CHAPTER 1

1.1 Revit File Types

Revit uses three types of files: project files, template files, and family files. Each one has a different file extension.

1. Revit project files, in which the actual building models are created, have a.rvt extension.
2. Revit family files, which are used to create objects such as doors, windows, annotations, symbols, and title blocks thvat are loaded into the project files, have a.rfa extension.
3. Template files that are used to create project and family files have a.rte and .rft extension.

1.1.1 Project

A project provides essential information about a building model, such as the size and location of components; materials used, annotations, and so on. The display settings in a project file define the appearance of the model in project views. Based on requirements, one can customize the default settings of a project. The project file is based on a template that provides initial settings such as material and display settings. Templates can be customized, and projects can even be started without using a template.

1.1.2 Project Templates

A project template helps to start a project by providing initial conditions such as the default project units and settings, the default building levels and standard views, system families (walls, floors, and others), and preloaded component families. A template can be selected from the template library, or a saved project can be used as a new project template. New projects inherit all the families, settings, and geometry from the starting template.

1. Project template files have an .rte extension. By default, they are stored in the template folders at the same level as the Imperial and Metric Library folders.
2. The settings for views, levels, materials, and annotations using project templates can be modified. They have a library of family content.
3. Elements can be created within project templates such as sheets, drafting views and details, schedules, additional families, cameras, groups, detail groups, links, and import/export settings.

Views and their controls are very important for working effectively in Revit Architecture. Templates for view types can be created to hold the settings and these templates can then be applied to views. For example, furniture plans, floor finish plans, or electrical plans may all show the same area of a model, but they look very different.

Starting Without a Template

A project can be started even without using a template; in this case, the project contains only one level with a plan view and a reflected ceiling plan view. One will need to specify the applicable units, that is, imperial or metric units. The only wall types that load are basic, curtain, and stacked; no windows, doors, or other components load; and no elevation view will need to be created in the project.

1.1.3 Families

A family is a group of elements with a common set of properties, called parameters, and a related graphical representation. Different elements belonging to a family may have different values for some or all of their parameters, but the set of parameters (their names and meanings) is the same. These variations within the family are called *family types or types.*

For example: The Furniture category includes families and family types that you can use to create different pieces of furniture, like desks, chairs, and cabinets.

Although these families serve different purposes and are composed of different materials, they have a related use. Each type in the family has a related graphical representation and an identical set of parameters, called the *family type parameters*.

When you create an element in a project with a specific family and family type, you create an instance of the element. Each element instance has a set of properties, in which you can change some element parameters independent of the family type parameters. These changes apply only to the instance of the element, the single element in the project. If you make any changes to the family type parameters, the changes apply to all element instances that you created with that type.

Three kinds of families in Revit

System Families: System families create basic elements that you would assemble on a construction site.

Ex: Walls, roofs, floors System settings, which affect the project environment and include types for levels, grids, drawing sheets, and viewports, are also system families.

System families are predefined in Revit. You do not load them into your projects from external files, nor do you save them in locations external to the project.

Loadable Families: Loadable families are families used to create Building components that would usually be purchased, delivered, and installed in and around a building, such as windows, doors, casework, fixtures, furniture, and planting. Some annotation elements that are routinely customized, such as symbols and title blocks also belongs to Loadable Families.

Because of their highly customizable nature, loadable families are the families that you most commonly create and modify in Revit. Unlike system families, loadable families are created in external RFA files and imported, or loaded, in your projects. For loadable families that contain many types, you can create and use type catalogs, which allow you load only the types that you need for a project.

In-place Families: In-place elements are unique elements that you create when you need to create a unique component that is specific to the current project. You can create in-place geometry so that it references other project geometry, resizing or adjusting accordingly if the referenced geometry changes. When you create an in-place element, Revit creates a family for the in-place element, which contains a single family type.

1.2 User Interface

Revit Architecture is a powerful CAD application that uses the BIM methodology. Revit Architecture is similar to other Windows based applications that utilize the Microsoft Office ribbon interface. It also has toolbars, dialog boxes, and windows that you can use to perform various tasks.

1.2.1 Recent Files

When you start Revit, by default the Recent Files window displays, listing the projects and families that you opened most recently. Click a recent project or family to open it, or use one of the buttons to perform another action.

If you are already working in a Revit session, return to the Recent Files window by clicking View tab » Windows panel » User Interface drop-down » Recent Files.

1. **Projects**: Projects providing options for opening and creating new projects as well as the icons are right listing any recent projects that you have been working on.
2. **Families**: Families providing options for opening and creating new families as well as the icons are right listing any recent families that you have been working on.

3. **Resources:** Resources provides access to additional resources on learning Revit (Figure 1).

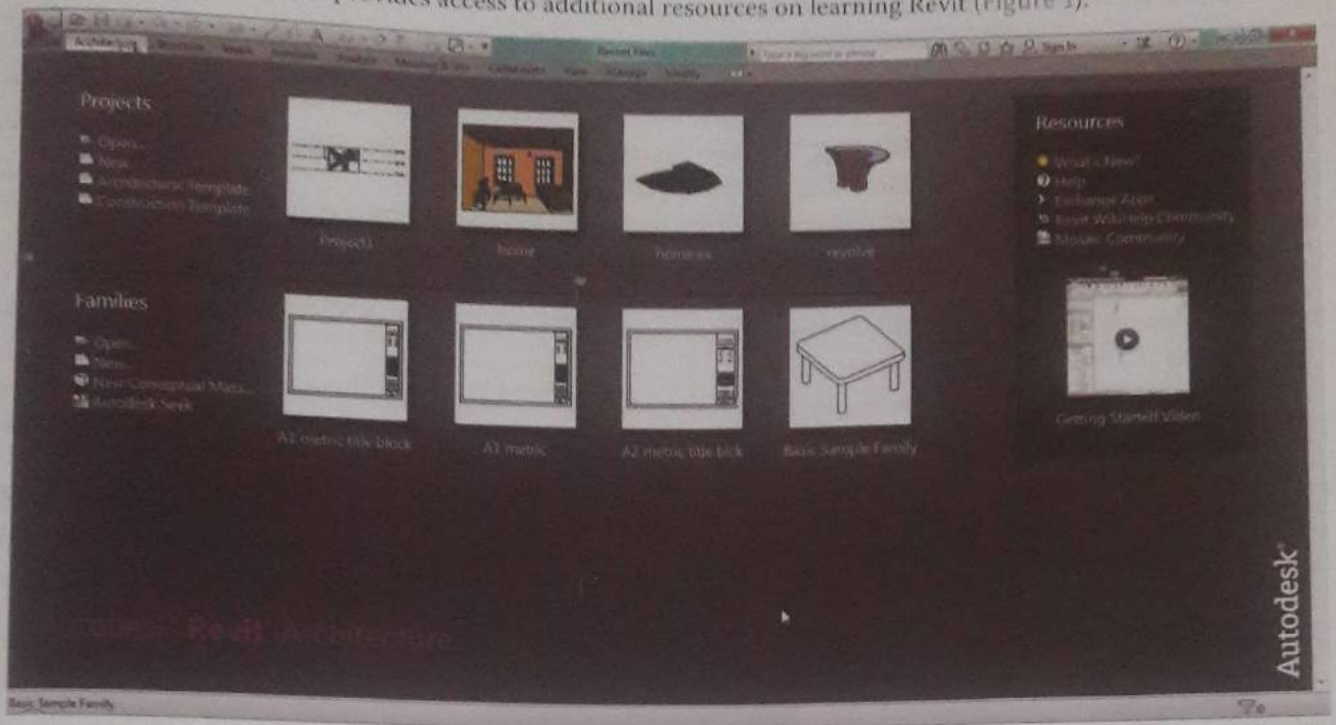

Fig 1: Recent Files

1.2.2 Primary User Interfaces (Figure 2)

Fig 2: Graphical User Interface

1. **Application Menu**: The application menu provides access to common file actions, such as New, Open, and Save. It also allows you to manage files using more advanced tools, such as Export and Publish.
   Click to open the application menu.
   a. Recent Documents: On the application menu, click the Recent Documents button to see a list of recently opened files. Use the drop–down list to change the sort order of recent documents. Use the push pins to keep documents on the list, regardless of how recently you opened them.
   b. Open Documents: On the application menu, click the Open Documents button to see a list of all open views in open files. Select a view from the list to display it in the drawing area (Figure 3).

2. **Quick Access Toolbar**: The Quick Access toolbar contains a set of default tools. You can customize this toolbar to display the tools that you use most often.
   a. To move Quick Access Toolbar: The Quick Access toolbar can display above or below the ribbon. To change the setting, on the Quick Access toolbar, click Customize Quick Access Toolbar drop–down » Show the Ribbon (Figure 4).
   b. To Add Tools to the Quick Access Toolbar: Navigate the ribbon to display the tool that you want to add. Right–click the tool, and click Add to Quick Access Toolbar (Figure 5). If you removed default tools from the Quick Access toolbar, you can add them again by clicking the Customize Quick Access Toolbar drop–down, and selecting the tool to add.

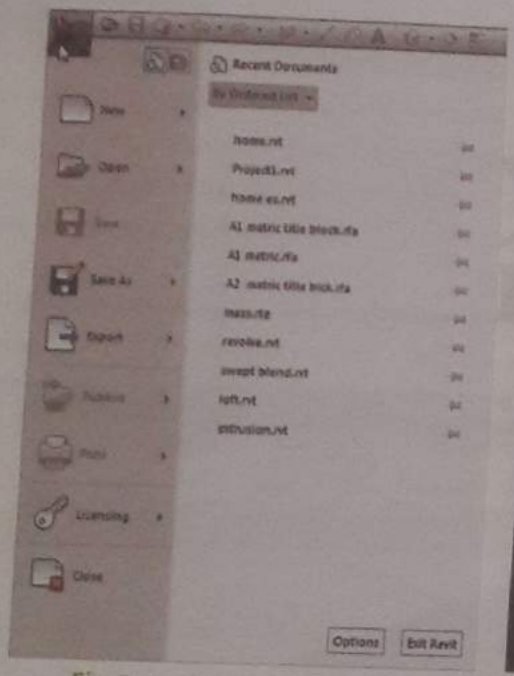

Fig 3: Application Menu

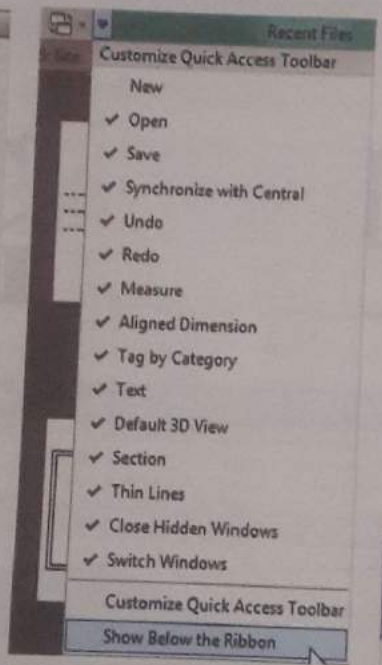

Fig 4: To move quick access toolbar

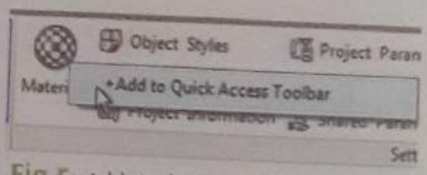

Fig 5: Add tools to Quick access toolbar

Some tools on contextual tabs cannot be added to the Quick Access toolbar.

   c. To Customize Quick Access Toolbar: To make a quick change to the Quick Access toolbar, right–click a tool on the Quick Access toolbar and select one of the following options:
   d. Remove from Quick Access Toolbar removes the tool.
   e. Add Separator adds a separator line to the right of the tool (Figure 6). To make more extensive changes, on the Quick Access toolbar drop–down, click Customize Quick Access Toolbar. In the dialog, do the following: (Figure 7)

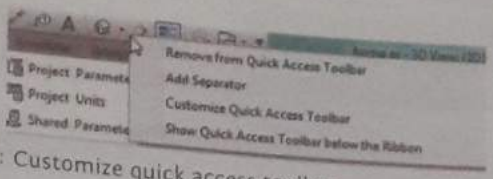

Fig 6: Customize quick access toolbar

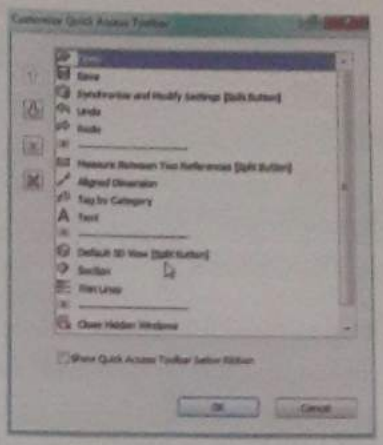

Fig 7: Customize quick access toolbar

f. To move tools up (left) or down (right) on the toolbar: in the list, select the tool. Then click (Move Up) or (Move Down) to move the tool to the desired location.

g. If you want to Add a Separator line then select the tool that will display above (to the left of) the separator line. Then click (Add Separator).

h. To remove a tool or separator line from the toolbar: select the tool or line and click (Remove).

3. **Title Bar**: Displays the Current Project name and which view in you are (Figure 8).

4. **Info Center**: Info Center is a feature used in several Autodesk products. It consists of a set of tools on the right side of the title bar that enable you to access many product–related information sources. Depending on the Autodesk product and the configuration, these tools might differ. For example, in some products, the Info Center toolbar may also include a Sign In button for Autodesk 360 services or a link to Autodesk Exchange.

5. **Ribbon**: The ribbon is the most common method for initiating command in Revit to help you in define your building project. It is broken in to two parts tabs and panels.
We can adjust the view state of ribbon by clicking the arrow control to the far right of the tab to cycle through the options (Figure 9).

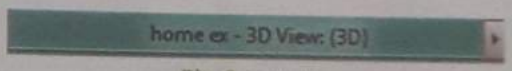

Fig 8: Title bar

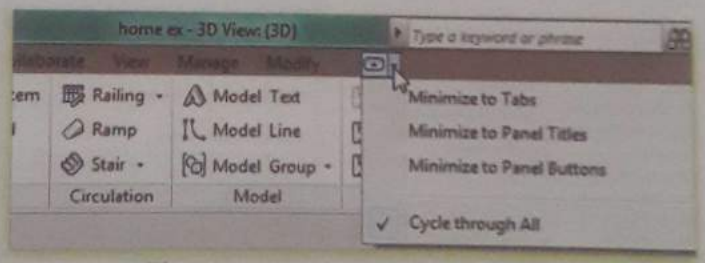

Fig 9: To adjust the state of ribbon

a. **Expand Panels:** An arrow next to a panel title indicates that you can expand the panel to display related tools and controls (Figure 10).
By default, an expanded panel closes automatically when you click outside the panel. To keep a panel expanded while its ribbon tab is displayed, click the push pin icon in the bottom–left corner of the expanded panel. (Figure 11)

b. **Dialog Launcher:** Some panels allow you to open a dialog to define related settings. A dialog–launcher arrow on the bottom of a panel opens a dialog (Figure 12).

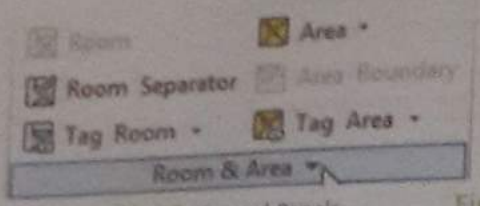

Fig 10: Expand Panels

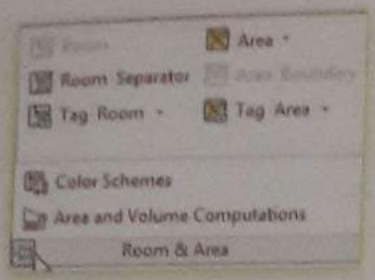

Fig 11: Expand panel » Push pin icon

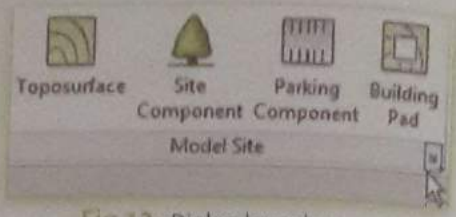

Fig 12: Dialog launcher

Contextual Ribbon Tabs: When you use certain tools or select elements, a contextual ribbon tab displays tools that relate to the context of that tool or element. The tab closes when you exit the tool or clear the selection (Figure 13).

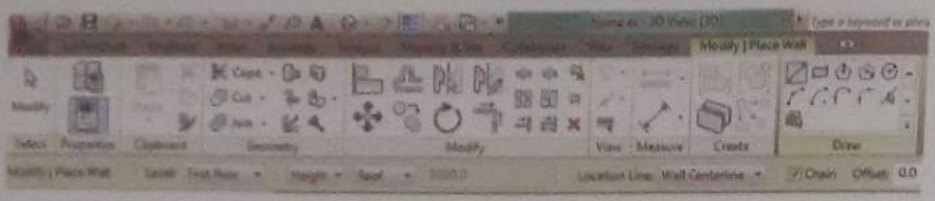

Fig 13: Contextual tab

Properties Palette: Properties Palette is where you can view and modify various parameters that define properties of elements in Revit. The Properties Palette is "modeless," so you have constant access to both view and element properties, without having to interrupt your design workflow. The palette is dockable, resizable and supports multiple monitor configurations. The Modeless Properties Palette can remain open or closed. This reduces the need to "click" open the type or instance properties, as settings are always quickly visible (Figure 14).

Type Selector: When a tool for placing elements is active, or elements of the same type are selected in the drawing area, the Type Selector displays at the top of the Properties palette. It identifies the currently selected family type and provides a drop–down from which you can select a different type (Figure 15).

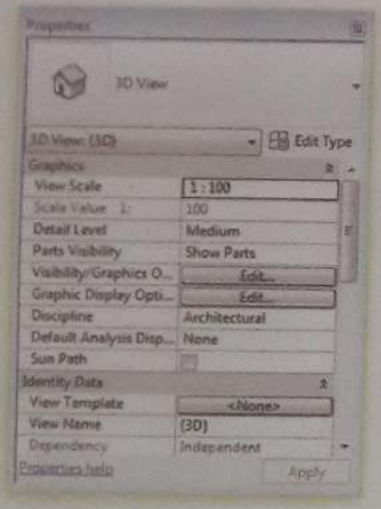

Fig 14: Properties Palette

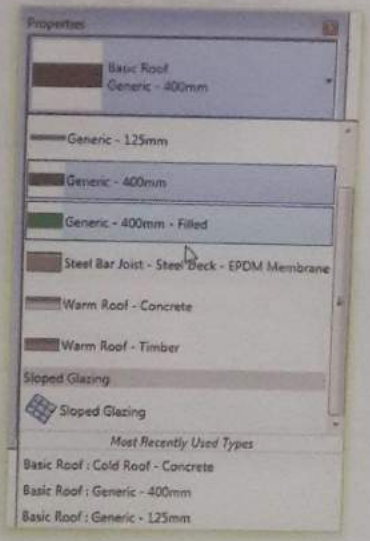

Fig 15: Type selector

There are two properties: Instance properties and Type properties.

Instance properties: Instance properties will be available immediately in the property dialogue when you placed or select an item. Instance property will change only the currently placed or selected item. From this palette, you can access the Type Selector, filter properties, and edit type parameters.

Type selector lists all the various types available for given elements that are currently loaded in to the project file. Whenever you selecting multiple elements, you can access filter properties from the same palette (Figure 16).

Type Properties: The Type Properties, when edited, it will alter every item of that type in the entire model. To access type properties click on edit type in properties palette dialogue box. (Figure 17)

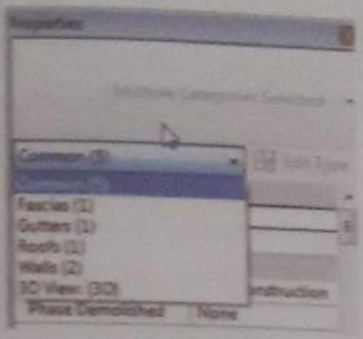

Fig 16: Filter Properties

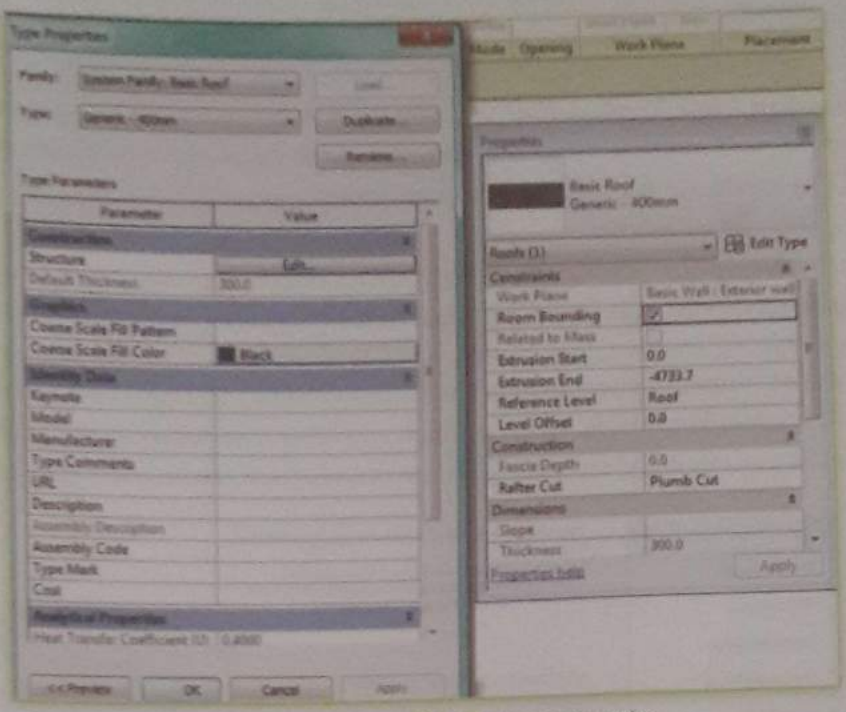

Fig 17: Type Properties

To make the Type Selector available when the Properties palette is closed, right-click within the Type Selector, and click Add to Quick Access Toolbar. To make the Type Selector available on the Modify tab, right-click within the Properties palette, and click Add to Ribbon Modify Tab. Each time you select an element, it will be reflected on the Modify tab.

6. **Project Browser**: The Project Browser shows a logical hierarchy for all views, schedules, sheets, families, groups, and other parts of the current project (Figure 18).
7. **View Control**: The View Control Bar is located at the bottom of the view window above the status bar. The View control bar controls the graphical display of the current view such as view scale, model graphic style etc (Figure 19).

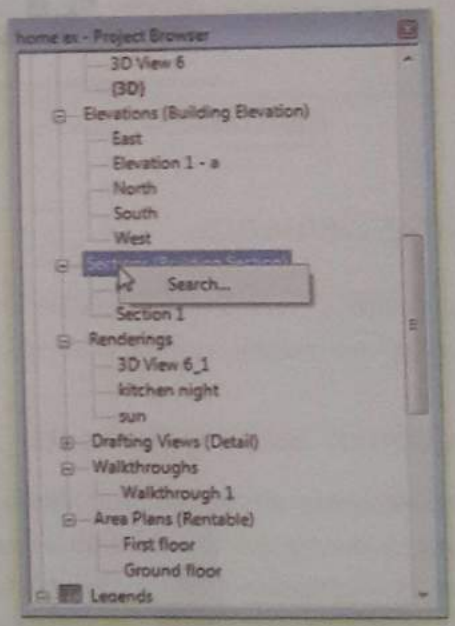

Fig 18: Project browser-Search option

You can search for entries in the project browser using the Search in Project Browser dialog. Right-click on any view in the Project Browser and select Search to open this dialog.

8. **Status Bar**: Displays the name of the family and element type when you position the cursor over an object. Displays tips or hints when you use a command. The Filter Counter at the right end of the status bar displays the number of items in a selection set. In addition to that, status bar contains work sets, design option controls and filter (Figure 20).

Fig 19: View control bar

Fig 20: Status bar

For accessing opened views go to Manage » Switch windows.

To refresh screen press F5

9. **Drawing Area**: The Drawing area displays the current area that you are working on. New window will open for each view. If multiple views are opened and the views are maximized other views will lay under the current view.
   a. To Invert the Back ground color of drawing area
   b. Click » Options.
   c. In the Options dialog, click the Graphics tab.
   d. Select or clear the Invert background color option (Figure 21).

10. **Context Menu**: Context menus are displayed when you right–click an object or an area of the user interface. They list common commands, such as Zoom, and other commands related to the current task. Now you able to reactivate the last command or recently used commands from the mouse right click context menu (Figure 22).

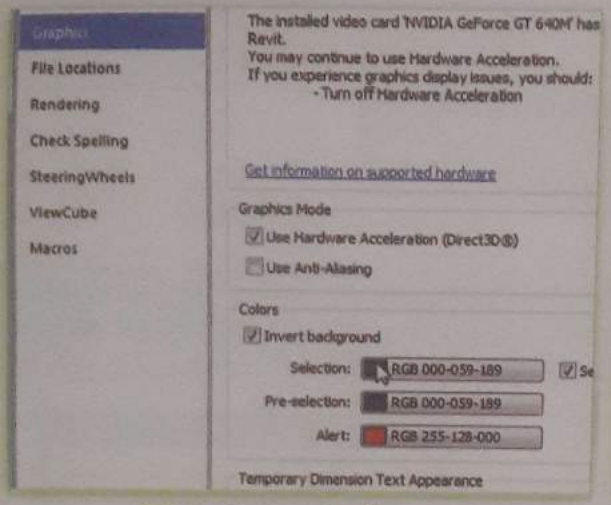

Fig 21: Options–Graphics

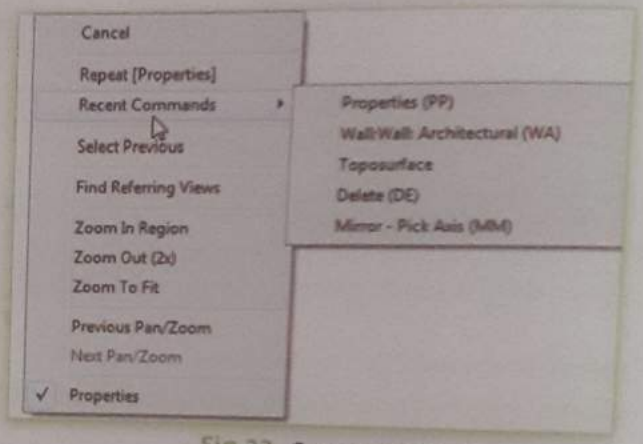

Fig 22: Context menu

1.3 Building Elements

The building design is created using building elements. Elements include walls, doors, roofs, windows, and so on. One can place, create, and modify building elements.

1.3.1 Definition of Building Elements

Revit building elements are the building blocks of a project and can be added when developing the project. When an element is placed in a model, the individual element is called an instance of that element type. An instance has some parameter values in common with the element type. Instances can be broadly classified into three classes:

Model: These are the elements, such as walls, windows, doors, and roofs that help in the 3Drepresentation of the building design. The host and component element instances belong to this class. Model elements have a specific location in the building.

Annotation: These are the elements, such as dimensions, tags, and elevation symbols that establish context or add supplementary information to document a building design. The datum and annotation element instances belong to this class. Annotation elements have a specific location on a drawing sheet.

View: These are the elements, such as plans, elevations, sections, 3D views, and schedules that dynamically represent the parts of a building model. Changes made to a part of the model in one view are automatically updated in all views that contain this part.

1.3.2 Building Element Types

The building elements are categorized as host, component, datum, annotation, and view.

Host: These are the elements, such as walls, floors, roofs, and ceilings, which form the basic built–in–place structure of a building.

Component: These are the elements, such as windows, doors, and furniture, which fill out the details of a building design.

Datum: These are the elements, such as levels, column grids, and reference planes, which establish a context for project objects. These elements help put together a building.

Annotation: These are view–specific 2D elements, such as dimensions, text notes, and section tags. These elements help produce building documentation.

Views: These are the elements, such as plans, sections, and schedules, which dynamically represent a building model. These elements have their own properties and can be modified or deleted. View elements also control the annotation elements placed on a view. If you delete a view, you will lose the annotations placed in the view. View elements do not control the model elements.

The following illustration categorizes building elements

Example of Family Tree

Element : Wall

Family/System family : Basic Wall

Type : Exterior brick on CMU

Instance: Actual user drawn wall in the project

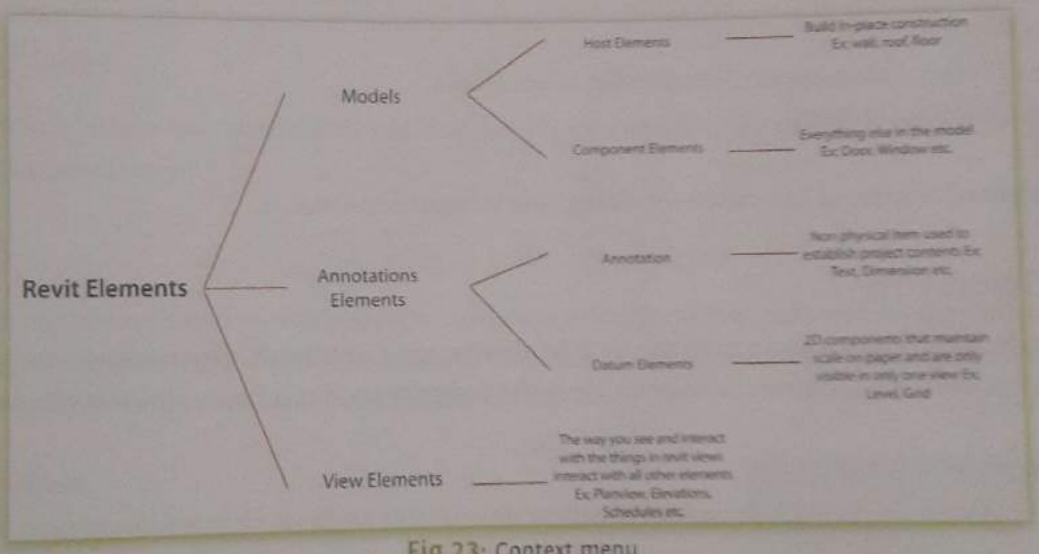

Fig 23: Context menu

1.4 Starting a Project

When starting a new project, one can select either the default project template or a standard template from the template library. Based on the requirements, the default template settings can be customized and the new settings saved as a template file. The following best practices help when starting a project.

1. When a template provided by the organization is used, it helps to familiarise oneself with the levels, views, and wall types before you create building model content. This helps you progress smoothly in the building design and prevents inconsistencies in the design.
2. When starting a project using a standard template file, the site view can be used to create topo–surfaces and the lowest level plan view to create walls at the lowest level of the building. This is because in a project that uses the standard template, the lowest level plan view and site view are at the same elevation and show the same level, but they have different settings and purposes. The level plan views do not show topo–surfaces by default. This helps to easily identify the site and level views.

3. When working on a multistory project, additional levels will need to be defined for the floors, roofs, and tops of exterior walls. This helps to create walls and other building elements with relevant constraints that can be adjusted quickly.
4. When starting a building model, one must begin with a standard template and then change it to organization–specific graphic standards, such as line weights, line styles, symbols, and annotations. The organization–specific standards can then be to create other templates for the organization. Building template development time into the budget for the first few projects helps to standardize in the later projects.

1.4.1 To Start a Project using Template

1. Click Application menu, and select New » Project.
2. In the New Project dialog, under Template file, do one of the following:
   a. Select a template from the list.
   b. Click Browse, navigate to the desired template an RTE file, and click Open (Figure 23).
3. For Create new, click Project.
4. Click OK.

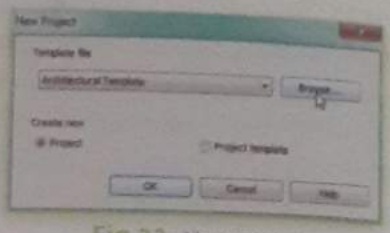

Fig 23: New project

1.4.2 To Create Project Using No Template

1. Click New Project.
2. In the New Project dialog, under Template file, select None.
3. For Create new, click Project.
4. Click OK.
5. In the Undefined System of Measurement dialog, select Imperial or Metric.

1.4.3 Saving Project Files

Template files can be saved and accessed from the local hard drive or on a network, depending on the setup. Project files can be saved on a network at a location that everybody in the design team can access. A project file can also be saved as a template file.

For saving a Project file:

1. Click on Application menu » Click on Save As.
2. Enter a name and click ok.

For creating custom Project template:

- Open an existing template file, modify the settings as necessary, and save it as a new template (rte) file.
- Start with a blank project file, define all settings for it, and then save it as a template (rte) file.

QUESTION

[1] When type properties edited, it will alter every item of that type in the entire model. (T/F)
[2] How to change the background color of window.
[3] Derivation of BIM.
[4] Up to which release Revit Architecture known as Revit Building.
[5] The file name and path of a project have to be specified each time you save the project. (T/F)
[6] You can save any project file as a template file. (T/F)
[7] Short key for Refresh screen