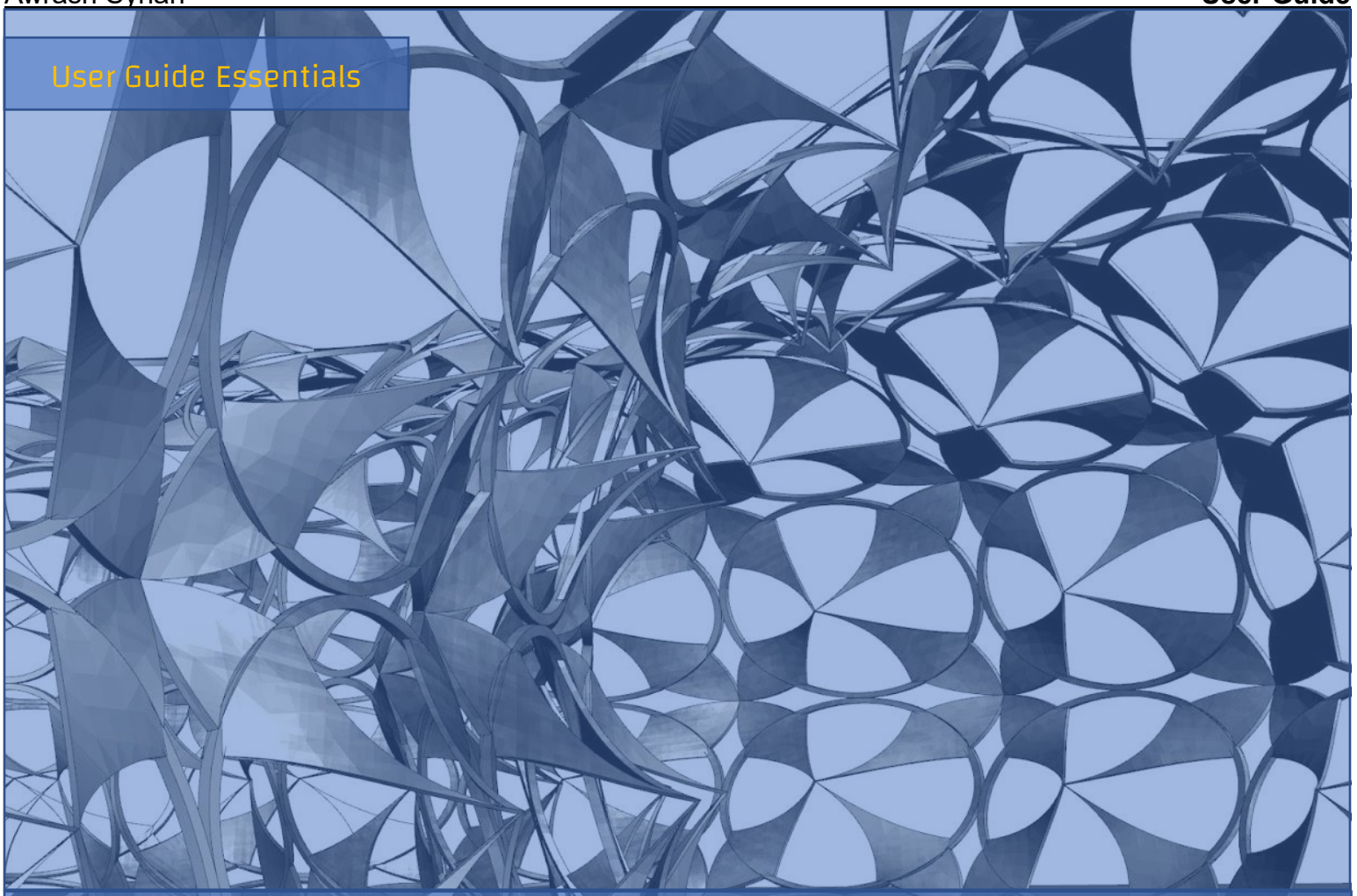

User Guide Essentials

How to improve your design skills using

Synan Awrash® 4.7.2

- ☑ All what you should know to master the software
- ☑ Discovering basic as well as advanced technics
- ☑ Customizing the software to fit your job's methods
- ☑ Modeling your know-how and increasing productivity
- ☑ Adding augmented functions to the software

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« I was a friend of the one who built this temple. He was from Megara and was called Eupalinos. He spoke to me readily about his art, all the care and all the knowledge It needs, he made me understand everything I saw with him on the site. I especially appreciated his astonishing spirit. I found in it the power of Orpheus. He predicted over there a monumental future with shapeless piles of stones and beams lying around us; and these materials, to his voice, seemed destined to the unique place where favorable destinies to the goddess would have assigned them. What a wonder were his speeches to the workers! There was no trace of his difficult meditations of the night before. He only gave them orders and numbers … »

"Eupalinos or the architect", Paul-Valéry 1924

Introduction

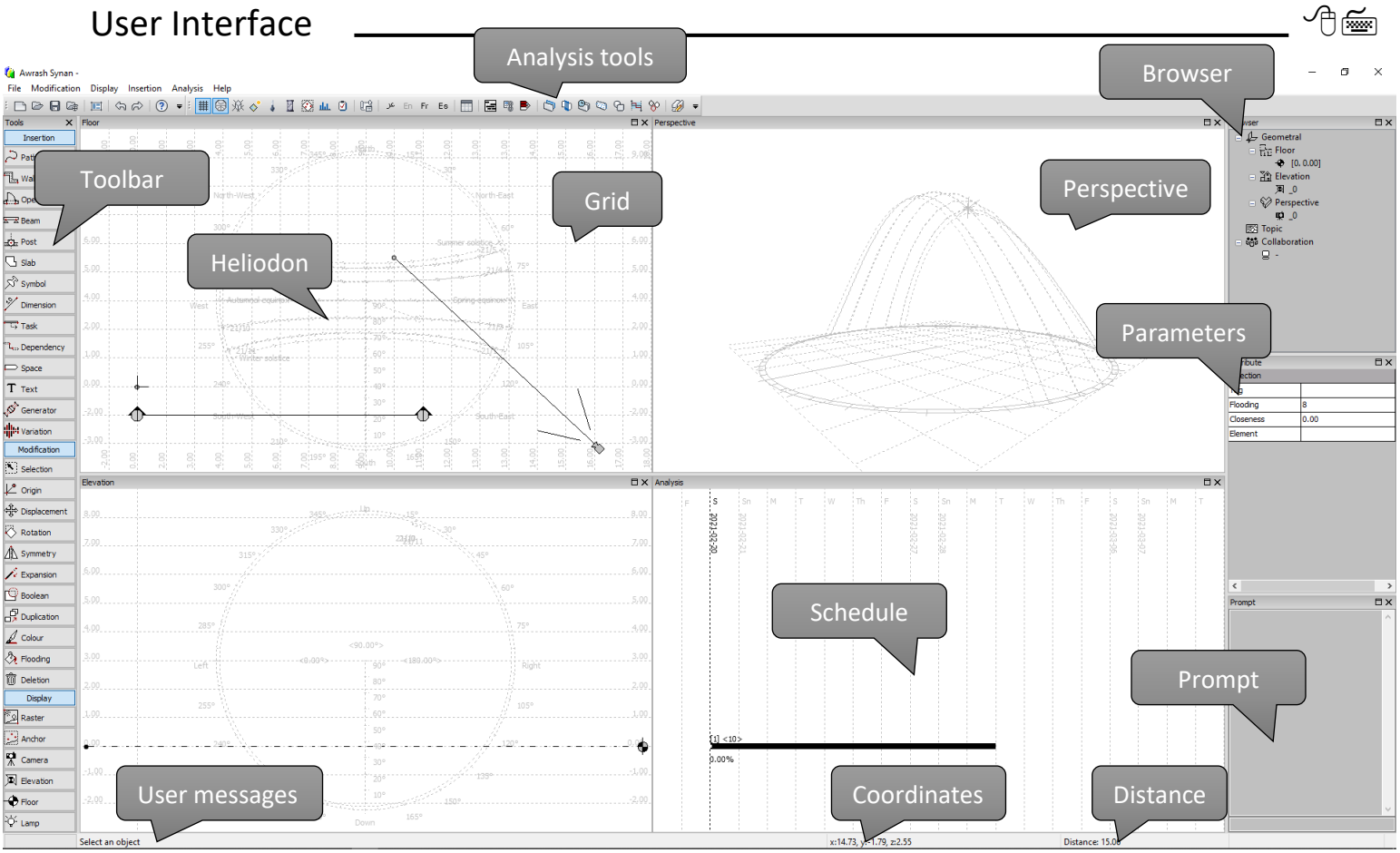
Awrash introduces a new generation of computer added design software dedicated to the integrated design, modeling, and management of projects. It is continuously developed to take advantage of the newest approaches of projects' multi-domaine integration at strategic, decisional, and operational levels. The civil uses of the software brought relevant applications for engineering, architecture, and urban planning domains. The User Guide Essentials do not purport to demonstrate all the features available in the software but is an introduction to how to use the main features to achieve the user's goals. It remains to the user to sharpen his skills gradually using the functions in more specific and detailed contexts. It is possible to complete in a few hours this guide, which includes a set of didactic examples that have been deliberately simplified to elementary and medium functions of the software. It is recommended to start using the software with simple projects and to tackle gradually the more complex ones.

Starting the software

This step assumes that the user has previously installed *Awrash* software on his computer or on a device connected to it. If you have not done so already, it is recommended to download the latest version of the software before continuing. It is noted, however, that virtually all features presented in this guide can be used in previous versions of the software.

The software is run by clicking on the *Awrash* icon in its downloaded folder or in the folder where you installed it. It is also possible to run the software by dropping a data file (*.snf) on the *Awrash* icon. When using the console mode, it is necessary to change the directory to *Awrash* folder using its path then type the command corresponding to the software's executable (Awrash.exe). Once launched, the software shows its welcome window for a moment during which it configures the parameters of the active session and displays s the user interface presenting the main menu, toolbars, and views.

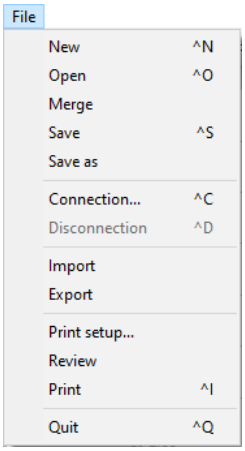
User Interface

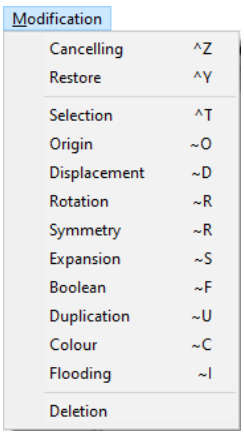


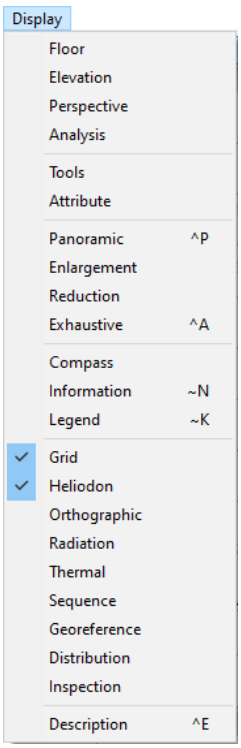
The interface appears immediately after running the program, in the middle of it there are multiple specialized panels, to model the project from different angles (floor planning, Elevation adjusting, perspective rendering, parameters, analyzing and reporting). This guide describes in the following how to use them. At the top of the interface there is a bar for the main menus of functions (*File*, *Edit*, *Preview*, *Insert*, *Help*), and the bottom of the interface shows fields for notifications for the user, coordinates, scale, and distance.

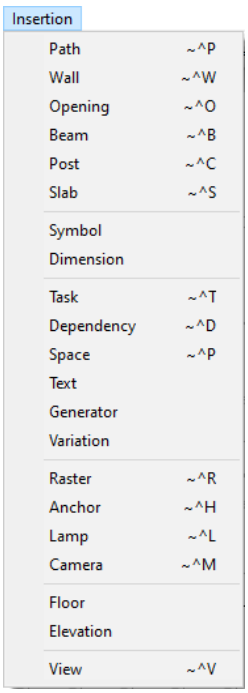
To the left of the user interface there is a column that includes most of the main tools. This column is split into groups (*Insert*, *Modification*, *Display*, *Option*). To the right there is column of three panels including the model's browser, command parameters, and process prompt. The first highlights the structure of the current model, while the second shows the characteristics of current applied command, and the third is used to type commands directly to *Awrash* interpreter using the programming language *Alkindi*. The two side columns can be hidden or shown by clicking on their names in the *Display* menu.

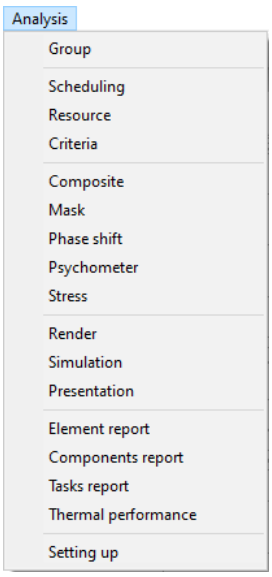
Menu bars

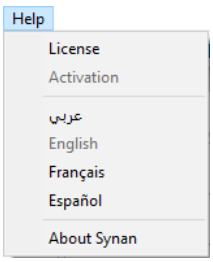




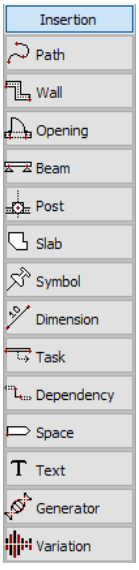


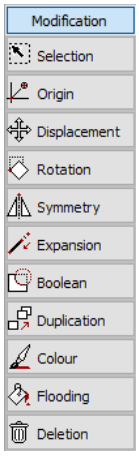


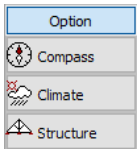




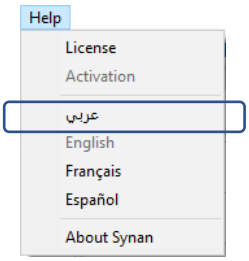
Tool bars



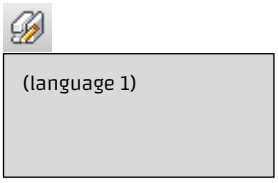




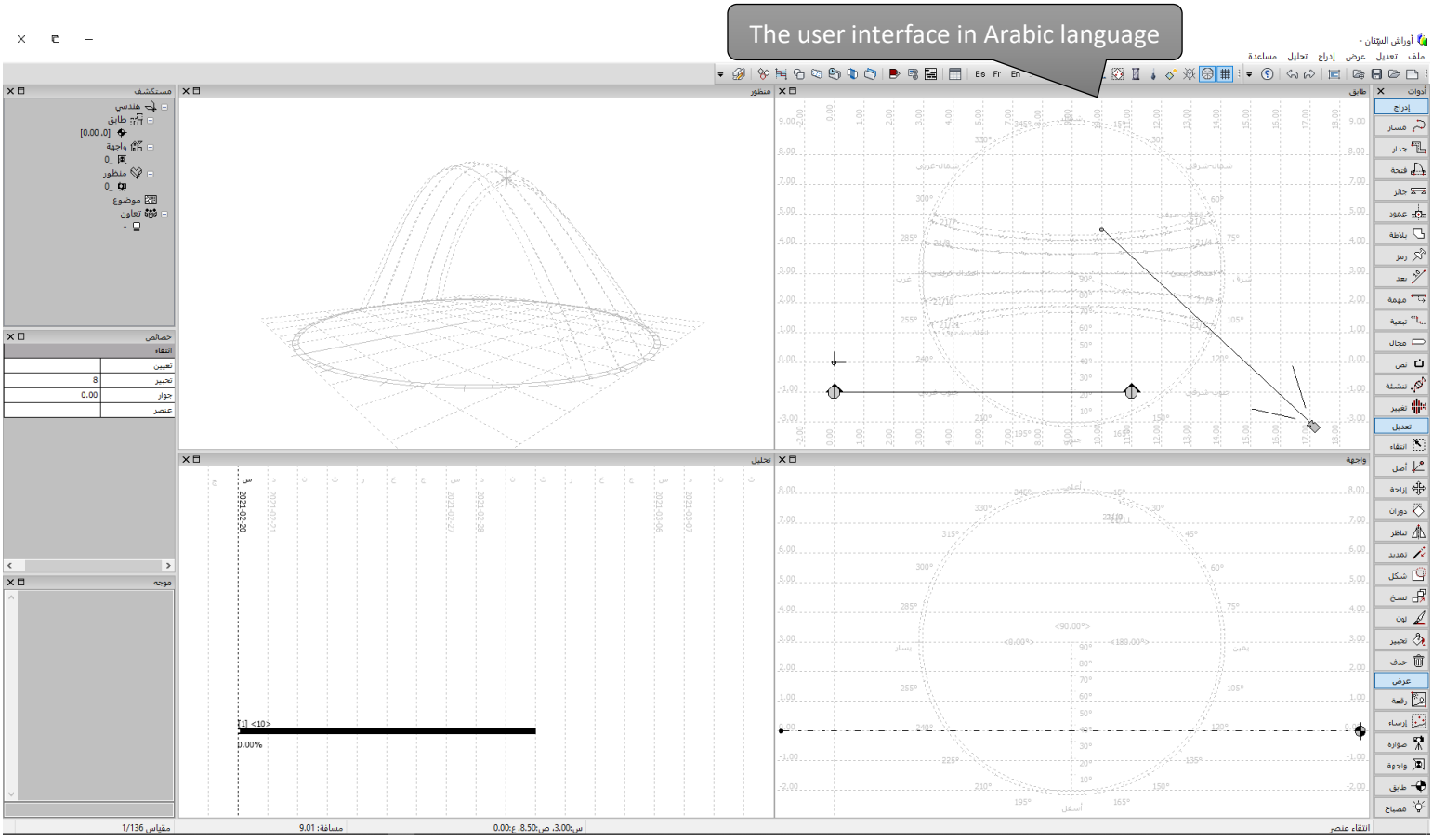
User language



Although Arabic is the main language of *Awrash*, the user can, during his session, change anytime the interface language to one of the other supported languages (*English*, *French* and *Spanish*). In this case, he may select the language from the "Help" menu. Then all menus and panels change, as well as the layout of displaying the interface (right for Arabic, left for other languages).



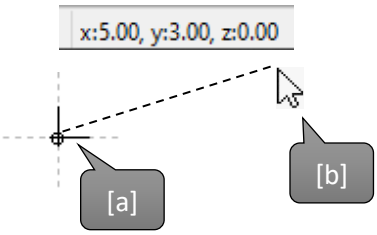
In addition, the software can be configured to use a specific language in all sessions, using a configuration file in the following manner. The user creates a new file named "_.snf" and registers it in the same folder that contains the software. Then he types the command to change the language in the configuration panel. The command to change the language is written in parentheses. It consists of the "language" operator, followed by a space, and then the number of the requested language (1: *Arabic*; 2: *English*; 3: *French*; 4: *Spanish*).



Modeling objects

In *Awrash* the model elements are fundamentally linked to each other through structural relationships. Each element interacts directly after making any change in its properties or on the relationships that bind it to the other elements of the model. For example, an *Opening* is automatically linked to the *Wall* that contains it, Or when displacing or removing a *Wall*, all of its *Windows* follow the same action and the links with adjacent *Walls* are updated as well.

Geometric Modeling

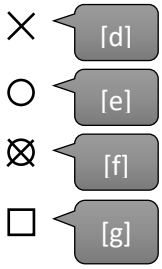


By default, the *Grid* is set to 5-meters step on each of the 3 geometral axis: x, y, and z. The symbol [a] located in the lower left side of the *floor* panel, indicates the position of the coordinate origin (0, 0, 0). The coordinates shown in the status bar determine the absolute distances between the position of the drawing cursor [b] and the coordinate origin, on the three axes. Coordinate values (x, y, z) change interactively after any move or rotation of the cursor to determine its new position.

Origin [c]

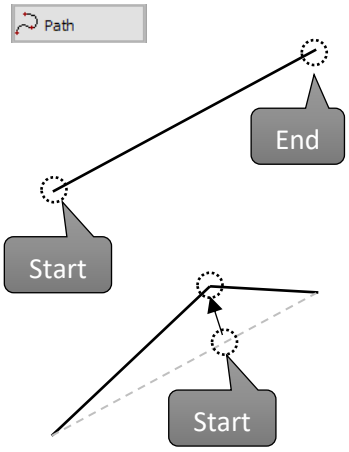
Origin	
Grid -X- (m)	1.00
Grid -Y- (m)	1.00
Grid -Z- (m)	1.00
Snap -X- (m)	0.50
Snap -Y- (m)	0.50
Snap -Z- (m)	0.50
Relative -X- (m)	27.00
Relative -Y- (m)	31.50
Relative -Z- (m)	0.00
Length (m)	0.00
Angle (°)	0.00
Precision	#.##
Primary unit	5
Secondary unit	1
Region	
Province	
County	
Seismic zoning	
Thermal zoning	

The *Origin* properties may be used to change the absolute coordinate origin into a relative one, the grid step, and the snap step in any of the three field axis (x, y, z). For example, the settings [c] set the grid step to 1m wide, the snap to 0.5m wide and the relative origin to 27m on X axis and 31.5m on Y axis. The Grid and the Snap nets work in an integrated manner, as the snapping net helps to accurately insert and update the position of the modeling elements, and the apparent grid shows the general wide of the model.



A drawing cursor can be thought of as a pen tip intended for drawing the model elements (*walls*, *columns*, etc.). After moving the cursor, its appearance changes to express its state of applicability, which occurs when the drawing cursor approaches a point on the snapping grid or a model element with a distance less than the tolerance distance (5 pixels). Then its body takes the shape [d] if it is applied to a grid node, and its body takes the shape [e] when it applies to the edge of a structural element, or its body takes the shape [f] when it is applied to one of the vertices of the model element, and the shape of the pointer takes the shape [g] When it is applied to the surface of a model element.

Path



Path	
Group	-
Task	[1]
Width (px)	1
Smooth	1
Length (m)	0.00
Coordinate	0

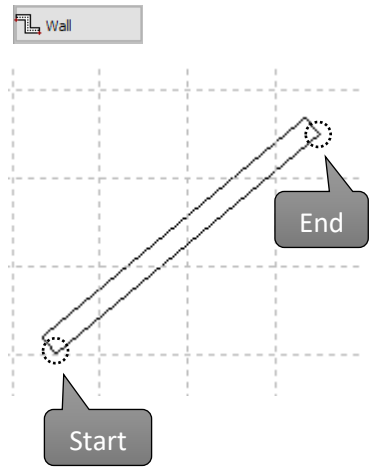
To see how the constructive operations are used, let's start by addressing the operation *Path*, which is the elementary linear component of the model. The *Path* is used to model straight and dashed lines, or as a driving pattern for other elements of the model. The *Path* command is selected from the *Insertion* menu or from the *Insertion* toolbar.

Inserting a *Path* requires to know the coordinates of at least two positions, the first being used as a starting point of the *Path*, and the second as its end. The *Path* is modeled by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. For an accurate positioning of the *Path*, the user may type the length and angle of the line in the *Origin* parameters before Ctrl-Click the *Path* tool. The *Path* will be automatically drawn at the given position.

A *Path* may be curved by dragging intermediate vertices using the same tool. Then setting the curvature with the *Smooth* parameter.

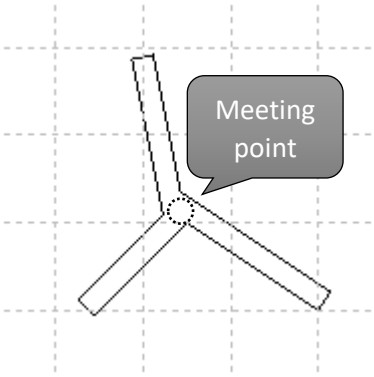
When selecting a specific *Path*, the properties panel displays the *Group* the element belongs to, the *Task* it is associated with, the line *Width* (in pixels), its *Smooth*, its *Length* and number of *Coordinates* (vertices). While this panel allows the user to change the *Group*, the *Task*, the *Width*, and the *Smooth*, it does not allow changing the value of the *Length* and the *Coordinate* because they are automatically calculated from the element's geometry.

Wall



The *Wall* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting a *Wall* requires to know the coordinates of at least two positions, the first being used as a starting point of the *Wall*, and the second as its end. The *Wall* is modeled by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. For an accurate positioning of the *Wall*, the user may type the length and angle of the driving line in the *Origin* parameters before Ctrl-Click the *Wall* tool. The *Wall* will be automatically drawn at the given position.

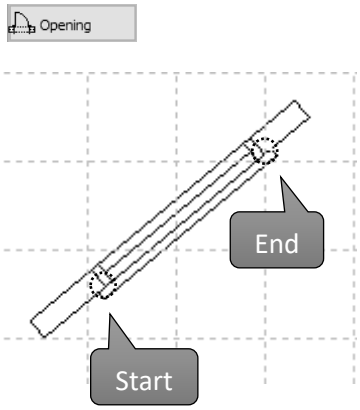


When a group of Walls meet at a specific intersection [T], for example, whether the Walls meet at their start or end points, they automatically connect to each other at that point.

When selecting a specific *Wall*, the properties panel displays the *Group* the element belongs to, the *Task* it is associated with, the *Composite*, its *Height*, *Slope*, *Length*, *Width*, *Volume*, *Weight*, and its *Thermal Conductivity*. While this panel allows the user to change the *Group*, *Task*, Composite, *Height*, and *Slope*, it does not allow changing the value of the *Length*, *Width*, *Volume*, *Weight*, and *Thermal Conductivity* because they are automatically calculated from the element's attributes.

Wall	
Group	-
Task	[1]
Panel (Composite)	-
Height (m)	3.00
Slope (°)	0.00
Length (m)	0.00
Width (m)	0.25
Volume (m³)	0.00
Weight (N)	0.00
U↔ (w/m².k)	0.00

Opening



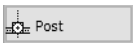
The *Opening* command is selected from the *Insertion* menu or from the left side toolbar.

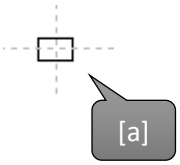
Inserting an *Opening* requires to know the coordinates of at least two positions, the first being used as a starting point of the *Opening*, and the second as its end. The *Opening* is modeled by placing the cursor over a *Wall* at the start position before left clicking the mouse click, and then dragging the cursor to the end position on the *Wall* before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. For an accurate positioning of the *Opening*, the user may type the length and angle of the driving line in the *Origin* parameters before Ctrl-Click the *Opening* tool. The *Opening* will be automatically drawn at the given position.

Opening	
Group	-
Task	[1]
Frame (Composite)	-
Glazing (Composite)	-
Height (m)	0.90
Apron (m)	1.10
Angle (°)	0.00
Style	
Hinge	Right
Length (m)	0.00
U↔ (w/m².k)	0.00

When selecting a specific *Opening*, the properties panel displays the *Group* the element belongs to, the *Task* it is associated with, the *Frame*, the *Glazing*, its *Height*, *Apron*, *Angle*, *Style*, *Hinge*, *Length*, and its *Thermal Conductivity*. While this panel allows the user to change the *Group*, *Task*, *Frame*, *Glazing*, *Height*, *Apron*, *Angle*, *Style*, and *Hinge*, it does not allow changing the value of *Length* and *Thermal Conductivity* because they are automatically calculated from the element's attributes.

Post





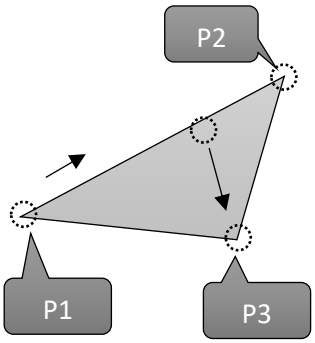
The *Post* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting a *Post* requires to know the coordinate position of the insertion point [a] of the *Post*. The *Post* is modeled by placing the cursor at the start position before left clicking and releasing the mouse. For an accurate positioning of the *Post*, the user may type the position coordinates of the insertion point in the *Origin* parameters before Ctrl-Click the *Post* tool. The *Post* will be automatically drawn at the given position.

Post	
Group	-
Task	[1]
Length (m)	0.40
Panel (Composite)	-
Height (m)	3.00
Angle (°)	0.00
Weight (N)	4.77
Load (N)	4.77

When selecting a specific *Post*, the properties panel displays the *Group* the element belongs to, the *Task* it is associated with, the *Length*, the *Composite*, the *Height*, the *Angle*, the *Weight*, and the *Load*. While this panel allows the user to change the *Group*, *Task*, *Length*, *Composite*, *Height*, and *Angle*, it does not allow changing the value of *Weight and Load* because they are automatically calculated from the element's attributes.

Slab



Slab	
Group	-
Task	[1]
Panel (Composite)	-
Height (m)	0.00
Influence (m)	0.00
Slope (°)	0.00
Width (px)	1
Smooth	1
Area (m²)	0.00
Perimeter (m)	0.00
Volume (m³)	0.00
Weight (N)	0.00
Coordinate	0
U↑ (w/m².k)	0.00

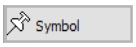
The *Slab* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting a *Slab* requires to know the coordinates of its polygon. The *Slab* is modeled by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. Then the intermediate vertices are dragged using the same tool.

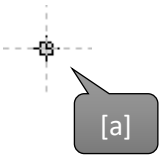
A *Slab* may be curved by setting the curvature with the *Smooth* parameter.

When selecting a specific *Slab*, the properties panel displays the *Group* the element belongs to, the *Task* it is associated with, the *Composite*, the *Height*, the *Influence*, the *Slope*, the *Width*, the *Smooth*, the *Area*, the *Perimeter*, the *Volume*, the *Weight*, the *Coordinate*, and the *Thermal Conductivity*. While this panel allows the user to change the *Group*, the *Task*, the *Width*, and the *Smooth*, it does not allow changing the value of the *Area*, the *Perimeter*, the *Volume*, the *Weight*, the *Coordinate*, and the *Thermal conductivity* because they are automatically calculated from the element's geometry.

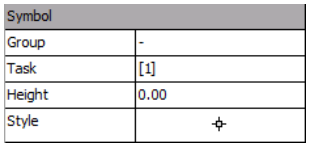
Symbol



The *Symbol* command is selected from the *Insertion* menu or from the left side toolbar.



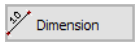
Inserting a *Symbol* requires to know the coordinate position of the insertion point [a] of the *Symbol*. The *Symbol* is modeled by placing the cursor at the start position before left clicking and releasing the mouse. For an accurate positioning of the *Symbol*, the user may type the position coordinates of the insertion point in the *Origin* parameters before Ctrl-Click the *Symbol* tool. The *Symbol* will be automatically drawn at the given position.

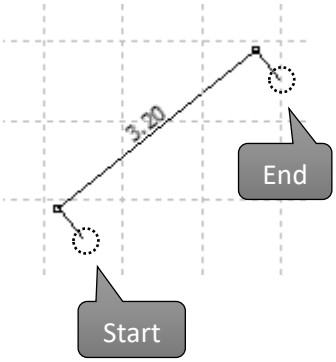


Symbol	
Group	-
Task	[1]
Height	0.00
Style	

When selecting a specific *Symbol*, the properties panel displays the *Group* the element belongs to, the *Task* it is associated with, the *Height*, and the *Style*. This panel allows the user to change all these parameters.

Dimension





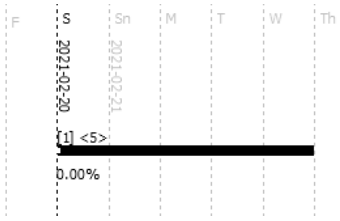
Dimension	
Group	-
Offset (m)	1.00

The *Dimension* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting a *Dimension* requires to know the coordinates of at least two positions, the first being used as a starting point of the *Dimension*, and the second as its end. The *Dimension* is modeled by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. For an accurate positioning of the *Dimension*, the user may type the length and angle of the driving line in the *Origin* parameters before Ctrl-Click the *Dimension* tool. The *Dimension* will be automatically drawn at the given position.

When selecting a specific *Dimension*, the properties panel displays the *Group* the element belongs to, and its *Offset*. This panel allows the user to change these parameters.

Task



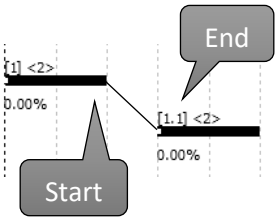
Task	
Group	-
Type	Project
Priority	Moderate
Completion (%)	0.00
Root	[1]
Weight (%)	100.00
Cost ($)	0.00
Commitment	0.00
Expense	0.00
Delay	0.00
Start	2021-02-20
Early start	2021-02-20
Late start	2021-02-20
End	2021-02-20
Early end	2021-02-20
Late end	2021-02-20
Duration	0
Product	0
Dependency	0
Branch	0

The *Task* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting a *Task* requires to know at least two dates, the first being used as a start date of the *Task*, and the second as its end. The *Task* is modeled by placing the cursor over the start date before left clicking the mouse click, and then dragging the cursor to the end date before releasing the mouse. During the drag, a rubber interactively tracks the duration of the *Task*.

When selecting a specific *Task*, the properties panel displays the *Group* the element belongs to, its *Type*, the *Priority*, the *Completion* percentage, the *Root* Task, *Weight*, *Cost*, *Commitment*, *Expense*, *Delay*, *Start* date, *Early start*, *Late start*, *End* date, *Early end*, *Late end*, *Duration Product*, *Dependency,* and *Branch*. While this panel allows the user to change the *Group*, its *Type*, the *Priority*, the *Completion* percentage, the *Root* Task, and *Weight*, it does not allow changing the value of the *Cost*, *Commitment*, *Expense*, *Delay*, *Start* date, *Early start*, *Late start*, *End* date, *Early end*, *Late end*, *Duration Product*, *Dependency,* and *Branch* because they are automatically calculated from the element's attributes.

Dependency



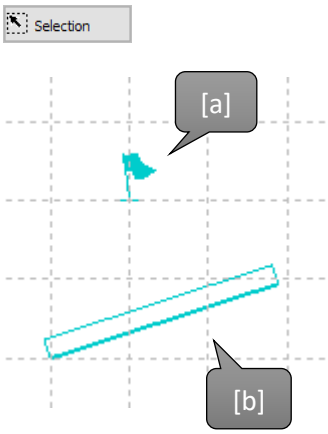
Dependency	
Group	-

The Dependency command is selected from the Insertion menu or from the left side toolbar.

Inserting a *Dependency* requires to know at least two *Tasks*, the first being used as a start *Task* of the *Dependency*, and the second as its end. The *Dependency* is modeled by placing the cursor over the start *Task* before left clicking the mouse click, and then dragging the cursor to the end *Task* before releasing the mouse. During the drag, a rubber interactively tracks the duration of the *Dependency*.

When selecting a specific *Dependency*, the properties panel displays the *Group* the element belongs to. This panel allows the user to change the *Group*.

Selection



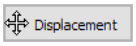
Selection	
Tag	
Flooding	8
Closeness	0.00
Element	

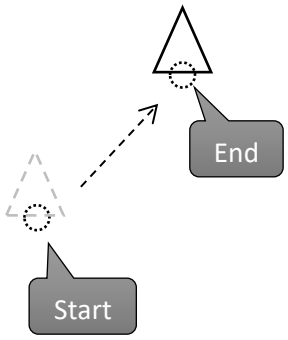
The *Selection* command is selected from the *Modification* menu or from the left side toolbar.

In most commands, elements need to be selected from the model before applying any modification on them. The *Selection* process is accomplished clicking on a visible element [a] from one of the modeling panels (pick selection), or by drawing a selection net (rectangle) around the visible elements [b] to create a selection set.

Note: Any selected element may be taken out from the selection set by re-selecting it a second time.

Displacement

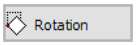


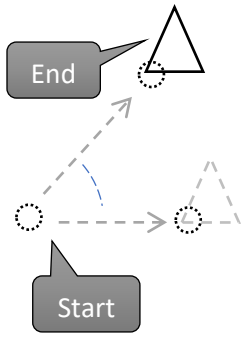


The *Displacement* command is selected from the *Modification* menu or from the left side toolbar.

Moving a selection set of elements requires to know the coordinates of at least two positions, the first being used as a starting point of the *Displacement*, and the second as its end. The *Displacement* is done by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. For an accurate *Displacement*, the user may type the length and angle of the driving line in the *Origin* parameters before Ctrl-Click the *Displacement* tool. The *selection set of elements* will be automatically drawn at the given position.

Rotation

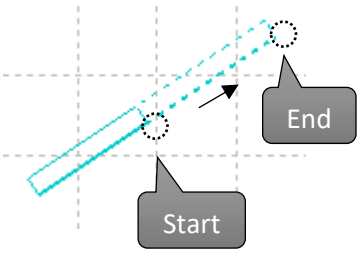




The *Rotation* command is selected from the *Modification* menu or from the left side toolbar.

Rotating a selection set of elements requires to know the coordinates of the center of rotation and the value of the rotation angle. The *Rotation* is done by placing the cursor over the position of the center of rotation before left clicking the mouse click, and then dragging the cursor with the angle of rotation before releasing the mouse. During the rotation, a rubber interactively tracks the position and angle of the pointer. For an accurate *Rotation*, the user may type the coordinates of the center of rotation and its angle in the *Origin* parameters before Ctrl-Click the *Rotation* tool. The *selection set of elements* will be automatically drawn at the given angle.

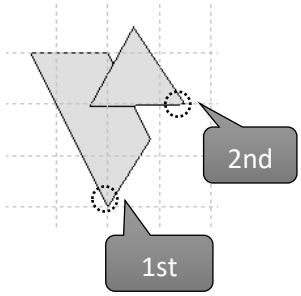
Expansion



The *Expansion* command is selected from the *Modification* menu or from the left side toolbar.

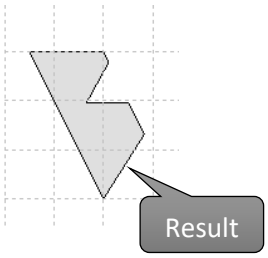
Expanding an element requires to know the coordinates of the center of rotation and the value of the rotation angle. coordinates of at least two positions, the first being used as a starting point of the *Expansion*, and the second as its end. The *Expansion* is done by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. For an accurate *Expansion*, the user may type the length and angle of the driving line in the *Origin* parameters before Ctrl-Click the *Expansion* tool. The expanded *element* will be automatically drawn at the given position.

Boolean



The *Boolean* command is selected from the *Modification* menu or from the left side toolbar.

Boolean operation may consist of an *Intersection*, *Subtraction*, *Union*, or *Exclusion* between two elements of the model. The first element is considered to be the transformed shape and the second element is considered as the transforming shape. The *Boolean* is done by left-clicking the first element, then choosing the Boolean method (Intersection Subtraction, Union or Exclusion) then left clicking the second element. The reshaped element will be automatically drawn at the given position.



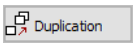

Intersection

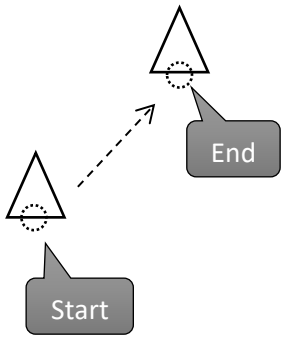

Subtraction


Union


Exclusion

Duplication

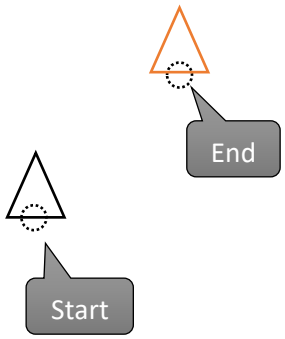


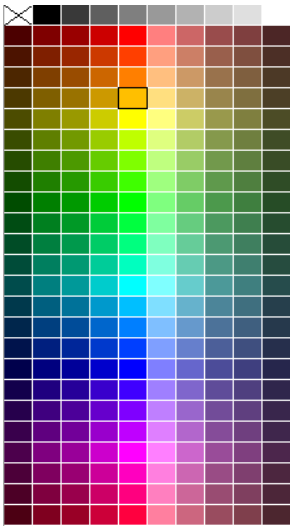


The *Duplication* command is selected from the *Modification* menu or from the left side toolbar.

Duplicating a selection set of elements requires to know the coordinates of at least two positions, the first being used as a starting point of the *Duplication*, and the second as its end. The *Duplication* is done by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. For an accurate *Duplication*, the user may type the length and angle of the driving line in the *Origin* parameters before Ctrl-Click the *Duplication* tool. A copy of *selection set of elements* will be automatically drawn at the given position.

Colour

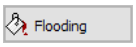


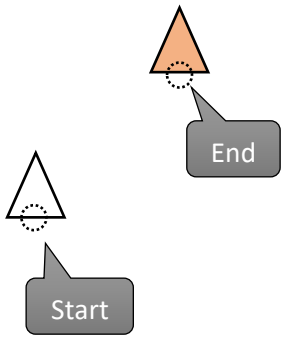


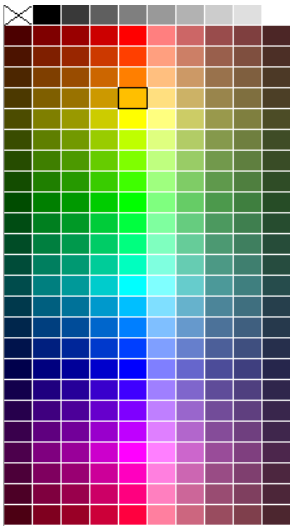
The *Colour* command is selected from the *Modification* menu or from the left side toolbar.

Colour a selection set of elements requires to know the color index in the color palette and a selection set of elements to be colored. The *Colour* is done by left clicking the indexed color from the color palette, then left clicking on the elements to be colored. When many elements should be colored with the same color, it is useful to create a selection set by using the Selection command, then left clicking the indexed color.

Flooding





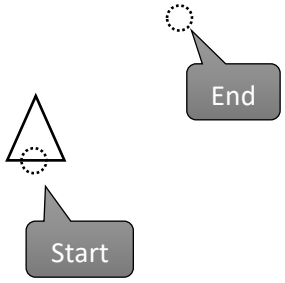


The *Flooding* command is selected from the *Modification* menu or from the left side toolbar.

Flooding a selection set of elements requires to know the color index in the color palette and a selection set of elements to be filled. The *Flooding* is done by left clicking the indexed color from the color palette, then left clicking on the elements to be filled. When many elements should be filled with the same color, it is useful to create a selection set by using the Selection command, then left clicking the indexed color.

Deletion

The *Deletion* command is selected from the *Modification* menu or from the left side toolbar.



Deleting a selection set of elements requires to know a selection set of elements to be removed. The *Deletion* is done by left clicking the elements to be removed. When many elements should be removed at the same time, it is useful to create a selection set by using the Selection command, then left clicking on the *Deletion* command.

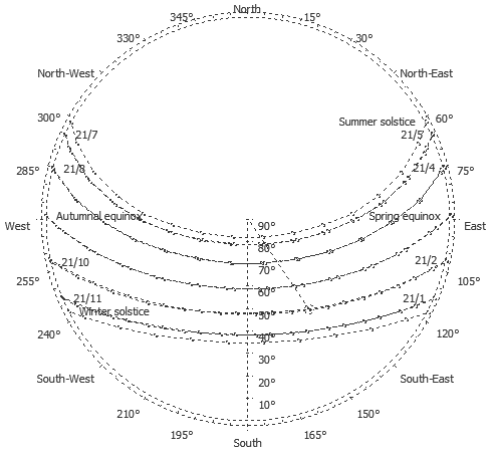
Compass

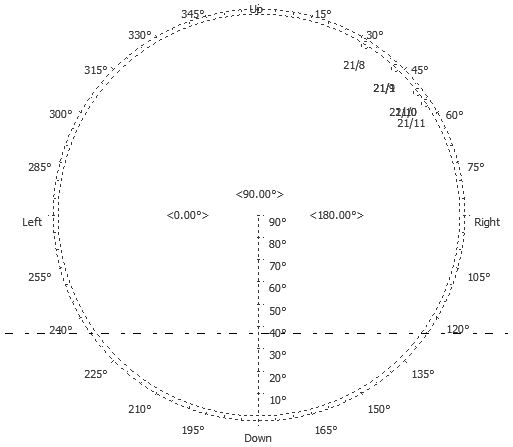
Compass

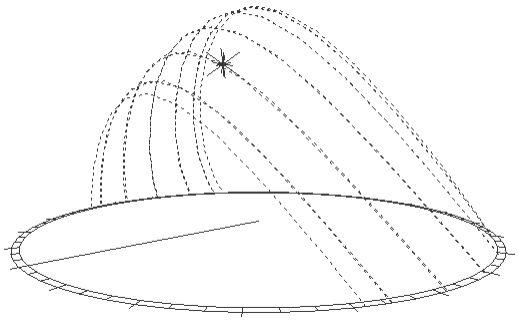
Compass	
Longitude (°)	0.00
Latitude (°)	0.00
Time zone	0.00
Year	2021
Month	2
Day	21
Hour	10
Minute	0
Second	0
Wind speed (km/h)	0
External temperature (°c)	-5.00
Internal temperature (°c)	18.50
Altitude (m)	0.00
Gravity (N/kg)	9.81
Visibility (m)	100.00
Azimuth (°)	108.45
Zenith (°)	55.20
Atmospheric pressure (mm hg)	760.00

The *Compass* command is selected from the *Option* menu or from the left side toolbar.

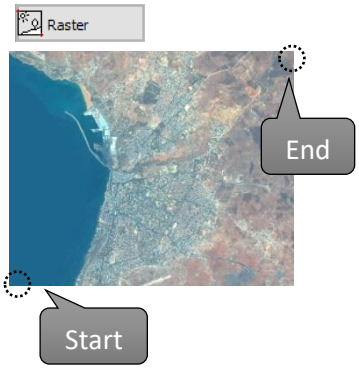
Compass option enables to determine the environmental characteristics of the project site, for example, the sun path during the year or the sun astronomical position (direction and noon) can be determined for any project site on Earth and at any time.







Raster

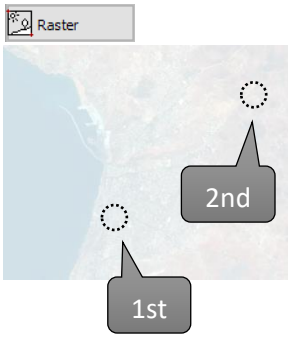


The *Raster* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting a *Raster* requires to know the coordinates of at least two positions, the first being used as a starting point of the *Raster*, and the second as its end. The *Wall* is modeled by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. The *Raster* will be automatically drawn at the given position.

Raster	
Group	-
Length (px)	1
Height (px)	1
Scale	0.00
Rotation (°)	0.00
File	

Anchor



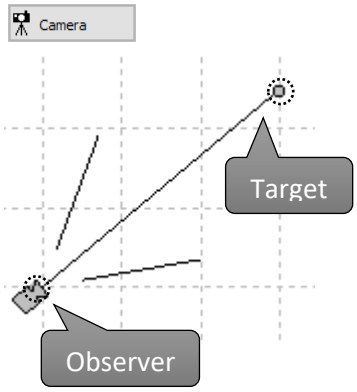
The *Anchor* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting an *Anchor* requires to know the geographic coordinates of a position in the site. The *Anchor* is modeled by setting the x and y real coordinates in the properties panel then placing the cursor over the known position before left clicking the mouse. The *Anchor* will be automatically drawn at the given position.

At least two *Anchors* are needed to georeferenced a *Raster*.

Anchor	
Group	-
x: (m)	0.00
y: (m)	0.00
Raster, x: (px)	0
Raster, y: (px)	0

Camera



The *Camera* command is selected from the *Insertion* menu or from the left side toolbar.

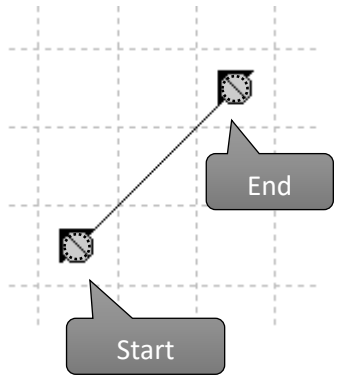
Inserting a *Camera* requires to know the coordinates of at least two positions, the first being used as the observer position, and the second as the target position. The *Camera* is modeled by placing the cursor over the observer position before left clicking the mouse click, and then dragging the cursor to the target position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. The *Camera* will be automatically drawn at the given position.

When selecting a specific *Camera*, the properties panel displays the *Group* the element belongs to, the *Observer* height and the *Target* height. This panel allows the user to change these parameters

Camera	
Group	-
Observer (m)	2.00
Target (m)	1.00

Elevation

The *Elevation* command is selected from the *Insertion* menu or from the left side toolbar.

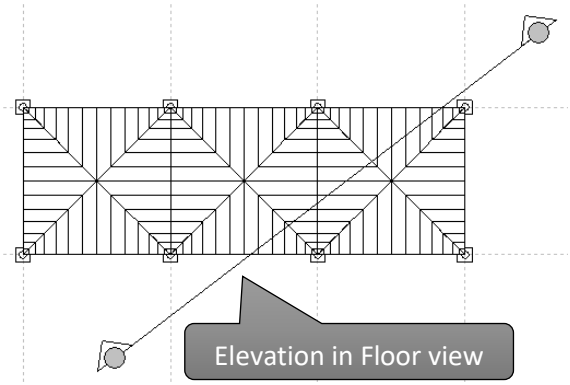


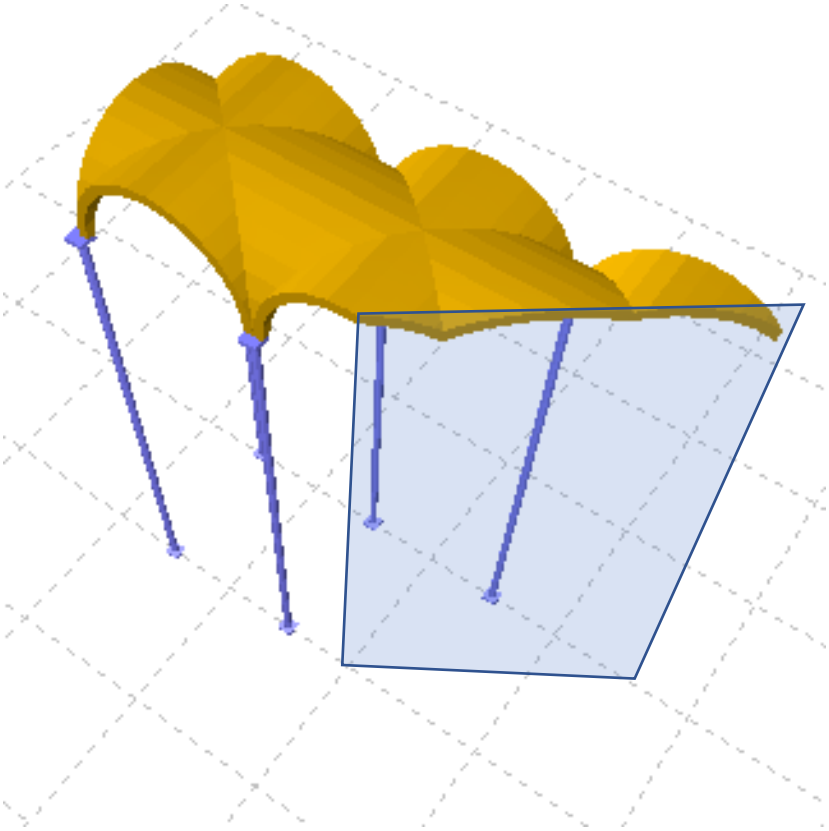
Inserting an *Elevation* requires to know the coordinates of at least two positions, the first being used as the start position, and the second as the end position. The *Elevation* is modeled by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. The *Elevation* will be automatically drawn at the given position.

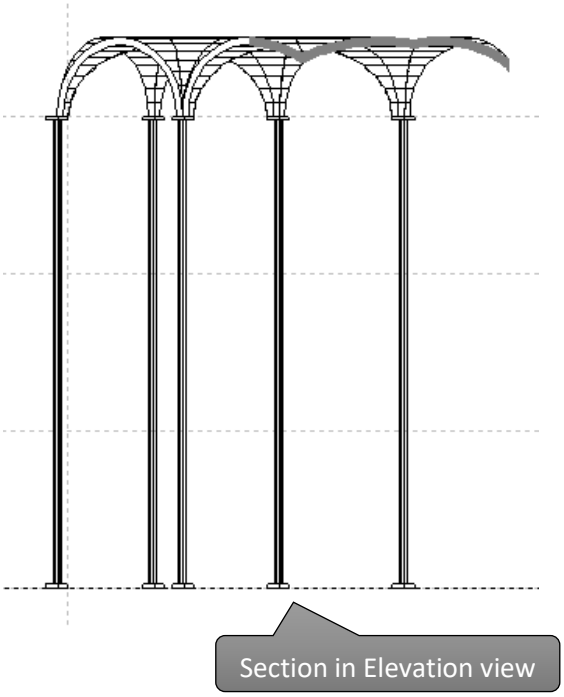
The Elevation may also be used as a section plane that split the model an showing its cross section in the Elevation view, and the visible part in the Perspective view.

When selecting a specific *Elevation*, the properties panel displays the *Group* the element belongs to. This panel allows the user to change this parameter.

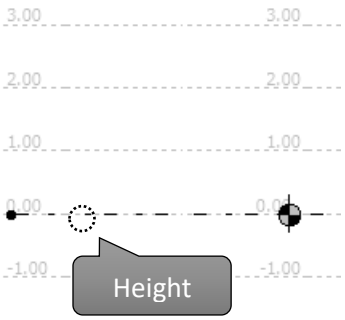
Elevation	
Group	-







Floor



Floor	
Group	-
Minor	1000000.00
Major	1.00

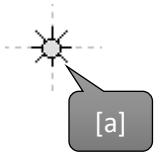
The *Floor* command is selected from the *Insertion* menu or from the left side toolbar.

Inserting a *Floor* requires to know its height from the site origin of heights. The *Floor* is modeled by placing the cursor over the height position, in the Elevation View) before left clicking the mouse. The *Floor* will be automatically drawn at the given position.

When selecting a specific *Floor*, the properties panel displays the *Group* the element belongs to, and its minor and major height (range of visibility). This panel allows the user to change these parameters.

Lamp

The *Lamp* command is selected from the *Insertion* menu or from the left side toolbar.

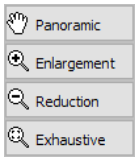


Inserting a *Lamp* requires to know the coordinate position of the insertion point [a] of the *Lamp*. The *Post* is modeled by placing the cursor at the start position before left clicking and releasing the mouse. For an accurate positioning of the *Lamp*, the user may type the position coordinates of the insertion point in the *Origin* parameters before Ctrl-Click the *Lamp* tool. The *Lamp* will be automatically drawn at the given position.

Lamp	
Group	-
Height (m)	3.00

When selecting a specific *Lamp*, the properties panel displays the *Group* the element belongs to, and its *Height*. This panel allows the user to change these parameters.

Viewing



Enlargement	
x:1 (m)	0.00
y:1 (m)	0.00
z:1 (m)	0.00
x:2 (m)	0.00
y:2 (m)	0.00
z:2 (m)	0.00

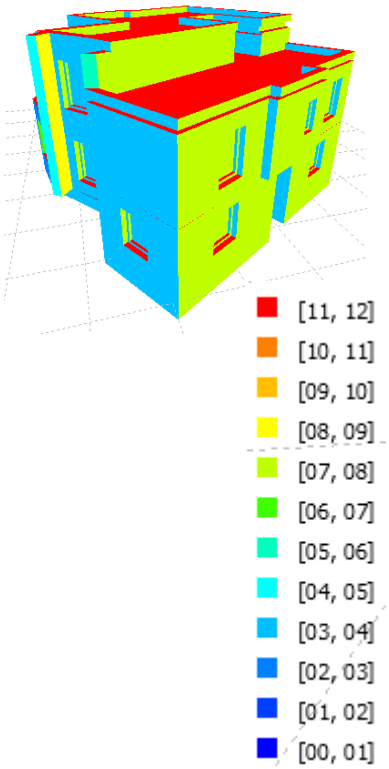
The projected view may be changed by using one of the preview commands (*Panoramic*, *Enlargement*, *Reduction* or *Exhaustive*) from the *Display* manu or from the left side toolbar.

The *Panoramic* command requires to know the coordinates of at least two positions, the first being used as the start position, and the second as the end position. The *Panoramic* is done by placing the cursor over the start position before left clicking the mouse click, and then dragging the cursor to the end position before releasing the mouse. During the drag, a rubber interactively tracks the position of the pointer. The model will be automatically drawn at the given position.

The Enlargement and Reduction commands have opposite effects and may be done by left clicking at a position or by drawing a selection net around elements that would be previewed. Whereas the Exhaustive command shows all the elements of the model at the given view.

When selecting one of Enlargement, Reduction or Exhaustive commands, the properties panel displays the coordinates of the bounding box that will be shown. This panel allows the user to change these parameters

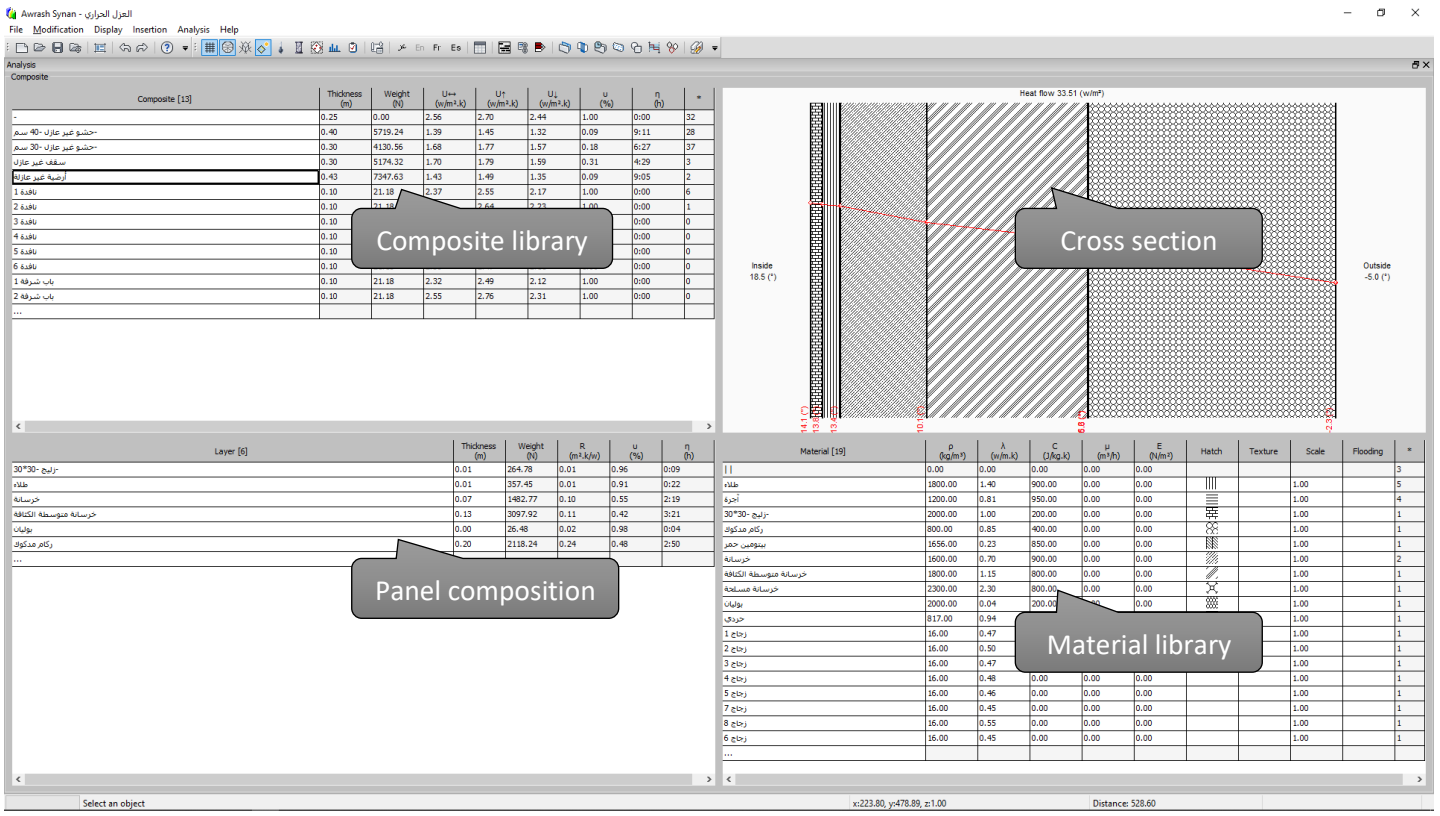
Composite



This analytical command is helpful when it comes to determe the specifications of composite panels that fit in compliance with the thermal regulation adopted in the project area.

The analysis begins with simulating the project to see how it is exposed to solar radiation and ventilation, and to determine its critical building elements. For this, the *Compass* features need to be previously set. Then the projection will be displayed in perspective, with the *Radiation* feature activated from the Display menu. The calculation of the thermal transfer coefficients requires: (a) setting the libray of materials used in the composition of the panel, and the determination of their physical properties; (b) adding the material to the panel and determining their thicknesses.

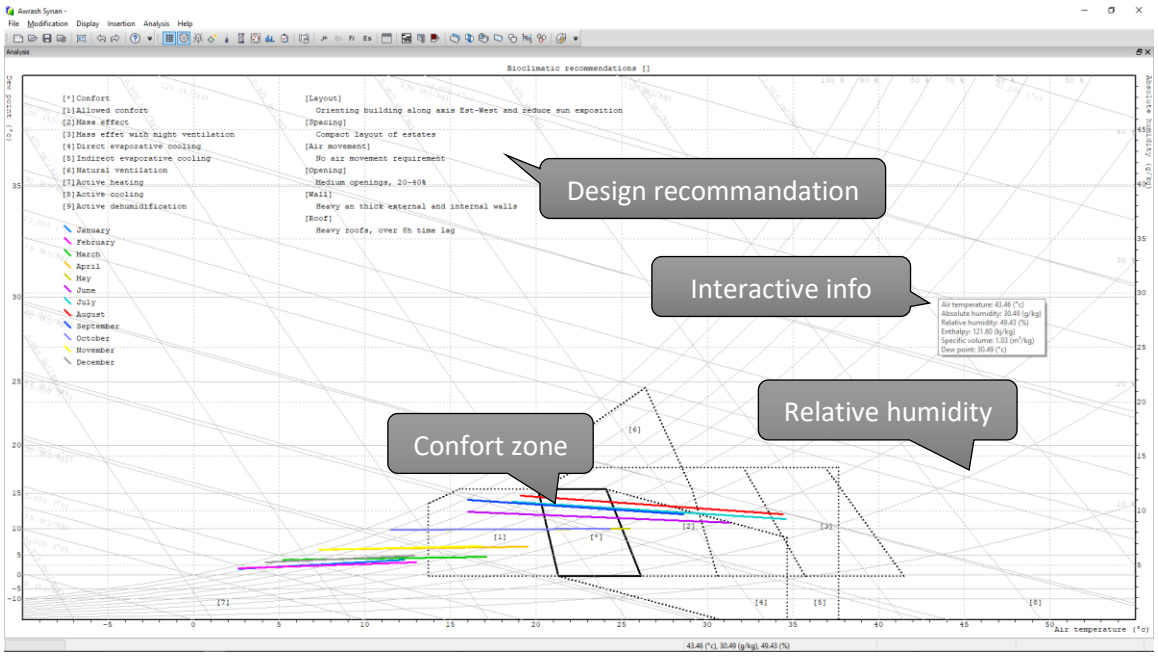
The composite view automaticaly calculates the thermal transfer coefficients for each compound, and displays its section, whether used as a wall (U←→), ceiling (U↑), or floor (U↓), while showing the temperature curve across the section. The three states of the composite can be displayed by clicking on the section.

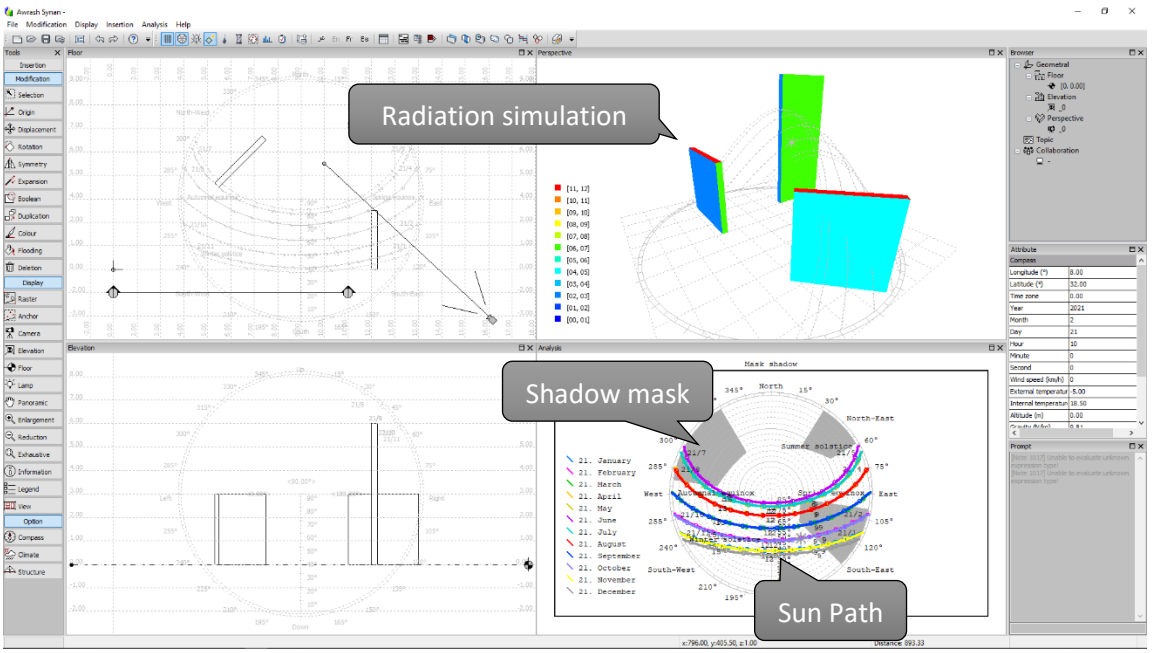


Bioclimatics

Minimal temperature mean (°c)	
January	2.60
February	2.60
March	5.20
April	7.30
May	11.60
June	16.00
July	18.60
August	19.10
September	16.00
October	11.50
November	7.30
December	4.20
Maximal temperature mean (°c)	
January	12.30
February	13.00
March	17.10
April	19.50
May	25.50
June	31.30
July	34.60
August	34.40
September	28.60
October	24.30
November	16.80
December	12.90
Minimal humidity mean (%)	
January	56.80
February	52.20
March	44.00
April	43.70
May	37.90
June	28.90
July	24.80
August	26.30
September	36.50
October	40.70
November	52.20
December	58.60

The bioclimatic diagram links between the basics of life physiology and building physics in accordance with the climatic characteristics of the project area. It provides guidance to determine the strategy if building design that is compatible with the project site environment and the spaces use. Whereas the shadow mask (continued) determines the size of the shadow projected on the project according to its geographical location (longitude, latitude, altitude) and the heights around it (neighboring buildings, topography, etc.).





Descriptive modeling

Descriptive modeling is concerned with the logics and relationships that structure the elements of a project, beyond their simple geometric shape as conventional Computer Added Design tools do. Descriptive modeling aims to record the know-how by means of symbolic description using *Alkindi* language and datasets for machine learning. *Awrash* uses the accumulated knowledge to generate N-dimentional models, and offers physical analysis, and simulation by means of dedicated tools and views.

The theory behind descriptive modeling is based on the following assumptions:

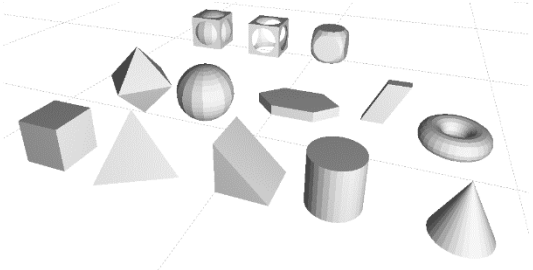
(i) In most cases, the geometric model of project do not reflect the design process and can't be used to formalize its underlying concepts;
(ii) Geometric models usually has more figurative potential than what combination of shapes may show to the observer;
(iii) Innovative design depends on the efficiency of the design methods and tools to explore the design space;
(iv) The designer's expertise is broadly or partially enhanced by the actions carried out during the design process;
(v) it is possible to capture design knowledge and record it according to logically formulated descriptions.

Click on this button to show the script window and take the following:

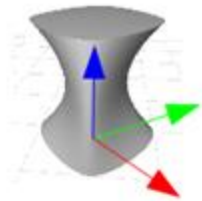
(state model (function () (cube)))

Then click on this button to run Alkindi Interpreter and generate the shape:

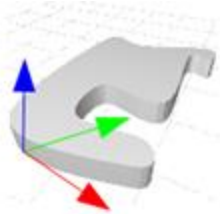
Alkindi uses a unified syntax in the format *(Operator Operand1 Operand2 ...)*. This expression applies the *operator* on a series of N arguments called *operands*. For example, the cube is expressed by the mono-operand formulation *(cube edge)* where the term *cube* is the name of the operator which generates a cubic shape, and the term *edge* determines its length as a positive real number. A cube of 1.5 unit may be expressed by (cube 1.5). Alkindi expressions can also be combined with each other. For example, it is possible to formulate equivalent expressions like (cube (* 3 0.5)) and (cube (+ 1 0.5)) to generate the same model. The description will be as following: *(state model (function ( ) (cube 1.5)))*, in order to get it interpreted by Alkindi. The user has to write it in the script window and run the Alkindi interpreter from the menu or shortcut. The following page shows Alkindi main operators that can be combined endlessly to generate any shapes that he can imagine.



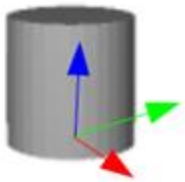
Modeling Operators



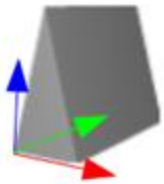
(loft smt1 smt2 scts)



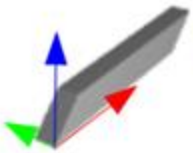
(extruded thk smt crds)



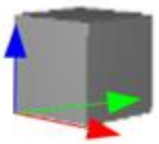
(cylinder hgt rds smt)
(cylinder crd1 crd2 rds smt)



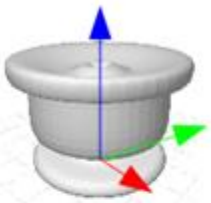
(prism wdt lgt hgt ofs)
(prism crd1 crd2 crd3 smt)



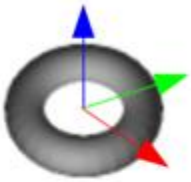
(parallelepiped lgt wdt hgt ofs)



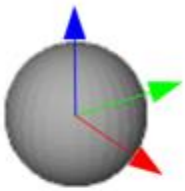
(cube width)



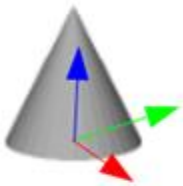
(revolved smt1 smt2 crds)



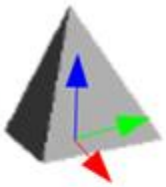
(loft rds1 smt1 rds2 smt2)



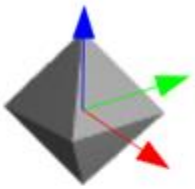
(sphere rds)



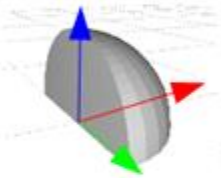
(cone hgt rds sdv)



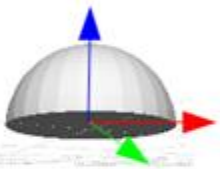
(pyramid rds)



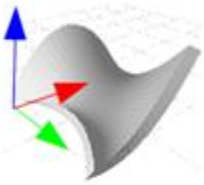
(octogon rds)



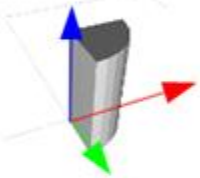
(quarter_phere rds smt)



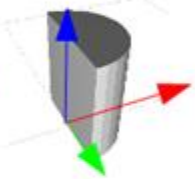
(half_sphere rds smt)



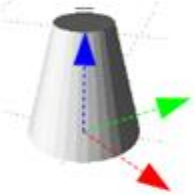
(shell Crd1 ... Crd9
smt1 smt2 tkn)



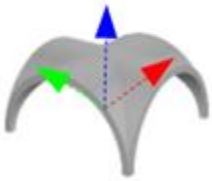
(quarter_cylinder
hgt rds smt)



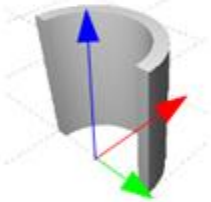
(half_cylinder
hgt rds smt)



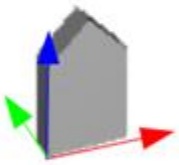
(octogon rds)



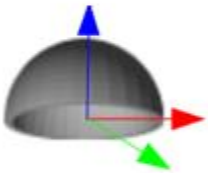
(pendant rds tkn smt)



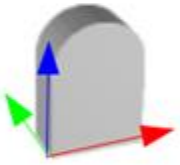
(half_tube hgt rds tkn smt)



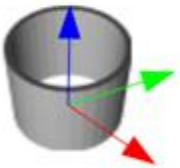
(arrow wdt tkn hgt agl)



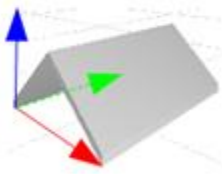
(dome rds tkn smt)



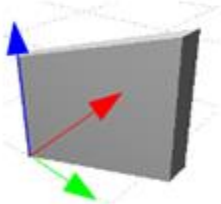
(vault wdt tkn hgt smt)



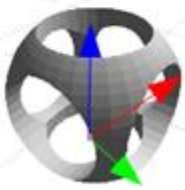
(tube hgt rds tkn smt)



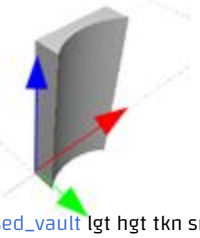
(double_slope lgt wdt smt agl)



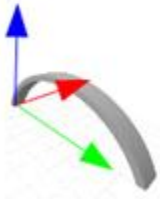
(sloping_parallelepiped
lgt hgt alt tkn)



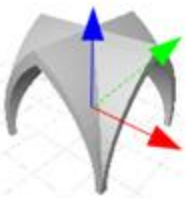
(screwed rds1 rds2 smt)



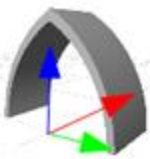
(reversed_vault lgt hgt tkn smt)



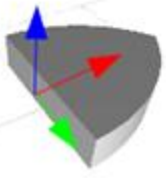
(arc lgt wdt hgt tkn)



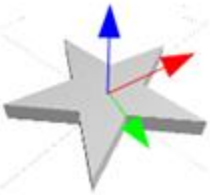
(gothic_pendant rds tkn smt
aHFOcWhuOHQ=



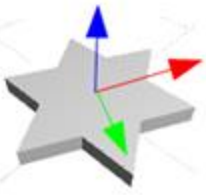
(gothic lgt wdt tkn smt)



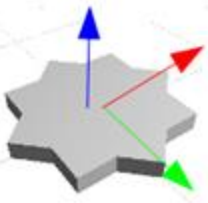
(ogive hgt rds tkn)



(start5 dmt tkn)



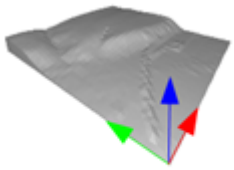
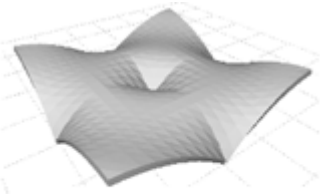
(start6 dmt tkn)



(start8 dmt tkn)

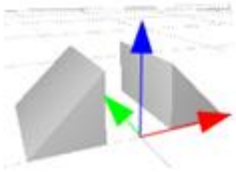
Legend:

lgt: length, wdt: width, hgt: height, tkn: thickness, smt: smooth, agl: angle, rds: radius, dmt: diameter, crd: coordinate, stc: section

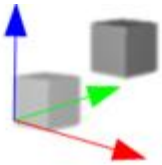



(landscape smt1 smt2 tkn crds) (quadric_shell crd1 ... crd25 thk)

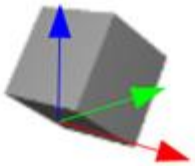
Modifying Operators



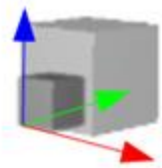
(symmetry ax ay az flg shp)



(translation dx dy dz shp)



(rotation angx angy angz shp)
(rotation crd1 crd2 agl shp)



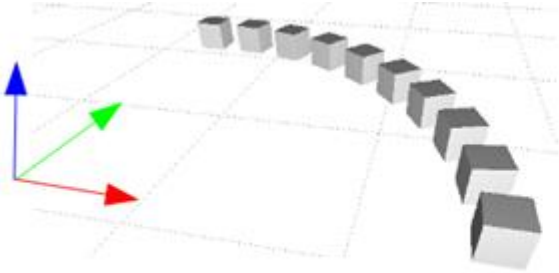
(scale sx sy sz shp)

(intersection shp1 shp2 flg)

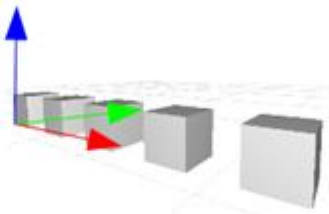
(subtraction shp1 shp2 flg)

(union shp1 shp2 flg)

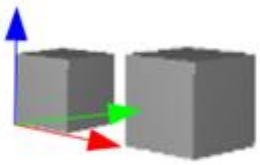
Copy Operators



(radial nbr axs agl rds1 rds2 shp)



(linear nbr axs dst shp)



(linear shp)

Info Operators

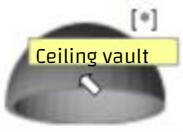
(distance (_ crd1 ... crdn))

(color idx tsp shp)

(centroid shp)

(volume shp)

(suface shp)

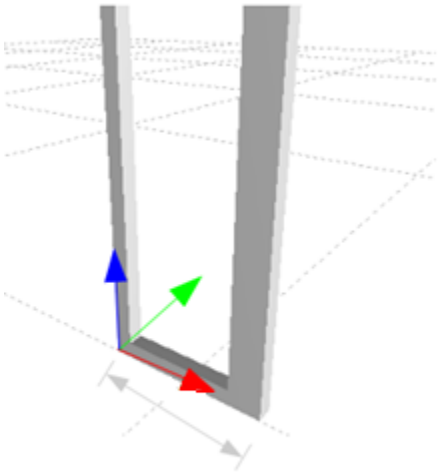


(tag idx str shp)

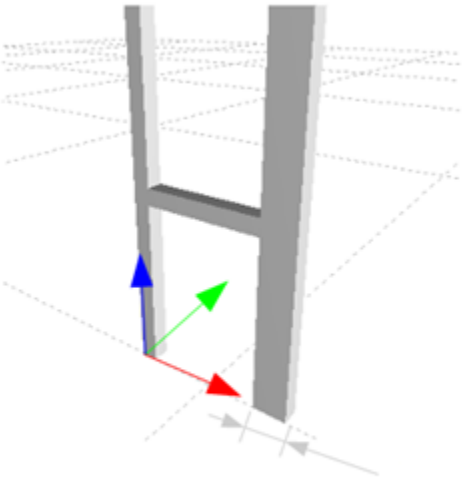
Legend:

Idx: index, tsp: transparency, str: string

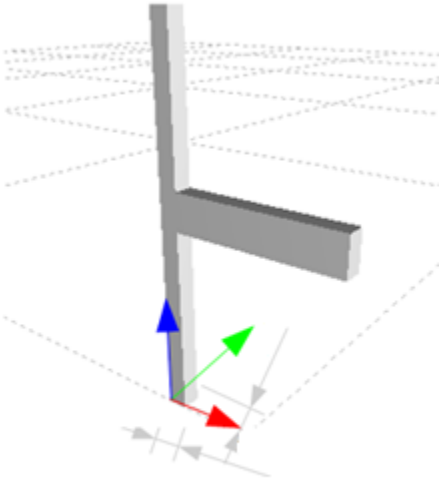
Frame Operators



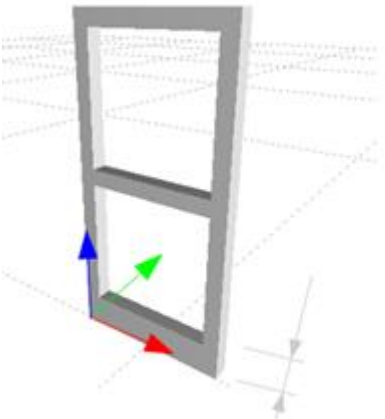
(frame_c lgt wdt hgt tkn1 tkn2 tkn3)



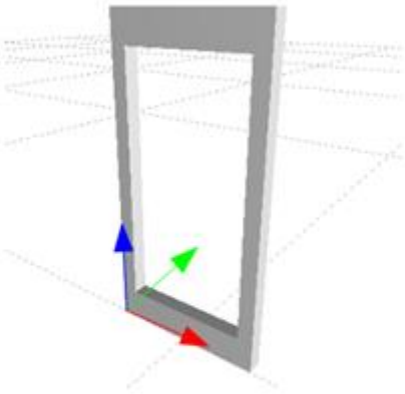
(frame_b lgt wdt hgt ofs tkn1 tkn2 tkn3)



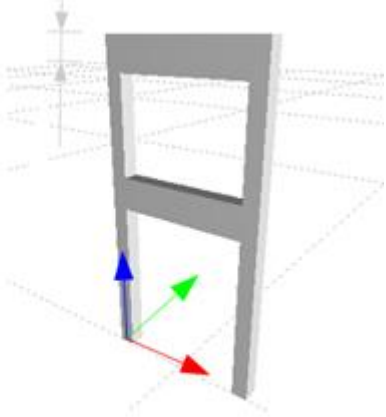
(frame_a lgt wdt hgt ofs tkn1 tkn2)



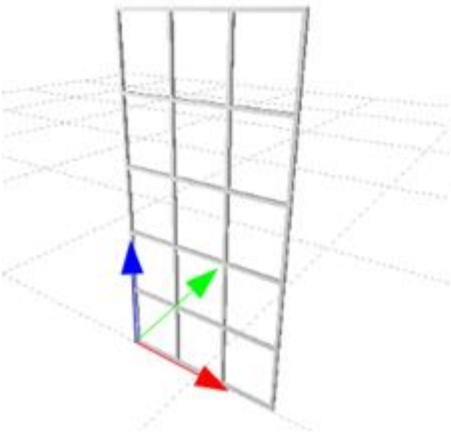
(frame_f lgt wdt hgt tkn1 tkn2 tkn3 tkn4 tkn5)



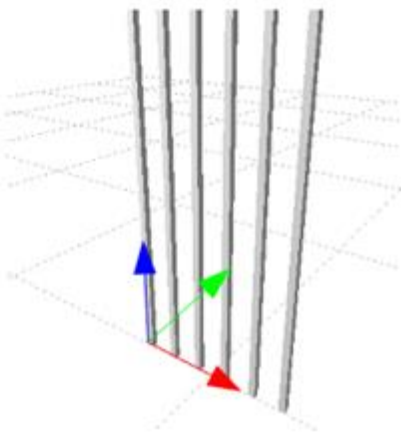
(frame_e lgt wdt hgt ofs tkn1 tkn2 tkn3 tkn4)



(frame_a lgt wdt hgt ofs tkn1 tkn2 tkn3 tkn4)



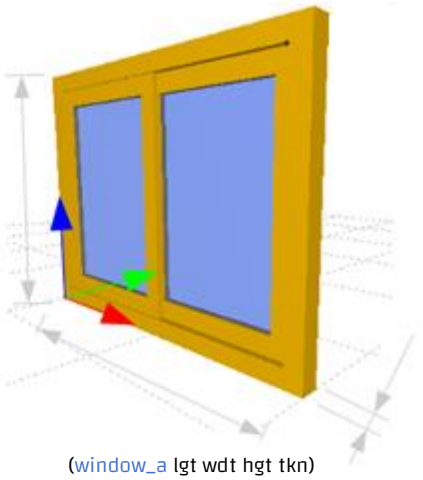
(grid lgt wdt hgt tknx sdvx tknz sdvz)



(columns lgt wdt hgt tkn sdv)

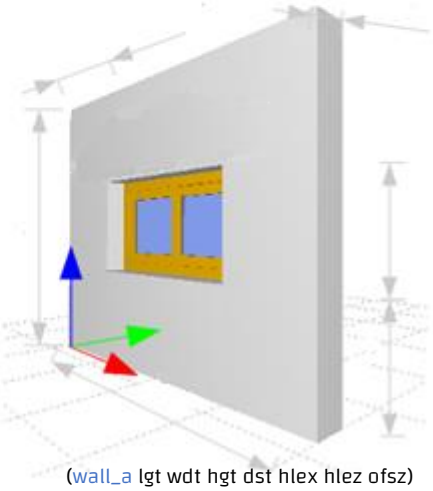
Frame Operators

(door_a lgt wdt hgt tkn)



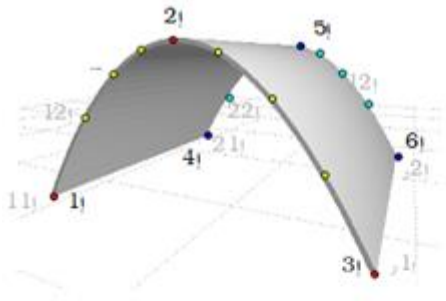
(window_a lgt wdt hgt tkn)

(wall_b lgt wdt hgt dst hlex hlez)

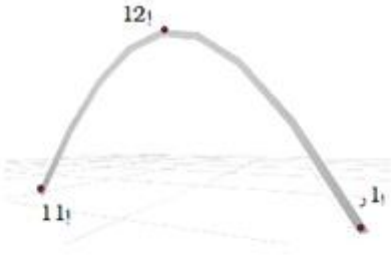


(wall_a lgt wdt hgt dst hlex hlez ofsz)

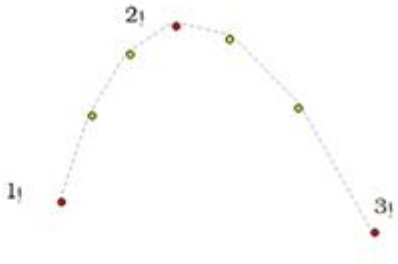
Composed Operators



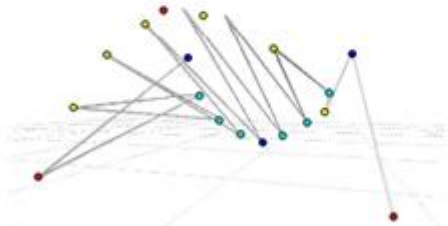
(ripple (_ crd11 … crd1n) (_crd21 … crd2n) tkn)



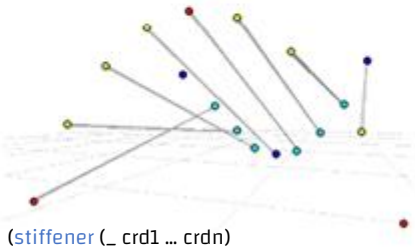
(bar (_ crd1 … crdn) tkn)



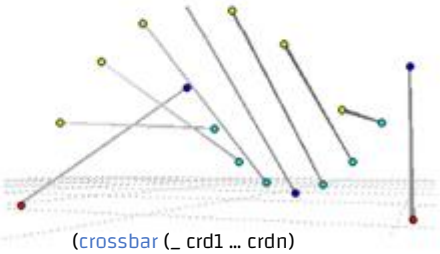
(line crd1 crd2 sdb)
(line crd1 crd2 crd3 sdb)



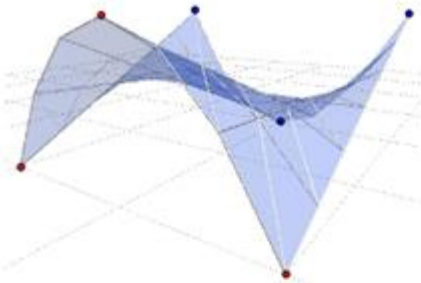
(crossbar_stiffener (_ crd11 … crd1n)
(_crd21 … crd2n) tkn)



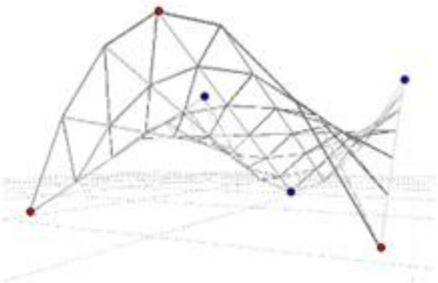
(stiffener (_ crd1 … crdn)
(_crd21 … crd2n) tkn)



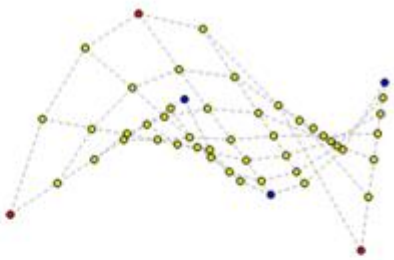
(crossbar (_ crd1 … crdn)
(_crd21 … crd2n) tkn)



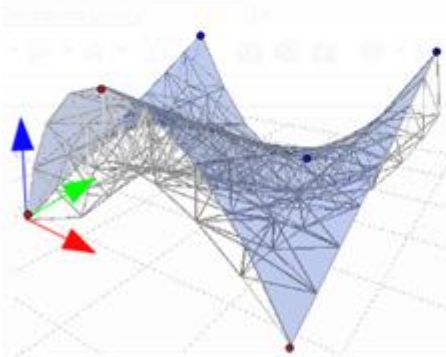
(cover map tkn)



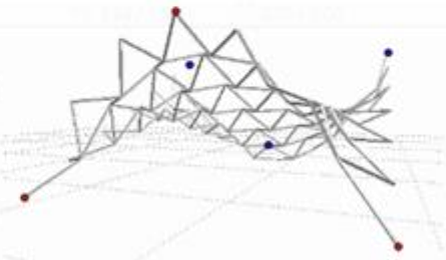
(net map tkn)



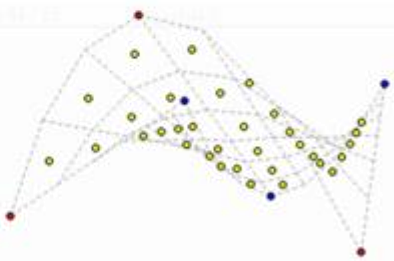
(map crd1 … crd6 sdb1 sdv2 tkn)



(composed_cover crd1 … crd6 sdv1 sdv2 hgt tkn)



(shrinked_crossbars map shk hgt)



(shrink crd1 … crd6 sdb1 sdv2 hgt)

Terms translation

Español	Français	English	عربي
Operadores primarios	Opérateurs primaires	Primary operators	مؤثرات أساسية
cubo	cube	cube	مكعب
tetraedro	tétraèdre	tetrahedron	هرم
prismo	prisme	prism	منشور
cilindro	cylindre	cylinder	أسطوانة
cono	cône	cone	مخروط
octaedro	octaèdre	octahedron	ثماني
esfera	sphère	sphere	كرة
placa	plaque	plate	صفيحة
paralelepipedo	parallélépipède	parallelepiped	متوج
torus	tore	torus	طارة
Operadores secundarios	Opérateurs secondaires	Secondary operators	مؤثرات فرعية
senal	repère	mark	معلم
cono_trucado	cône_tronqué	truncated_cone	مخروط_مبتور
mitad_esfera	demi_sphère	half_sphere	نصف_كرة
cuatro_esfera	quart_sphère	quarter_sphere	ربع_كرة
mitad_cilindro	demi_cylindre	half_cylinder	نصف_أسطوانة
cuatro_cilindro	quart_cylindre	quarter_cylinder	ربع_أسطوانة
tubo	tube	tube	أنبوب
bóveda	voûte	vault	قبو
cupula	coupole	dome	قبة
flecha	flèche	arrow	سهم
pechina	pendentif	pendant	تقبيب
doble_pendiente	bipente	double_slope	ثنائي_الميل
bóveda_invertida	voûte_inverse	reversed_vault	قبو_معكوس
enroscado	fileté	screwed	ملولب
paralelepipedo_inclinado	parallélépipède_incliné	sloping_parallelepiped	متوج_مائل
mitad_tubo	demi_tube	half_tube	نصف_أنبوب
sulaymania	sulaymania	sulaymania	سليمانية
daudia	daudia	daudia	داودية
khumasia	khumasia	khumasia	خماسية
ojiva	ogive	ogive	حنيرة
gótico	gothique	gothic	قوطي

Attribution operators

	Español	Français	English	عربي
1	Pórtico	Portique	Portico	أزج
2	Tubo	Tube	Pipe	أنبوب
3	Marco	Cadre	Frame	إطار
4	Puerta	Porte	Door	بابـ
5	Torre	Tour	Tower	برج
6	Tornillo	Vis	Screw	برغي
7	Descansillo	Palier	Stair Landing	بسطة
8	Losa	Dalle	Slab	بلاطة
9	Armazón	Armature	Reinforcement	تسليح
10	Clavar	Cloutage	Nailing	تسمير
11	Rayo	Poutre	Beam	جائز
12	Refuerzo	Raidisseur	Stiffener	جاسئ
13	Pared	Mur	Wall	جدار
14	Entramado	Ferme	Truss	جمالون
15	Aleta	Ailette	Alette	جناح
16	Paso	Marche	Step	درجة
17	Ripia	Bardeau	Shingle	درعة
18	Remache	Rivet	Rivet	دسار
19	Viga	Chevron	Rafter	رافدة
20	Pilar	Pillier	Pillar	رسي
21	Pavimento	Pavage	Pavement	رصفـ
22	Conjuto	Agrégat	Aggregate	ركام
23	Estribo	Culée	Abutment	ركيزة
24	Galería	Galerie	Gallery	رواق
25	Parapeto	Parapet	Parapet	ساتر
26	Listón	Latte	Lath	ساجة
27	Dintel	Linteau	Lintel	ساكف
28	Sótano	Sous-sol	Basement	سرداب
29	Terraza	Terrasse	Terrace	سطح
30	Tejado	Toit	Roof	سقف
31	Tejado a piñón	Toit à pignon	Gable roof	سقف مسنم
32	Pasamano	Clôture	Railing	سياج
33	Barra de lazo	Tirant	Tie rod	شداد

	Español	Français	English	عربي
34	Balcón	Balcon	Balcony	شرفة
35	Placa	Plaque	Plate	صفيحة
36	Andamio	Echafaudage	Scaffold	صقالة
37	Traversaño	Traverse	Transom	عارضة
38	Umbral	Seuil	Threshold	عتبة
39	Umbral	Nervure	Rib	عصب
40	Bóveda	Voûte	Vault	عقد
41	Bóveda en tonel	Voûte en berceau	Barrel vault	عقد برميلي
42	Ático	Mansarde	Attic	علية
43	Columna	Colonne	Column	عمود
44	Poste	Poteau	Post	عمود
45	Abertura	Ouverture	Opening	فتحة
46	Bovedilla	Solin	Space	فرجة
47	Mosaico	Mosaïque	Mosaic	فسيفساء
48	Yarda	Cour	Yard	فناء
49	Domo	Coupole	Dome	قبة
50	Cubre junta	Couvre-joint	Joint-cover	قدة
51	Azulejo	Tuile	Tile	قرميدة
52	Cáscara	Coque	Shell	قشرية
53	Barra	Barre	Bar	قضيب
54	Zapato	Sabot	Shoe	كعب
55	Garaje	Garage	Garage	مرآب
56	Mansión	Chalet	Mansion	مرتل
57	Obturador	Volet	Shutter	مصراع
58	Gozne	Charnière	Hinge	مفصلة
59	Barandilla	Main-courante	Handrail	ممسكة
60	Callejón	Allée	Alley	ممشى
61	Acceso	Accès	Access	منفذ
62	Ventana	Fenêtre	Window	نافذة
63	Esqueleto	Squelette	Skeleton	هيكل
64	Cuña	Cale	Wedge	وتد
65	Junta	Joint	Joint	وصلة
66	Plinto	Plinthe	Plinth	وطيدة

Awrash White Paper

The main purpose of developing Awrash (meaning Studios in Arabic) is to provide a professional, multi-language, and multi-platform software for Computer Aided Design and Simulation based on the artificial intelligence technics, especially genetic algorithms and neural networks. This software aims to tackle design issues especially in the fields of architectural, civil, mechanical, electrical, and aeronautic engineering.

As a Computer Aided Design and Simulation software, Awrash allows to draw and model in 2D and 3D using mouse and/or script driven actions. It allows the study of the project's model with planes, elevations, sections, renders and cost calculations. By using artificial intelligence algorithms Awrash allows the user to explore his conceptual space and rate all possible solutions and extract the optimal solutions for each design problem. Then generate the valid solutions in geometrical or analytical views for examination with his colleagues or discussion with the project owners (see the User Guide).

Awrash comes in one compact executable, built upon 7 specialized kernels that are developed in the C language (ANSI). This allows many advantages :

(i) The software to be very optimized for size, with less than 10 Megabytes when compared to other packages of many Gigabytes;

(ii) Each version of the software comes in three releases compiled natively for Apple OS, Microsoft Windows and Linux. Awrash binary files (.snf) saved from any release are read in the others;

(iii) Projects modeled in Awrash can be exported in any other CAD software using the conventional file formats of the industry;

(iv) As it is totally independent from the Operating System, Awrash can be run from any domain, Hard, Optical or even USB drive;

(v) Awrash is very fast to run and do not suffer from memory leak, as C language allows a very efficient memory allocation and release;

(vi) The software can be linked to any Software or System that provides a C APIs. Thus, Awrash can also run as a service in both directions with the partner system;

(vii) By links directly to the web, via HTTP protocol, Awrash allows collaborative use in a in LAN and WAN configuration, for sharing projects' databases among multiple team members working remotely on the same projects.

(viii) Awrash provides its own interpreted language *Alkindi*. This language is used for developing new commands and extending its capabilities. Many of the functions and most libraries of the software are developed in Alkindi.

Awrash runs internally in Arabic and translates instantly according to the language the user chooses for his User Graphic Interface. Awrash supports 4 languages (Arabic, English, French and Spanish) and 3 more languages are under development (German, Turkish) and will be available in the following releases.

Contact email :
support@awrash.org