explorer, or in the workspace.
- **Type** - is defaulted at To Depth, - this can be left as is.
- **Current Depth** - is defaulted at 5.000 " - You may set this at any figure easily by picking up or down selections beside the dimension display, or entering a correct number and pressing 'Tab'. For now, set it at 0.500 ". End images move out to reflect the new length.
- Leave the **Direction** as Checked - Along Normal.
- For this - leave the **Draft Angle** at 0 degrees.
- Edit the **Label** - Pyramid-Step<5>.

Click **OK**.

Create the Sixth Step Sketch on the Pyramid from the Fifth Step Extrude.

Click on the top of the newly created Solid Surface.

- From The Sketching Icons, Click **Project to Sketch**.
- From the Pop-up, leave the Selection at the default - **Create Sketch Figure**, and Click - **OK**
- Select the top and right-side lines.
(Shift+Click for multiple selections. They turn Yellow when selected).
- From The Sketching Icons, Click **Offset**. Set the Distance for .250 ".
- Select **Flip direction** if lines are outside of selected lines.
- Confirm **Distance** at .250 " , and new lines (blue) are inside of the selected yellow lines,
- Click **OK**.
- Press the **Delete** Key - to remove the two selected lines.
- Select **Trim** Figure - either from the Sketch Icons, or Trim from the Sketch Menu.
- **Click** once on each of the two .250" tails left outside of the new lines to Trim them away.

Create the Sixth Step on the Pyramid from the Profile Sketch.

Click **Extrude Boss** from the Feature Icons

- **Sketch** - should already be selected as Sketch<6>, if not - click in the sketch selection area, and on sketch<6> in design explorer, or in the workspace.
- **Type** - is defaulted at To Depth, - this can be left as is.
- **Current Depth** - is defaulted at 5.000 " - You may set this at any figure easily by picking up or down selections beside the dimension display, or entering a correct number and pressing 'Tab'. For now, set it at 0.500 ". End images move out to reflect the new length.
- Leave the **Direction** as Checked - Along Normal.
- For this - leave the **Draft Angle** at 0 degrees.
- Edit the **Label** - Pyramid-Step<6>.

Click **OK**.

Create the completed Pyramid in the next steps.

The Pyramid will be completed by feature Mirroring to create the Whole Step- Pyramid-1.

From the Feature Menu, Select **Mirror**

- In the **Features Mirror** Popup Window - under **Features to mirror**: shift+click to Select all 6 features, from Pyramid-Step-1, to Pyramid-Step-6 in the Design Explorer
- Under **Mirror plane**: select on of the flat faces of the collective features [i.e.: Face 17], and you will see the lines appear indicating where the features will be mirrored.
- Click **OK**.
- You now have one - half of the full step pyramid completed.

Again, From the Feature Menu, Select **Mirror**

- In the **Features Mirror** Popup Window - under **Features to mirror**: shift+click to Select all 6 features, from Pyramid-Step-1, to Pyramid-Step-6 Plus Mirror<7> in the Design Explorer
- Under **Mirror plane**: select on of the flat faces of the collective features [i.e.: Face 16], and you will see the lines appear indicating where the features will be mirrored.
- Click **OK**.

Congratulations! You have now completed the modelling of the Step Pyramid.

Now, to save this file in it's own folder:

- From the main text menu, select **File, Save As**
- From the Explorer directory view - select Tutorials folder.
- Click on **New Folder** - create one with the name Step-Pyramid-1 under Tutorials.
- Select this new folder named: Step-Pyramid-1
- Edit the name of the part - to Step-Pyramid-1, and click - **Save**.

If you want - you can edit the pyramids Color properties and re-save!

- Click **Edit, Color Properties**,
- From the **Color Properties** Popup Window - Set the **Reflectivity** Slider to 10%,
- Leave **Opacity** at 100%,
- Click on **Color** to select a new Color:
[i.e. Choose the 4th box down on the left - a Reddish Brown]
- Click **OK** to close the Color selection box and accept the new Color,
- Click **OK** to apply the Color to the model.

Now, to Update save this file:

- From the Top Standard Icons - select **Save**. (The Floppy disk Icon.)
- On the Popup - Select **Save**.

Congratulations!
You have completed the Step-Pyramid-1 Tutorial!

(Text Version)

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