

A 3D CAD model of a mechanical assembly, featuring a large grey cast part with a central bore and a smaller yellow cylindrical component. The background is a light grey gradient.

# Chapter 1

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## ***Introduction to Solid Edge ST4***

### **Learning Objectives**

**After completing this chapter, you will be able to:**

- *Know the basic properties and different environments.*
- *Know the system requirements.*
- *Understand important terms and definitions.*
- *Know about the user interface.*
- *Save the Solid Edge designs automatically after regular intervals.*
- *Modify the color scheme.*

## INTRODUCTION TO Solid Edge ST4

Welcome to the world of Solid Edge ST4, a product of SIEMENS. If you are a new user of this software, you will join hands with thousands of users of this high-end CAD tool worldwide. The previous releases of this software helped the users improve their design skills. In this latest release, the user interaction has been taken to a new level, thus making Solid Edge the easiest and fastest mechanical CAD product.

Solid Edge is a powerful software that is used to create complex designs with great ease. The design intent of any three-dimensional (3D) model or an assembly is defined by its specification and use. You can use the powerful tools of Solid Edge to capture the design intent of any complex model by incorporating intelligence into the design. With Synchronous Technology, Solid Edge redefines the rules of 3D modeling. It combines the speed and flexibility of modeling with precise control of dimension-driven design, thereby generating tremendous productivity gains over traditional methods.

In Solid Edge, the synchronous and traditional (now called Ordered) modeling environments are combined into a single modeling environment. This means, you do not need two separate environments to work with synchronous and traditional modeling technologies. The most interesting feature is that you can switch between the **Synchronous** and **Ordered** environments and can convert a particular Ordered feature into a Synchronous feature.

To make the design process simple and efficient, this software package divides the steps of designing into different environments. This means each step of the design process is completed in a different environment. Generally, a design process involves the following steps:

- Sketching by using the basic sketch entities and converting them into features or parts. These parts can be sheet metal parts, surface parts, or solid parts.
- Assembling different parts and analyzing them.
- Generating drawing views of the parts and the assembly.

All these steps are performed in different environments of Solid Edge, namely **Synchronous Part/Ordered Part, Assembly, Synchronous Sheet Metal/ Ordered Sheet Metal, Weldment, and Draft**.

Solid Edge provides Software Development Kit (SDK) that helps you customize Solid Edge according to your requirement. Solid Edge also provides assistance, tutorials, and technical support to users. The tutorials can be browsed from the welcome screen. You can view as well as work on the models simultaneously. Solid Edge helps you find commands quickly by using the Command Finder. Also, the enhanced tooltips in this version provide complete information of a tool such as its name and description as well as the shortcut keys used to invoke the tool.

Solid Edge supports data migration from various CAD packages such as IDEAS, AutoCAD, Mechanical Desktop, Pro/E, Inventor, CATIA, and NX. As a result, you can convert all files and documents created in these software into a Solid Edge document. You can also view or change the settings of a file while importing it. Solid Edge allows you to evolve a 3d model from a 2d drawing created in the Draft environment of Solid Edge or imported from any other software.

Solid Edge ST4 is a combination of synchronous, parametric and feature-based solid modeling software. The bidirectional associative nature of this solid modeling tool makes the design process very simple and less time-consuming. The synchronous, parametric, feature-based, and bidirectional properties of this software are explained next.

## Synchronous Technology

The Synchronous Technology of Solid Edge ST4, with its new commands and workflow concepts, has made modeling much easier, faster, and accurate than in the other parametric modeling as this technology enables you to create sketches as well as to develop features in the same environment. Note that the features created in this environment do not depend on the order of their creation. Therefore, the editing of the model becomes a lot easier. This state-of-the-art technology makes Solid Edge ST4 a completely feature-based 2D/3D CAD software package.

## Parametric Nature

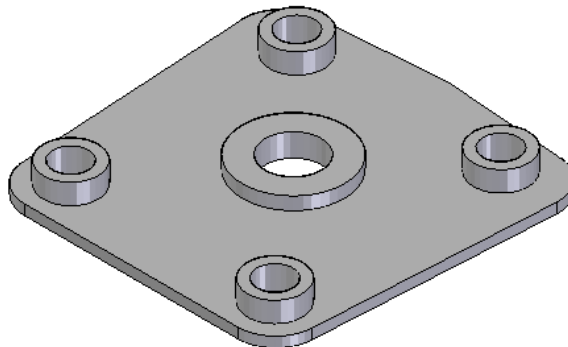
Parametric nature of a solid modeling package means that the sketch is driven by dimensions, or in other words, the geometry of a model is controlled by its dimensions. For example, to model a rectangular plate of 100X80 units, you can draw a rectangle of any dimension and then modify its dimensions to the required dimensions of the plate. You will notice that the dimensions drive the geometry of the sketch.

Therefore, using this parametric property, any modification in the design of a product can be accomplished at any stage of the product development. This makes the design flexible.

## Feature-based Modeling

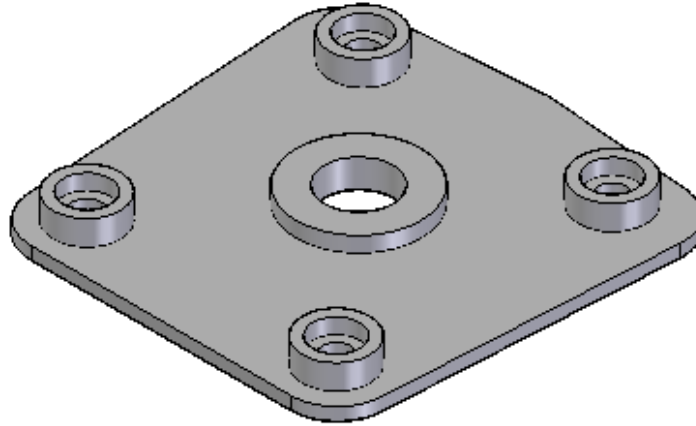
A feature is defined as the smallest building block of a model. Any solid model created in Solid Edge is an integration of a number of features. Each feature can be edited individually to make any change in the solid model. As a result, the feature-based property provides greater flexibility to the created parts.

The advantage of dividing a model into a number of features is that it becomes easy to modify the model by modifying the features individually. For example, Figure 1-1 shows a model with four simple holes near the corners of the plate.



*Figure 1-1 Model with simple holes*

Now, consider a case where you need to change all outer holes to counterbore holes. In a non-feature based modeling package, you need to delete all the holes and then create the counterbore holes. However, in Solid Edge, you can modify some parameters of the holes in the same part and convert the simple holes into counterbore holes, see Figure 1-2.

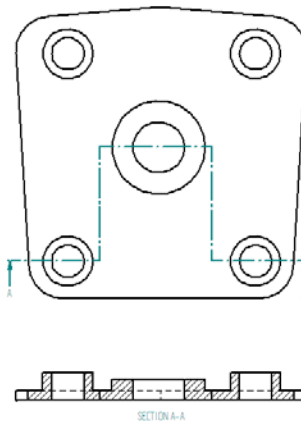


*Figure 1-2 Model with counterbore holes*

## Bidirectional Associativity

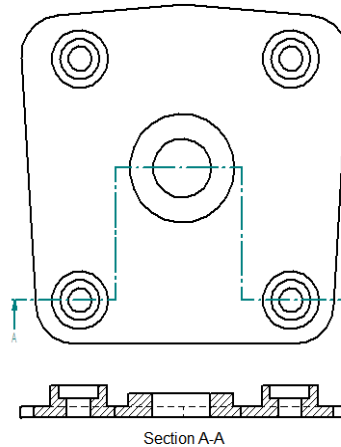
The bidirectional associativity of a software package is defined as its ability to ensure that any modification made in a particular model in one environment is also reflected in the same model in the other environments. For example, if you make any changes in a model in the part environment, the changes will reflect in the same model in the **Assembly** environment and vice-versa.

Figure 1-3 shows the top view and the sectioned front view of the part shown in Figure 1-1.



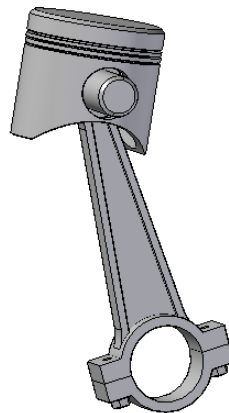
*Figure 1-3 Drawing views of the model before modification*

These drawing views are generated in the **Draft** environment. The views show that the part consists of a simple hole at the center and four simple holes near the corners. Now, when the model is modified in the part environment, the modifications are automatically reflected in the **Draft** environment, as shown in Figure 1-4. This figure shows that the four simple holes are converted into counterbore holes. This implies that the part environment and the **Draft** environment of Solid Edge are bidirectionally associative.



**Figure 1-4** Drawing views of the model after modification

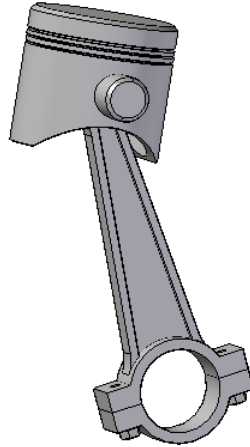
Consider the assembly shown in Figure 1-5. The piston is connected to the connecting rod through a pin. It is clear from the assembly that the diameter of the hole is more than what is required. In an ideal case, the diameter of the hole on the piston should be equal to the diameter of the pin.



**Figure 1-5** Piston, connecting rod, and pin assembly

Now, when you open the piston in the part environment and modify the diameter of the hole on it, the same modification is also reflected in the **Assembly** environment, as shown in Figure 1-6. This is due to the bidirectional associative nature of Solid Edge.

Similarly, if the modification is made in the **Assembly** environment, the piston, when opened in the part environment, is also modified automatically. This shows that all environments of Solid Edge are associative by nature.



*Figure 1-6 Assembly after modifying the diameter of the hole on the piston*

## Solid Edge ENVIRONMENTS

To reduce the complications of a design, this software package provides you with various design environments. You can capture the design intent easily by individually incorporating the intelligence of each design environment into the design. The design environments available in Solid Edge are discussed next.

### Part Environment

This environment of Solid Edge ST4 is used to create solid as well as surface models. The part environment consists of two environments namely **Synchronous Part** and **Ordered Part**. You can switch between these environments and create a model which consists of both synchronous and ordered features. To invoke this environment, start Solid Edge ST4 by choosing **Start > All Programs > Solid Edge ST4 > Solid Edge ST4** from the taskbar. After Solid Edge ST4 starts, a welcome screen is displayed. From this screen, choose the **ISO Part** option from the **Create** area; the part environment gets started with the ISO units. By default, the **Synchronous Part** environment is invoked. However, you can switch to the **Ordered Part** environment by choosing the **Ordered** radio button from the **Tools** tab.

### Synchronous Part

Solid Edge ST4 with the Synchronous Technology makes it a complete feature-based 2D/3D CAD system. This technology combines the speed and flexibility of direct modeling with precise control of dimension-driven design. In this environment, there is no separate environment to draw sketches; rather the sketching tools are available in the **Synchronous Part** environment itself. It includes direct model creation and modification through precision sketching, region selection, face selection, and handle selection.

## Ordered Part

The **Ordered Part** environment of Solid Edge ST4 is used to create parametric and feature-based solids as well as surface models. You can draw sketches of models or features by invoking the sketching environment. Once the sketch is drawn, you can convert it into a solid model using simple but highly effective modeling tools. One of the major advantages of using Solid Edge is the availability of command bar. The command bar is displayed in the drawing window. In this environment, you can create a feature step by step by using the command bar. You can also use the command bar to easily go one or more steps backward to modify a parameter. You can also convert the features created in this environment to the synchronous features for editing them directly. The models created in the part environment can also be used in the other environments of Solid Edge to complete the model's life cycle, also known as the Product Life Cycle.

## Assembly Environment

This environment of Solid Edge is used to create an assembly by assembling the components that were created in the **Synchronous/Ordered Part** environment. Both the synchronous and ordered tools are combined in this environment. This environment supports animation, rendering, piping, and wiring. Other visualization and presentation tools are also available in this environment. In addition to that, you can apply a relation between the faces of two different synchronous components in an assembly. For example, you can make the selected face of a component tangent with the target face of another component.

## Draft Environment

This environment is used for the documentation of the parts or the assemblies in the form of drawing views. The drawing views can be generated or created. All the dimensions added to the component in the part environment during its creation can be displayed in the drawing views in this environment.

## Sheet Metal Environment

This environment is used to create sheet metal components. If you are conversant with the part environment, then modeling in this environment becomes easy. This is because in addition to the sheet metal modeling tools, this environment works in a way similar to the part environment. To invoke this environment, start Solid Edge ST4; a welcome screen will be displayed. Choose the **ISO Sheet Metal** option from the **Create** area in the welcome screen; the Sheet Metal environment gets started with the ISO units. By default, the **Synchronous Sheet Metal** environment is invoked. However, you can switch to the **Ordered Sheet Metal** environment by choosing the **Ordered** radio button from the **Tools** tab.

## Synchronous Sheet Metal

The **Synchronous Sheet Metal** environment is used to create and edit sheet metal components in a history-free approach. The procedure of selection of faces introduced in this environment allows you to model sheet metals directly. Also, the method of dimensioning the sheet metal components has been introduced in Solid Edge ST4 to enable you to create a dimension-driven design.

## Ordered Sheet Metal

The **Ordered Sheet Metal** environment is used to create parametric and feature-based sheet metal components.

## Weldment Environment

This environment enables you to insert components from the part or the **Assembly** environment and apply weld beads to the parts or the assembly. This environment is associative with the part and **Assembly** environments.

## SYSTEM REQUIREMENTS FOR Solid Edge ST4

The system requirements for Solid Edge ST4 are as follows:

1. An Intel Pentium or AMD processor-based computer.
2. Windows XP Professional (32-bit or 64-bit), Windows Vista Business or Vista Enterprise (32-bit or 64-bit), Windows 7 (Professional, Ultimate or Enterprise).
3. Microsoft Internet Explorer 6.0 or later.
4. 2GB RAM minimum.
5. Disk space for installation = 3 GB.

## IMPORTANT TERMS AND DEFINITIONS

Some important terms that are used in this textbook are discussed next.

### Relationships

Relationships are the logical operations that are performed on a selected geometry to make it more accurate by defining its position and size with respect to the other geometry. There are two types of relationships available in Solid Edge and these are discussed next.

### Geometry Relationships

These logical operations are performed on the basic sketched entities to relate them to the standard properties such as collinearity, concentricity, perpendicularity, and so on. Although Solid Edge automatically applies these relationships to the sketched entities at the time of drawing, you can also apply them manually. You can apply eleven types of geometry relationships, which are discussed next.

#### Connect

This relationship connects a point to another point or entity.

#### Concentric

This relationship forces two selected curves to share the same center point. The curves that can be made concentric are circles, arcs, and ellipses.

#### Horizontal/Vertical

This relationship forces the selected line segment or two points to become horizontal or vertical.



**Collinear**

This relationship forces two line segments to lie on the same line.

**Parallel**

This relationship is used to make two line segments parallel.

**Perpendicular**

This relationship makes a line segment perpendicular to another line segment or series of line segments.

**Lock**

This relationship is used to fix an element or a dimension such that it cannot be modified.

**Tangent**

This relationship is used to make the selected line segment or curve tangent to the selected line or curve.

**Equal**

This relationship forces the selected line segments to be of equal length. It also forces two curves to be of equal radius.

**Symmetric**

This relationship is used to force the selected sketched entities to become symmetrical about a sketched line segment, which may or may not be a center line.

**Rigid Set**

This relationship is used to group the selected sketched entities into a rigid set so that they behave as a single unit.

**Feature Relationships (Only in Synchronous Part Environment)**

The feature relationships are the relationships that are applied on a selected face to make it geometrically related to the target face. These relationships are used to modify the parts created in the **Synchronous Part** environment. The following types of feature relationships can be applied between faces:

**Concentric**

This relationship makes the selected faces concentric with the target face.

**Coincident**

In this relationship, the selected faces coincide with the target face.

**Parallel**

This relationship enables you to make the selected faces parallel to the target face.

**Perpendicular**

This relationship helps you to make the selected faces perpendicular to the target face.

**Tangent**

This relationship makes the selected faces tangent with the target face.

**Rigid**

This relationship is used to make all the faces in the selection set rigid with respect to each other. This means, if either of the face is moved or rotated, then all the related faces will also move or rotate, thereby maintaining the distance and orientation between them.

**Ground**

This relationship grounds or constrains the selected face in the model space. As a result, the grounded faces can be neither moved nor rotated.

**Symmetric about**

This relationship makes a selected face symmetric to a target face about a symmetry plane.

**Equal Radius**

This relationship makes the radius of a selected cylindrical face equal to the radius of a target cylindrical face.

**Coplanar Axis**

This relationship allows the selected entities to be coplanar to the theoretical plane you define.

**Assembly Relationships**

The assembly relationships are the logical operations that are performed on the components to assemble them at their respective working positions in an assembly. These relationships are applied to reduce the degrees of freedom of the components.

**Flash Fit**

This relationship minimizes the efforts of applying various relationships like: Mate, Planer Align, and so on by automatically positioning the component wherever required.

**Mate**

This relationship is used to make the selected faces of different components coplanar. You can also specify some offset distance between the selected faces.

**Planar Align**

This relationship enables you to align a planar face with the other planar face.

**Axial Align**

This relationship enables you to make a cylindrical surface coaxial with the other cylindrical surface.

**Insert**

This relationship is used to mate the faces of two components that are axially symmetric and also to make their axes coaxial.

**Connect**

This relationship enables you to connect two keypoints, line, or a face on two different parts.

**Angle**

This relationship is used to place the selected faces of different components at some angle with respect to each other.

**Tangent**

This relationship is used to make the selected face of a component tangent to the cylindrical, circular, or conical faces of the other component.

**Cam**

This relationship applies the cam-follower relationship between a closed loop of tangent face and the follower face.

**Parallel**

The **Parallel** relationship is used to force two edges, axes, or an edge and an axis parallel to each other.

**Gear**

The **Gear** relationship allows you to apply rotation-rotation, rotation-linear, or a linear-linear relationship between two components.

**Entity**

An element of a geometry is called an entity. An entity can be an arc, line, circle, point, and so on.

**Concept of a Profile and a Sketch**

In Solid Edge, there are two methods of drawing a sketch. The first method is to draw a sketch in the sketching environment by invoking the **Sketch** tool from the **Home** tab. The second method is to invoke a feature creation tool such as **Extrude**, **Revolve**, and so on and then draw the sketch for the feature. The sketch drawn using the first method is called a Sketch and the sketch drawn using the second method is called a Profile. You will learn more about this in later chapters of this book.

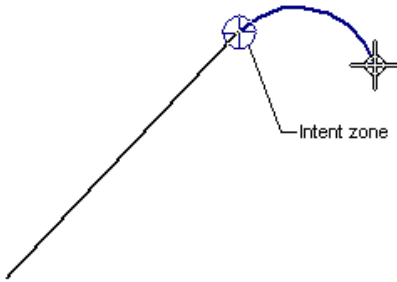
**Note**

*In case, you are working in the **Synchronous Part** environment, there is no separate sketching environment in it, and the sketching tools are added to the same environment.*

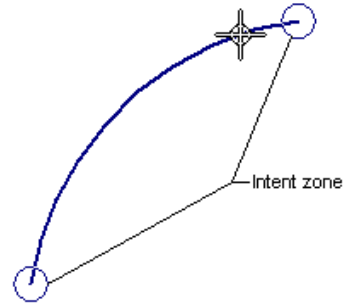
**Intent Zone**

The intent zone is defined by a circular area that is divided into four quadrants. It is used

while drawing an arc or a circle from a line, or vice-versa. The quadrants define whether the element is perpendicular, tangent or at some other orientation from the other element. This zone enables you to draw or modify various elements of a geometry within the same tool. For example, while drawing a line tangent to an arc, you can draw a tangent arc or a perpendicular arc by moving the cursor in the intent zone. The movement of the cursor in the intent zone determines the creation of a tangent or a perpendicular arc. The intent zone while drawing a tangent arc and a three point arc is shown in Figure 1-7 and 1-8, respectively.



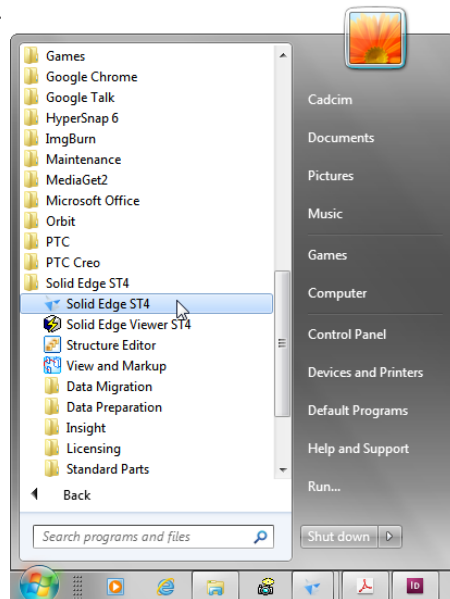
**Figure 1-7** Intent zone displayed while drawing a tangent arc



**Figure 1-8** Intent zone displayed while drawing a three point arc

## GETTING STARTED WITH Solid Edge ST4

After you have installed Solid Edge on your computer, choose **Start > All Programs (or Programs) > Solid Edge ST4 > Solid Edge ST4**, as shown in Figure 1-9; the welcome screen will be displayed. In this screen, links for various environments will be displayed in the **Create** area. You can start a new document in the desired environment by clicking on the corresponding link in this area. As discussed earlier, Solid Edge divides the designing steps into various environments.



**Figure 1-9** Starting Solid Edge ST4 from taskbar

You can open the existing documents by choosing the **Open Existing Documents** button located above the **Create** area. The links for the recently used documents are displayed in the **Recent Documents** area. You can click on the link of the required document in this area to open that document. The welcome screen also displays the link for step-by-step tutorials in the **Tutorials** area. The **Favorite Links** area contains the links for the home page and the technical support page of Solid Edge. However, you can add or remove links from this area.

## USER INTERFACE OF Solid Edge

Solid Edge provides you a **Ribbon** with different tabs and groups while working in different environments. This means that the tabs and groups available while working in the **Synchronous Part /Ordered Part, Assembly, Draft** and **Synchronous Sheet Metal/Ordered Sheet Metal** environments are different. Also, every environment has the **PathFinder** and the prompt line that assist you in creating the design. These user interfaces are discussed next.

### Prompt Line

If you invoke a tool, the prompt line is displayed below the command bar. This line is very useful while creating a model because it provides you with the prompt sequences to use a tool.

### PathFinder

The **PathFinder**, as shown in Figure 1-10, is present on the left of the drawing area. It lists all occurrences of features and sketches of a model in a chronicle sequence.



#### Note

*Remember that though the profiles of the features are not displayed in the **PathFinder**, but the sketches are displayed. You will learn about the difference between sketches and profiles later in this textbook.*

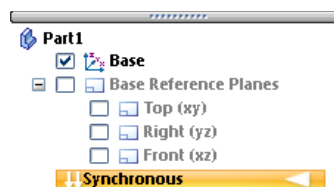


Figure 1-10 The PathFinder

### Docking Window

The docking window is available on the left of the screen and remains collapsed by default. It has different tabs on the top. These tabs can be used to activate the feature library, family of parts, and so on. The docking window expands when you move the cursor over the left pane of the screen. In case, any tab is missing in it, choose the **Panes** button from the **Show** group in the **View** tab; a flyout will be displayed with various options. Choose the required option; the tab corresponding to that option will be added to the docking window. The options available in the docking window are discussed later in this textbook.

### Ribbon

The **Ribbon** is available at the top of the Solid Edge window and contains all application tools. It is a collection of tabs. Each tab has different groups and each group is a collection of similar tools. You can increase the drawing area by minimizing the **Ribbon**. To do so, right-click on a tab in the **Ribbon** and choose **Minimize the Ribbon** from the shortcut menu displayed.

## Quick Access Toolbar

The **Quick Access** toolbar is available on the top-left of the title bar of the Solid Edge window. It provides you an access to the frequently used commands such as **New**, **Open**, **Undo**, **Redo**, **Save** and **Print**. However, by default, only the **Save** option is displayed in the **Quick Access** toolbar. To add commands such as **New**, **Open**, and so on, choose the black arrow on the right of the **Quick Access** toolbar; the **Customize** flyout will be displayed. Choose the required command from the flyout to add it to the **Quick Access** toolbar; refer to Figure 1-11. On deselecting any command from the flyout, the selected command will be removed from the toolbar.

You can also customize the **Quick Access** toolbar to add more commands to it. To do so, invoke the **Customize** flyout again and then choose **More**



Figure 1-11 The **Quick Access** toolbar

commands from it; the **Customize** dialog box will be displayed with the **Quick Access** tab chosen by default. In this dialog box, select the required option from the **Choose commands from** drop-down list; the corresponding menus will be available in a list box displayed below it. Select the required tool from the list box and then choose the **Add** button to add the tool to the **Quick Access** toolbar. Similarly, you can also remove commands by using the **Customize** dialog box. To do so, select the required command from the list box at the right of this dialog box; the **Remove** button will be activated. Choose the **Remove** button; the selected command will be removed from the **Quick Access** toolbar.

To remove any tool from the **Quick Access** toolbar, right-click on the required tool; a shortcut menu will be displayed. Choose **Remove from Quick Access Toolbar** from the shortcut menu; the corresponding tool will be removed from the toolbar.

## Application Button

The **Application Button** is available on the top left corner of the Solid Edge window. It is present in all environments. On choosing this button, the Application menu containing the options for creating, opening, saving, and managing documents will be displayed.

## Status Bar

The status bar is available at the bottom of the Solid Edge window. It enables you to quickly access all the view controls like **Zoom Area**, **Zoom**, **Fit**, **Pan**, **Rotate**, **Sketch View**, **View Orientation**, and **View Styles**. A slider on the right of the status bar controls the amount of zooming. Most importantly, it consists of the Command Finder that helps you to locate the required command.

## QuickBar

The **QuickBar** provides the command options for the active tool. The **QuickBar** that is available by default in the **Synchronous Part** environment is shown in Figure 1-12. It contains all possible tools to perform various operations, thereby increasing speed and flexibility.



Figure 1-12 The **QuickBar**

## Command Bar

The command bar provides the command options for the active tool. It enables you to switch back and forth while creating a model, an assembly, or a drawing. It is available in all environments of Solid Edge and contains different buttons/steps. The command bar that is available for the **Extrude** tool is shown in Figure 1-13. However, the buttons displayed in the command bar depend upon the tool invoked from the **Part** environment. For example, on invoking the **Extrude** tool, the buttons/steps displayed will have different options.



Figure 1-13 The command bar

## QuickPick

This tool enables you to select elements from the drawing window. This tool is used when the elements or the components are overlapping and you need to make a selection. The following steps explain the procedure of using this tool:

1. Bring the cursor near the element or the component that you need to select. Now, pause the cursor, and when three dots appear close to it, right-click on the screen. On doing so, the **QuickPick** dialog box will appear with an entry of each possible selection, as shown in Figure 1-14.
2. In the **QuickPick** dialog box, each entry represents an element. As you move your cursor over the elements in this list, the corresponding components get highlighted in the drawing window.
3. To exit the **QuickPick** dialog box, simply click on the screen.

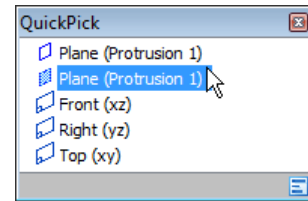


Figure 1-14 The QuickPick dialog box



**Tip:** You can use the **Options** button available on the bottom right in the **QuickPick** dialog box to invoke the **QuickPick Options** dialog box. You can use the options in this dialog box to modify the **QuickPick** options.

## Part Environment Tabs

There are several tabs in the **Ribbon** that can be invoked in the part environment. The tabs that are extensively used during the designing process in this environment are discussed next.

### The View Tab

This tab is available in all environments of Solid Edge. The **View** tab of the **Ribbon** is shown in Figure 1-15.



Figure 1-15 The View tab

## The Home Tab

This tab consists of the modeling tools that are used to convert a sketch into a solid model. The **Home** tab along with all its tools is shown in Figure 1-16.

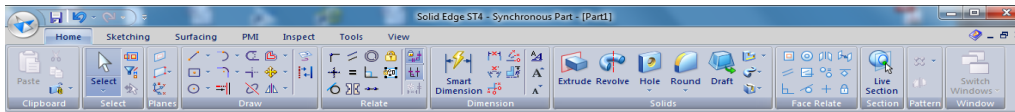


Figure 1-16 The *Home* tab in the *Part* environment

## The Surfacing Tab

This tab contains the modeling tools that are used to create surface models. This tab is available only when you are in the **Part / Synchronous Part** environment. The **Surfacing** tab, along with all its tools, is shown in Figure 1-17.

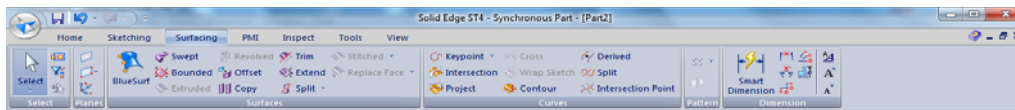


Figure 1-17 The *Surfacing* tab in the *Part* environment

## Assembly Environment Tabs

There are several tabs that can be invoked to create and manage assemblies in the **Assembly** environment of Solid Edge.

### The Assemble Group

The **Assemble** group is available in the **Home** tab of the **Ribbon**. The tools in this tab are used to create and manage assemblies. The **Home** tab in the **Assembly** environment is shown in Figure 1-18.



Figure 1-18 The *Home* tab in the *Assembly* environment

## Draft Environment Tabs

The **Ribbon** in the **Draft** environment provides you with various tools to generate and create drawing views. Various drafting tools available in the **Home** tab are shown in Figure 1-19.

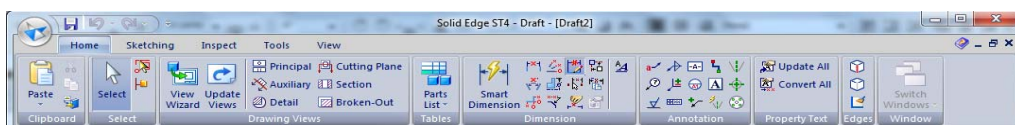


Figure 1-19 The *Home* tab of the *Draft* environment



## Radial Menu

The radial menu is a set of tools arranged radially, as shown in Figure 1-20. To invoke a tool from the radial menu, press the right mouse button and drag the cursor; the radial menu will be displayed. Keeping the right mouse button pressed, move the cursor over the tool to be invoked and then release the mouse button; the tool will be invoked. You can add or remove tools from the radial menu. To do so, right-click on the **Ribbon** and choose the **Customize the Ribbon** option from the shortcut menu displayed; the **Customize** dialog box will be displayed. Choose the **Radial Menu** tab and select the **Use Custom** radio button. Next, select the category that contains the tool that you want to add to radial menu from the **Choose commands** from drop-down list. On doing so, the categories and the commands are displayed in the Command tree. Next, drag and place the tool onto the radial menu image in the dialog box; the tool will be displayed in the radial menu. To remove a tool from the radial menu, click on the tool in the radial menu image and drag it into the white space. Next, choose the **Close** button to exit the **Customize** dialog box.



Figure 1-20 The Radial Menu

## SIMULATION EXPRESS

Solid Edge ST4 provides you an analysis tool called **Simulation Express**. This tool is used to execute the linear static analysis and to calculate the displacement, strain, and stresses applied on a component with respect to the material, loading, and restraint conditions applied to a model. A component fails when the stress applied to it reaches a certain permissible limit. The Static Nodal displacement plot of the Master rod of the engine, designed and analyzed by using the **Simulation Express** tool is shown in the Figure 1-21. A new tab, **Simulation**, is added in the **Ribbon** of the part, **Assembly**, and Sheet Metal environments with all basic analysis tools in it. Both the Femap and industry standard NX Nastran solvers are used in Solid Edge's **Simulation Express**.

## USING INTELLISKETCH

**Intellisketch** is a dynamic drawing tool that allows you to draw a sketch with accuracy by specifying various relations like endpoint, midpoint, perpendicular, parallel, tangent, horizontal, vertical, and so on. The **Intellisketch** shows the dynamic display of the relation while drawing a sketch. Moreover, while sketching a relationship indicator will be displayed at the cursor; click when the indicator is displayed to apply the respective relation to the drawing. You can also apply a relation after drawing the sketch. Additionally, these relationships are maintained even when you modify the sketch. In the **Sketch** environment, the **Intellisketch** tool is available in the **Home** tab, whereas in the Synchronous environments, it is available in the **Sketching** tab.

Part Name: master.par  
 Material Name: Steel  
 Type of Analysis: Stress  
 Displayed: Deformed Model

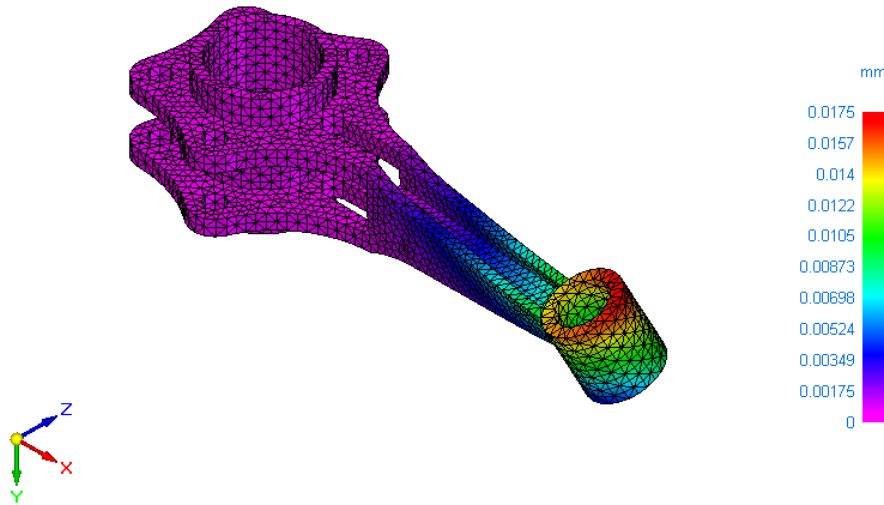


Figure 1-21 The Master Rod analyzed using *Simulation Express*

## UNITS FOR DIMENSIONS

The units for dimensioning a sketch or feature can be the Metric and English templates. The Metric templates are prefixed as **ansi mm**, **din**, **iso**, **jis**, **metric** and **uni** and the English templates are prefixed as **ansi**.

## AUTOMATIC SAVING OPTION

In Solid Edge, you can set the option for saving the files automatically after a regular interval of time. While working on a design project, if the system crashes, you may lose the unsaved design data. If the option of automatic saving is on, your data is saved automatically after regular intervals. To set this option, choose **Application Button > Solid Edge Options**; the **Solid Edge Options** dialog box will be displayed. Choose the **Save** tab and select the **Automatically preserve documents by** check box. You can also select the **Saving all documents every** radio button and set the minutes in the spinner. You can also select to save uniquely named copies of the documents at a specified location. By default, the files will be saved in the default folder. You can change the default backup folder location by selecting the **File Locations** tab from the dialog box.

## COLOR SCHEME IN Solid Edge

In Solid Edge, you can use various color schemes as the background color of the drawing window and for displaying the entities in it. Note that this book uses white as the background color. To change the background color, choose **Application Button > Solid Edge Options**; the **Solid Edge Options** dialog box will be displayed. Choose the **Colors** tab from this dialog box to display various colors, as shown in Figure 1-22.

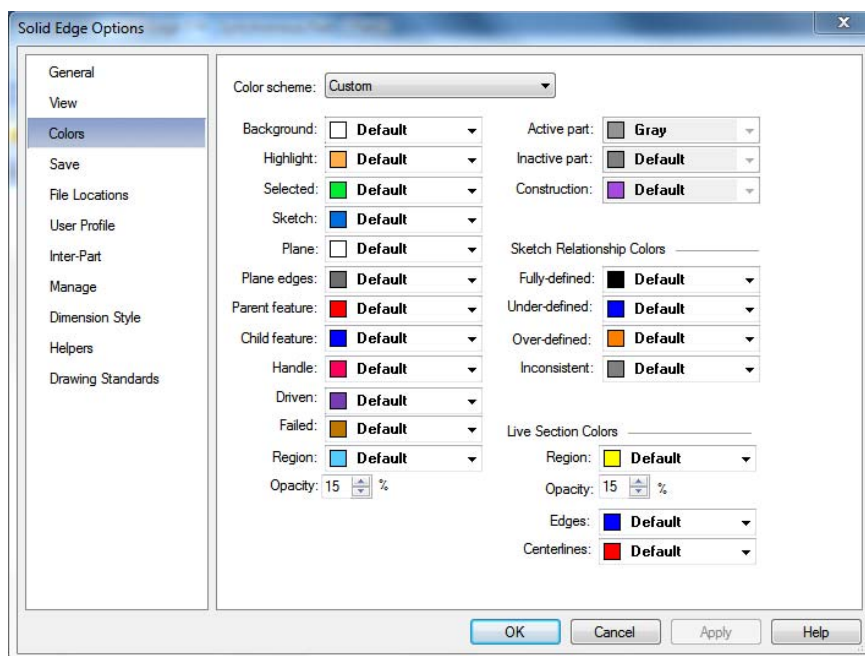


Figure 1-22 The **Colors** tab of the **Solid Edge Options** dialog box

From the **Background** drop-down list in the **Colors** tab, select the **White** color; the background color will change to white. Next, choose **OK** from the **Solid Edge Options** dialog box to exit from it.

Next, choose the **View Overrides** tool from the **Style** group of the **View** tab; the **Format View** dialog box will be displayed. Choose the **Background** tab and select **Solid Edge default** from the **Type** drop-down list, as shown in Figure 1-23. Choose **OK** to exit this dialog box. Note that the current file will use this color scheme.

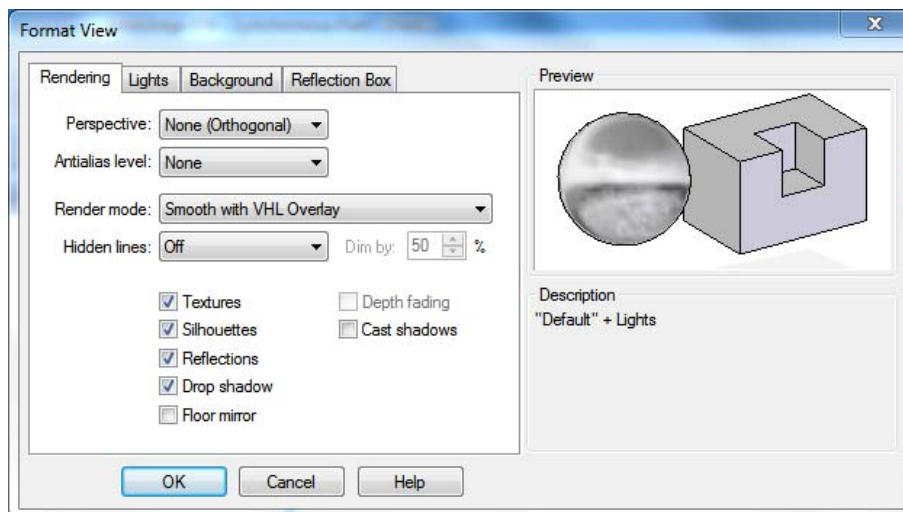


Figure 1-23 The **Format View** dialog box

## Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. The **Ordered Part** environment of Solid Edge is a feature-based parametric environment in which you can create solid models. (T/F)
2. Any solid model created in Solid Edge is an integration of a number of features. (T/F)
3. The welcome screen of Solid Edge displays the link for step-by-step tutorials in the **Tutorials** area. (T/F)
4. In Solid Edge, the solid models that are not created by integrating a number of building blocks are called features. (T/F)
5. The \_\_\_\_\_ property ensures that any modification done in a model in any one of the environments of Solid Edge is automatically reflected in the other modes immediately.
6. The \_\_\_\_\_ relation forces two selected arcs, circles, a point and an arc, a point and a circle, or an arc and a circle to share the same center point.
7. The \_\_\_\_\_ relation is used to make two points, a point and a line, or a point and an arc coincident.
8. The \_\_\_\_\_ relation forces two selected lines to become equal in length.
9. The \_\_\_\_\_ lists all occurrences of features and sketches of a model in a chronicle sequence.

### Answers to Self-Evaluation Test

1. T, 2. T, 3. T, 4. F, 5. Bidirectional associativity, 6. Concentric, 7. Coincident, 8. Equal, 9. PathFinder