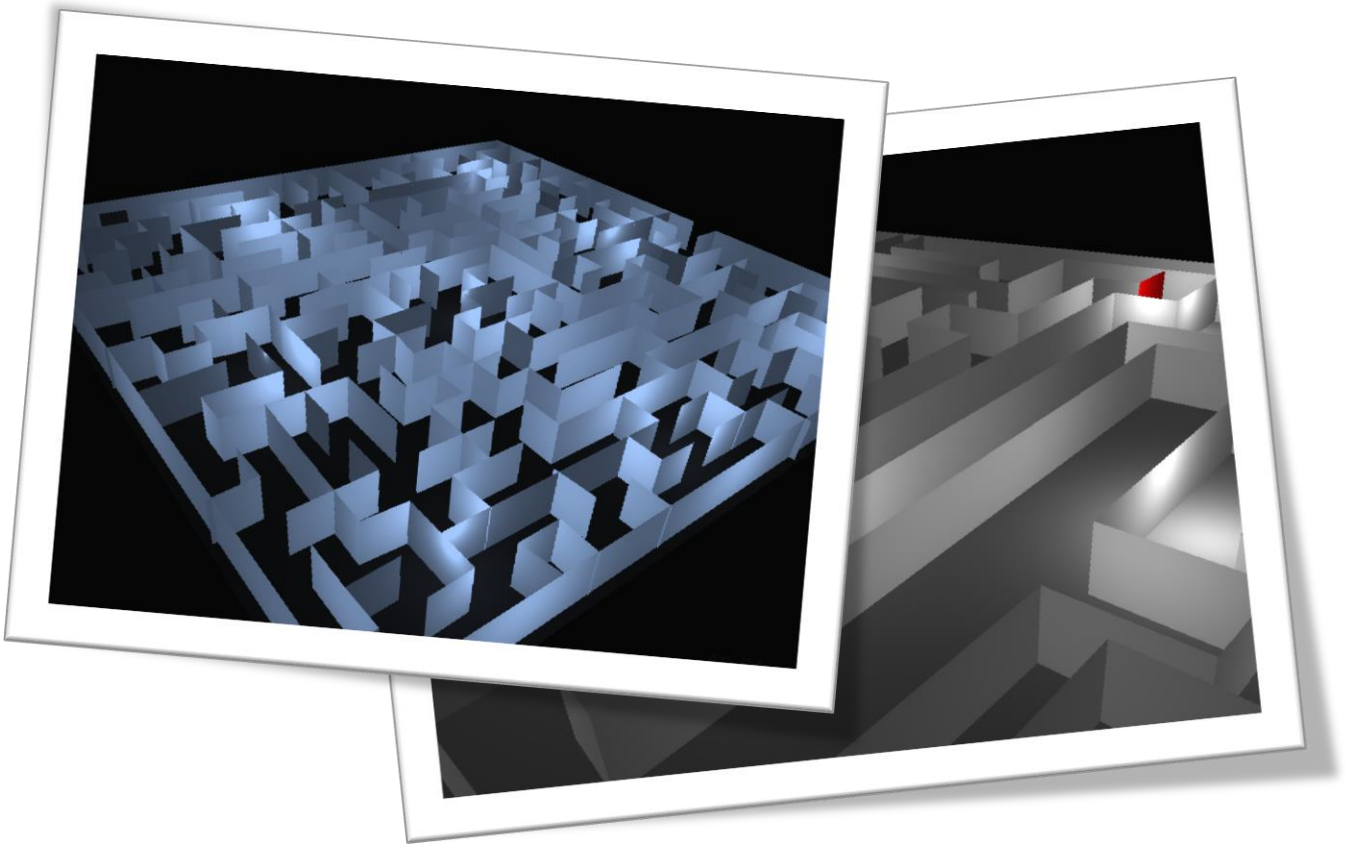
MazeSuite

Quick Start Guide



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Please refer to MazeSuite in your scholarly papers with the following:

Ayaz, H., Shewokis, P. A., Curtin, A., Izzetoglu, M., Izzetoglu, K., & Onaral, B. (2011). Using MazeSuite and Functional Near Infrared Spectroscopy to Study Learning in Spatial Navigation. J Vis Exp(56), e3443. doi: 10.3791/3443

http://www.jove.com/Details.php?ID=3443

Please let us know about your study and papers that you have used MazeSuite.
Drop a line to ayaz@drexel.edu for comments and questions.

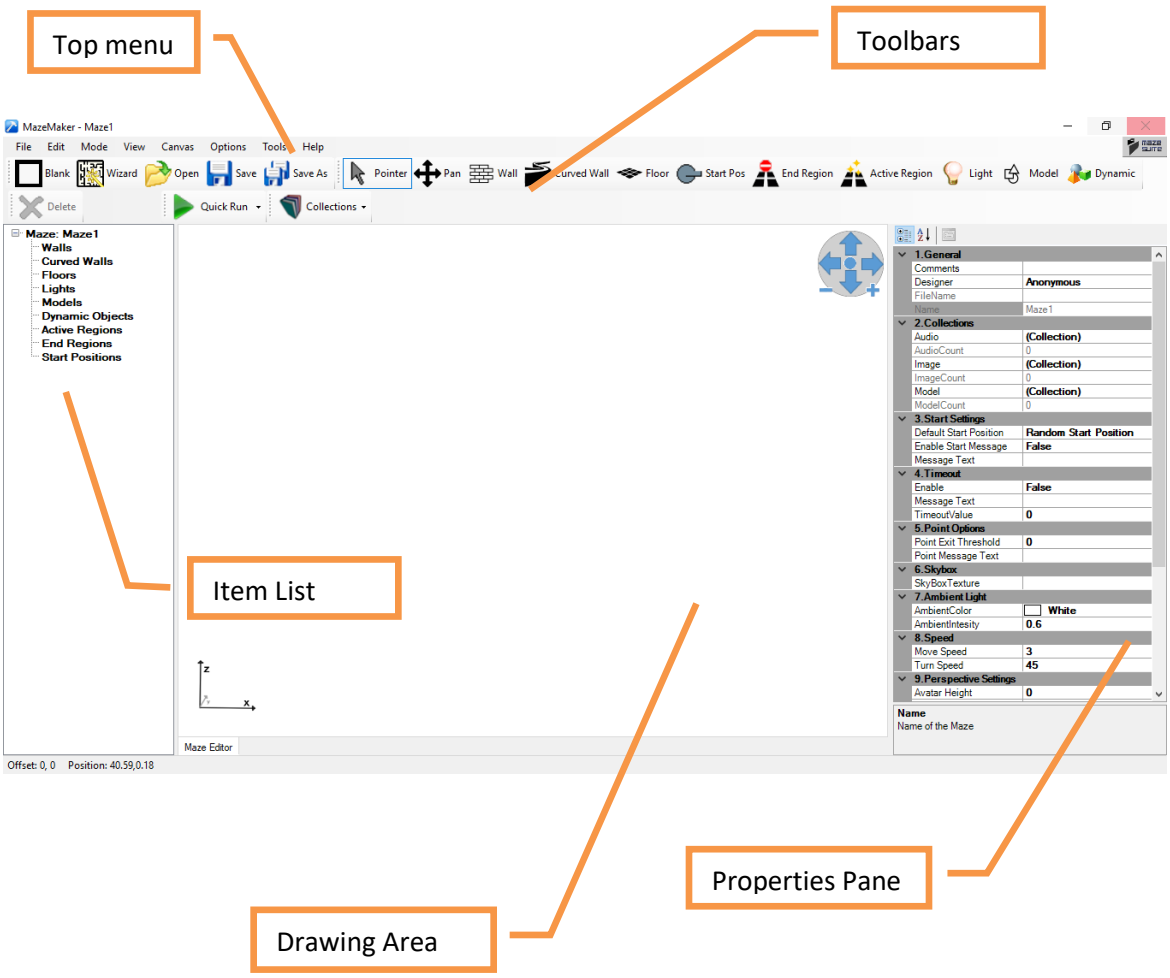
1. Introduction

This document is intended to be a quick start guide for using MazeSuite. This section describes MazeSuite components and their main features. Please see next section for instructions about installing MazeSuite to your computer, followed by a step by step guide for creating a simple maze and rendering it for navigation. The subsequent sections discuss advanced features for customization and various visual effects.

MazeSuite consists of three main applications; an editing program to create and alter maze environments (MazeMaker), a visualization/rendering module (MazeWalker), and finally an analysis/mapping tool (MazeAnalyzer). Descriptions of main parts are as follows.

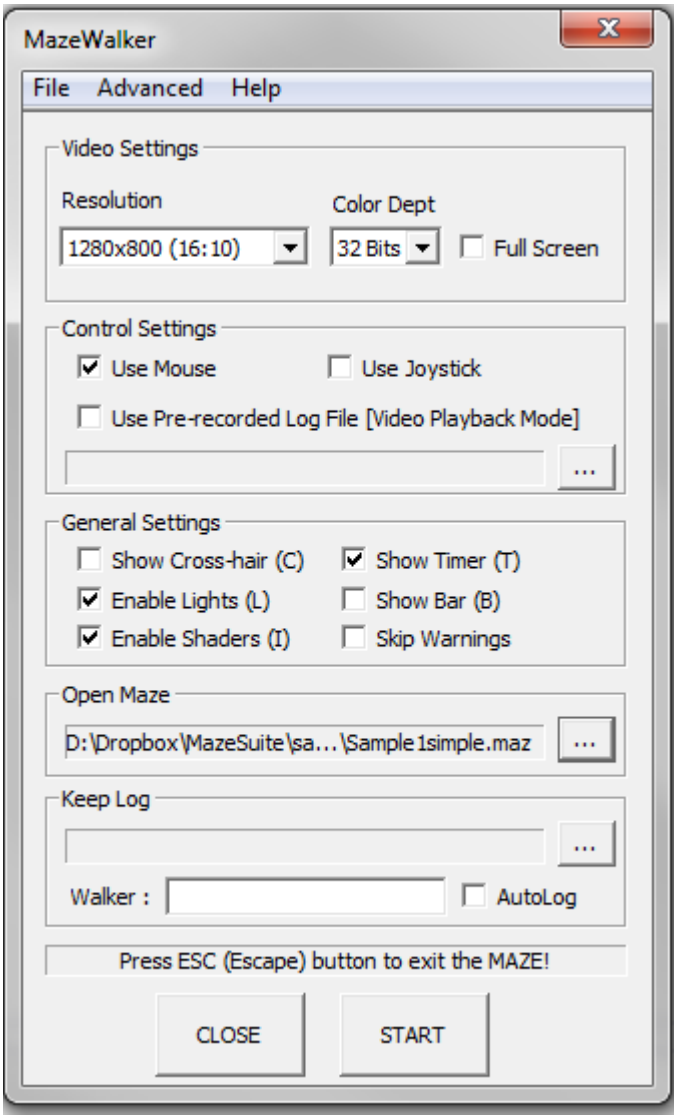
1.1. MazeMaker

Maze Maker is the core application that enables creating and editing maze files and also can perform quick run to immediately render the current maze file. Below is the main window of MazeMaker that appears when the application is run. There are four main parts: Top menu, toolbars, drawing area and side pane. See 'Creating a maze' section for quick introduction to using MazeMaker.



1.2. MazeWalker

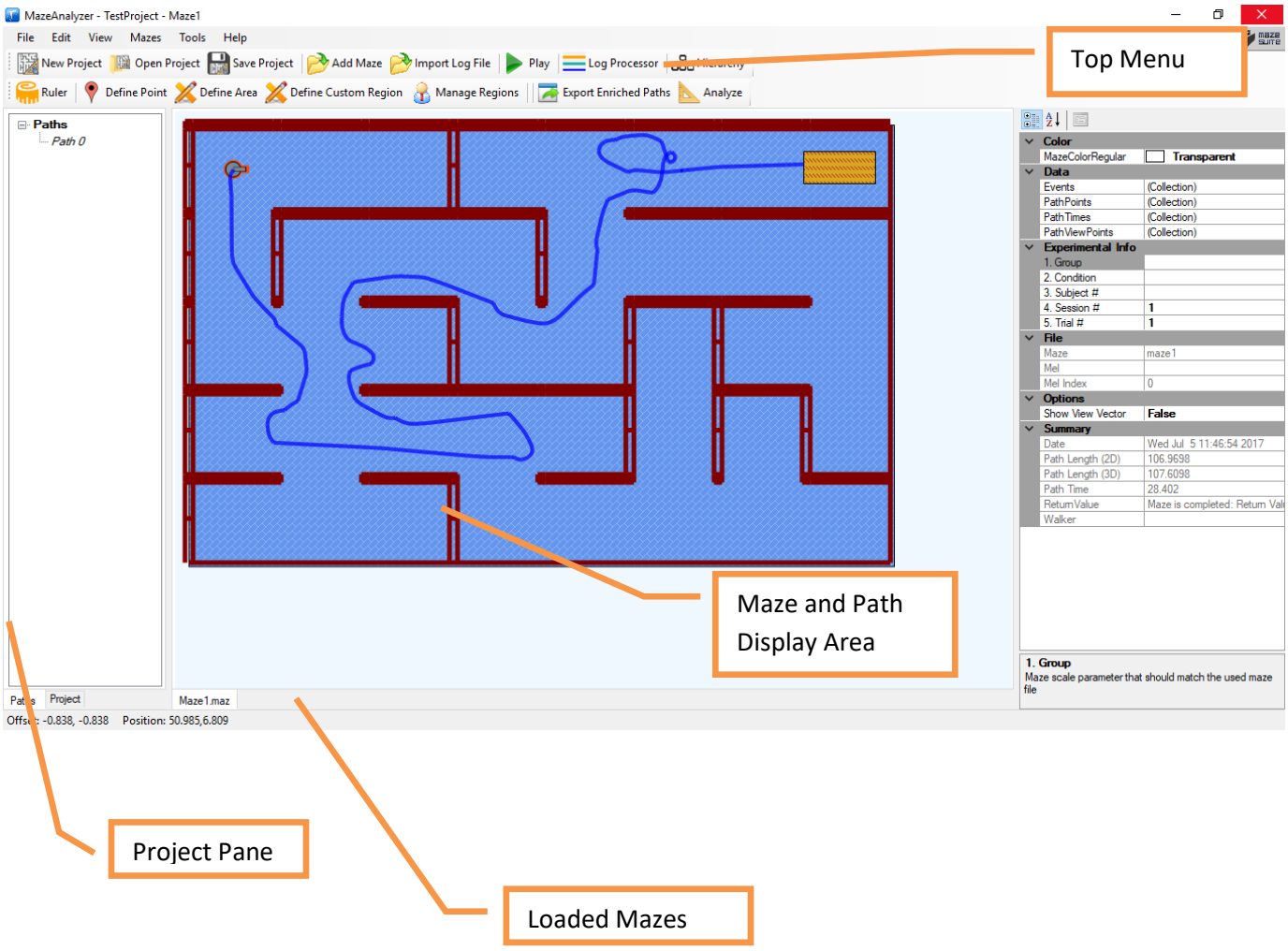
MazeWalker is the presentation application and the 3D engine that renders maze files. It can log events within a session, send synchronization time markers through serial port and open pre-recorded log files to show video of previous activity. Below is the initial settings dialog box, detailed settings can be accessible through “Advanced” top menu item.



Video Settings	
Resolution	Set the MazeWalker Window Resolution
Color Depth	Set the MazeWalker color depth
Full screen	Toggle Full screen mode Unselect for windowed mode
Control Settings	
Use Mouse	Select to enable mouse input
Use Joystick	Select to enable physical or API joystick input
Use Log File	Select to playback the movements recorded in a log file for a corresponding maze.
General Settings	
Show Crosshair	If selected a crosshair is placed in the center of the screen
Enable Lights	Enables Lighting effects in Mazewalker.
Enable Shaders	Enables Advanced Lighting effects in Maze Walker, Disable if experiencing compatibility issues
Show Timer	If selected, displays a timer in the lower right corner indicating time since start of maze.
Show Bar	If selected, displays a meter indicative of player’s score or device input response.
Skip Warnings	If selected, messages displayed regarding missing textures and objects will not be displayed during loading of the level.
Open Maze	
Select File	Click to browse to and open the desired maze file.
Keep Log	
Select File	Click to browse and save a log file for the next MazeWalker run
AutoLog	If selected, MazeWalker will automatically save a log file to default MazeSuite folder with date and time
Walker	Name of subject for the log file.

1.3. MazeAnalyzer

MazeAnalyzer is the analysis tool of MazeSuite. MazeAnalyzer can open log files created by MazeWalker and enables researchers to analyze the behavior (e.g., subjects' path, time to completion of the maze, number of errors) of the subject in the maze. MazeAnalyzer is also able to load multiple overlapping paths on the same maze, allowing researchers to instantly compare the actions of different subjects. Log files contain information about the path that a subject traveled as well as where the subject looked at each time and other events that occurred with a session.



2. Frequently Asked Questions

1. **MazeWalker is slow, what should I do?**

   Try decreasing the video display resolution and disabling V-sync and MSAA options from main menu, Tools>Advanced Graphics Settings.

2. **How can I make objects compatible with MazeWalker?**

   Use a tool such as Google SketchUp Pro, Blender, or other model editor and export your model as an .Obj file. Make sure all material (.mat) files and associated textures are in the correctly defined folders and are accessible to MazeWalker.

3. **I've tried everything but _____ still won't work!**

   Go to www.MazeSuite.com/forum and ask for help!

3. Installation

This section describes the installation procedure of MazeSuite. Visit http://www.mazesuite.com to download the setup file.

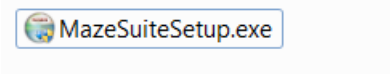
3.1.Requirements

MazeSuite can be installed on PC computer with Windows XP, Windows Vista or Windows 7 operating system. Performance and visual quality are associated with the graphics cards and system performance. A modern system with dedicated video card should allow running with most features. Graphics cards with OpenGL version 2.1 and above are required. For Windows XP systems, Microsoft .NET Framework version 4 or later is required. Latest .NET runtime can be downloaded from http://www.microsoft.com/net/

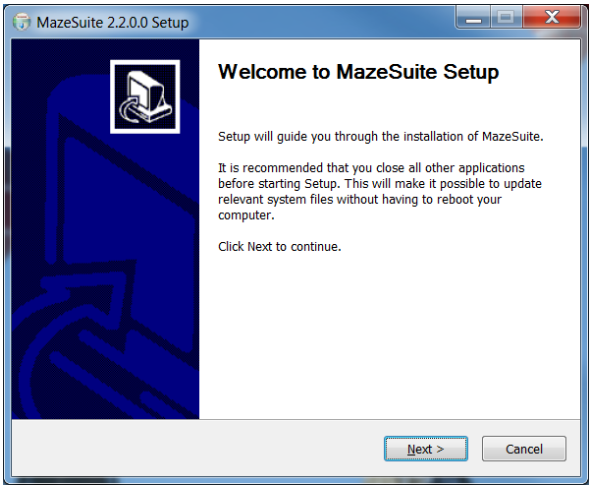
Warning: Graphics card hardware that supports OpenGL 2.1 and above is required.

3.2.Setup

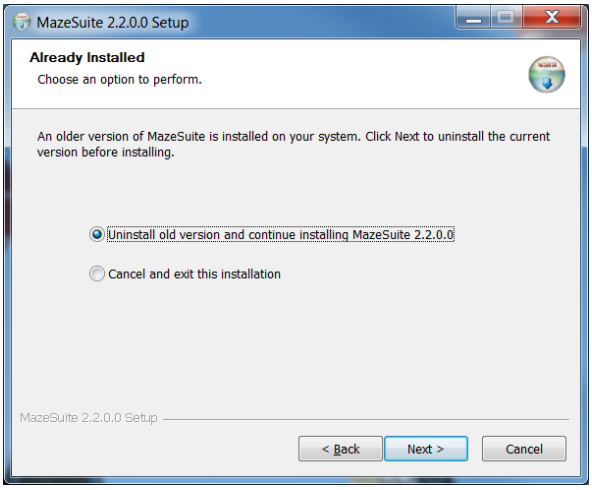
1) Run the 'MazeSuiteSetup.exe' application to initiate installation.



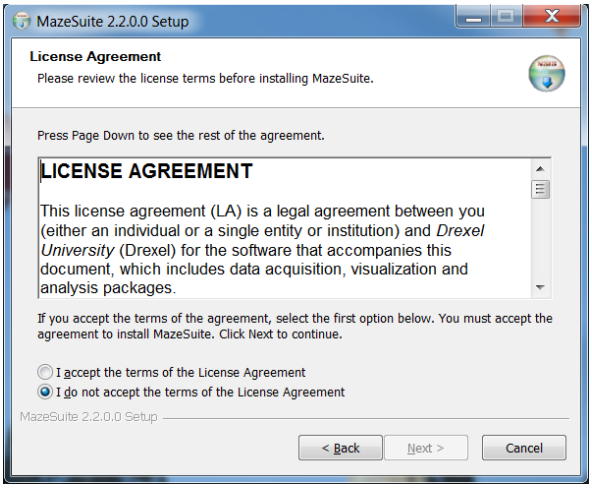
2) The setup wizard will appear as follows. Click next to continue.



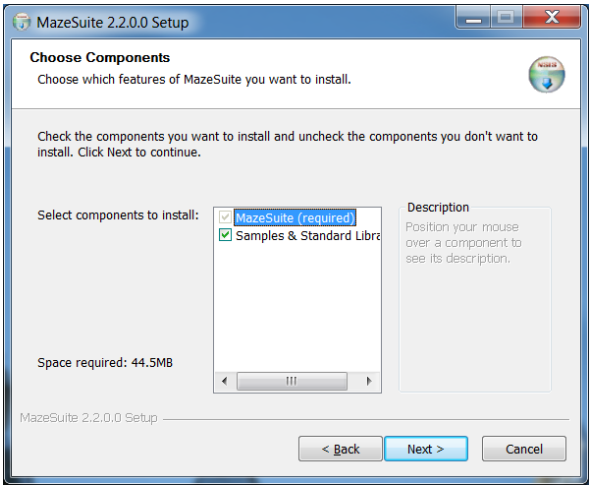
3) If you have a previous version installed, setup will ask you to confirm and perform the uninstallation of old version.



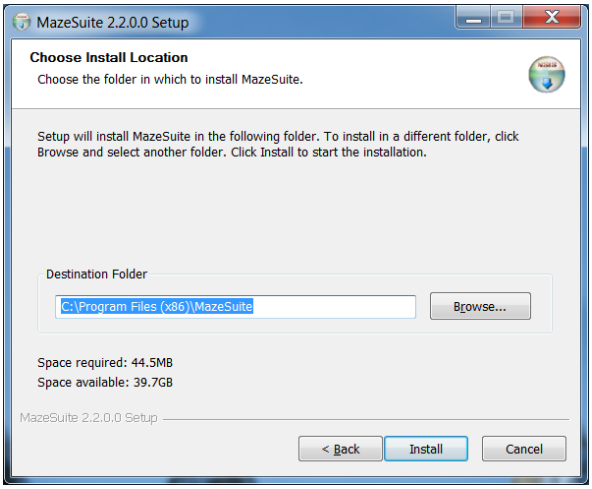
4) License agreement screen will appear; select accept and next to continue.



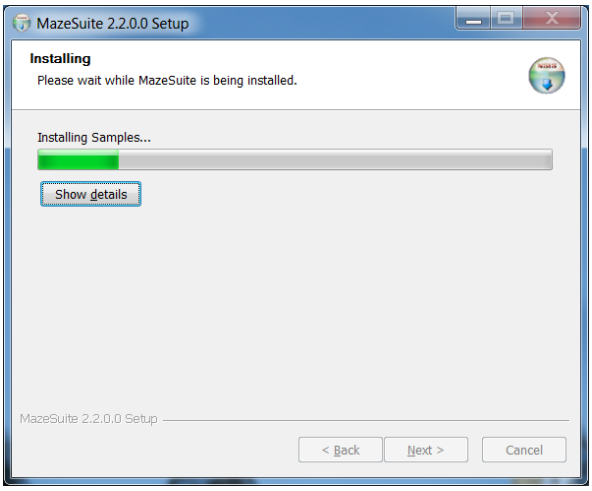
5) Installation can be customized not to include sample mazes, textures (images) and library objects.



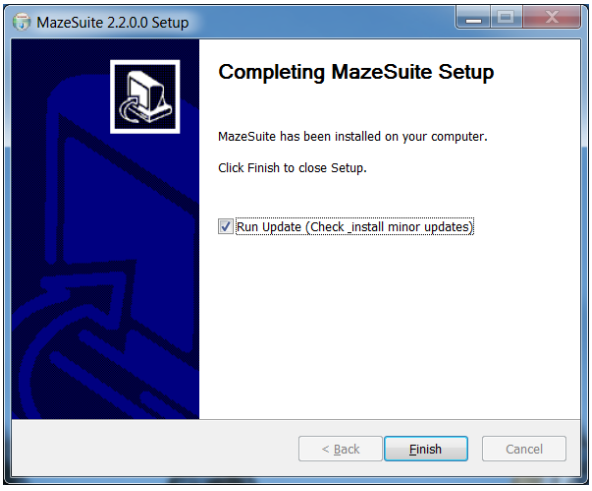
6) Installation location can be customized, it is recommended to select default values and click next.



7) Finally, confirm installation and click next to start the setup process. Installation progress will be shown as follows. Accept and select yes grant access if any admin privilege popup dialogs appear.

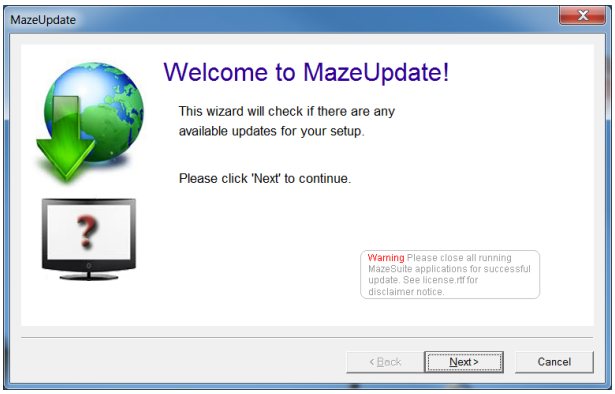


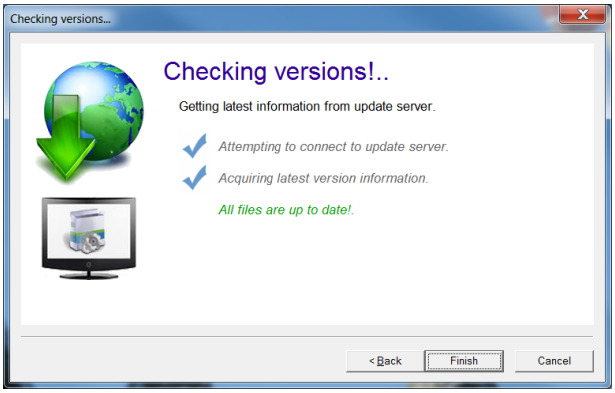
8) Below is the final screen appearing when installation is completed.



3.3.Update

To check for updates installing patches, use MazeUpdate tool. Reinstallation is required for major updates, and new setup can be downloaded from MazeSuite website. This tool can perform all other minor updates.

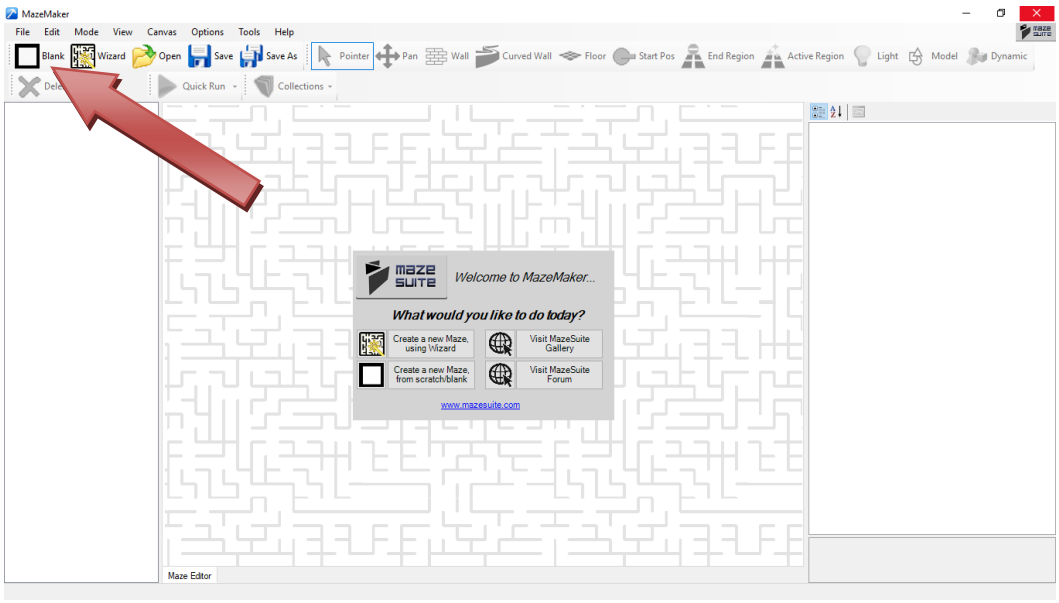




4. Creating a maze

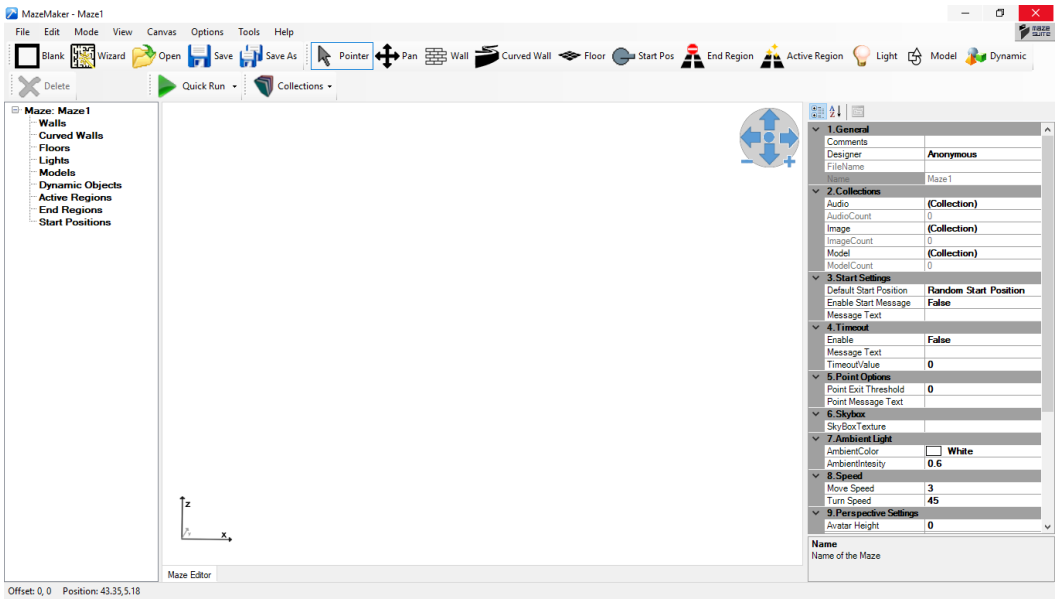
This section is a step by step guide to create a new simple maze and run it.

1) Start **MazeMaker** from Start Menu>All Programs>MazeSuite>MazeMaker. The following window will appear.



2) Click on 

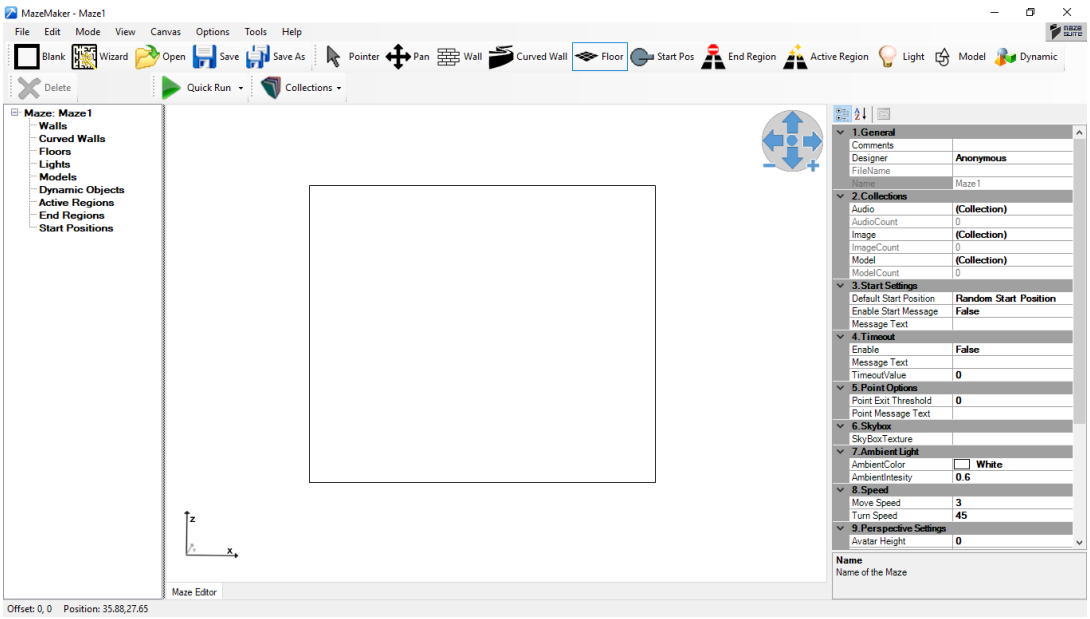
toolbar button on the top left-hand side as marked above. You will see the **drawing area** becomes white and most of the toolbar buttons are now enabled. Now you can add floor and walls as described in the next chapters.



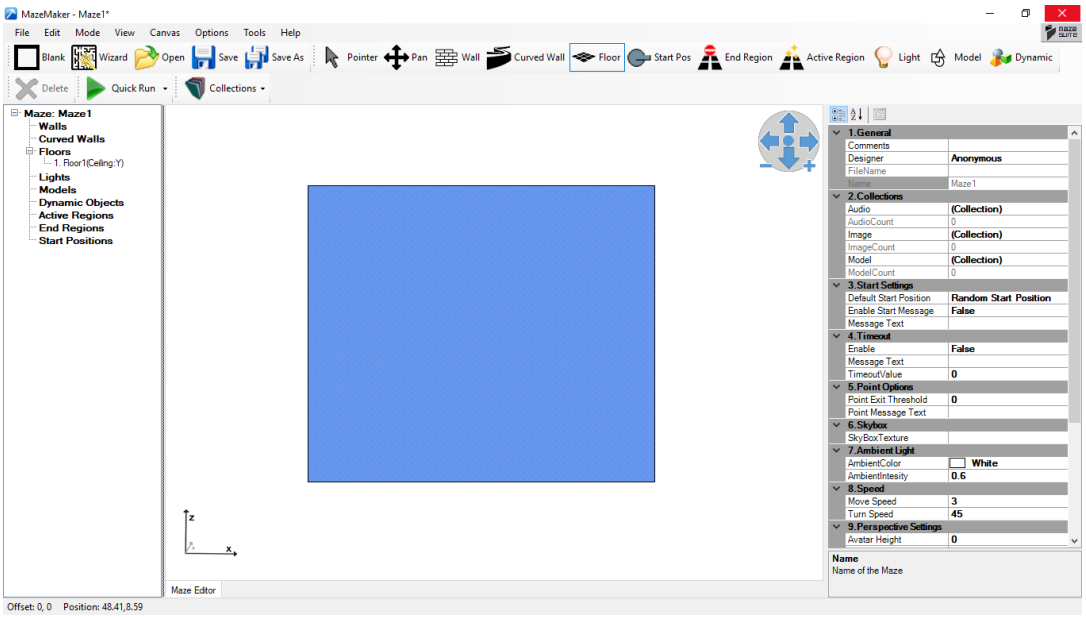
4.1.Adding Floor and Ceiling

1) To add a floor, first click on the Floor toolbar button. The button should become highlighted.

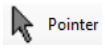
2) Next, move your cursor to the Drawing Area; the mouse icon should look like a pointing hand. Press "**Left Mouse Button**" and move the mouse cursor away. You should see a rectangle where your new floor is going to emerge.



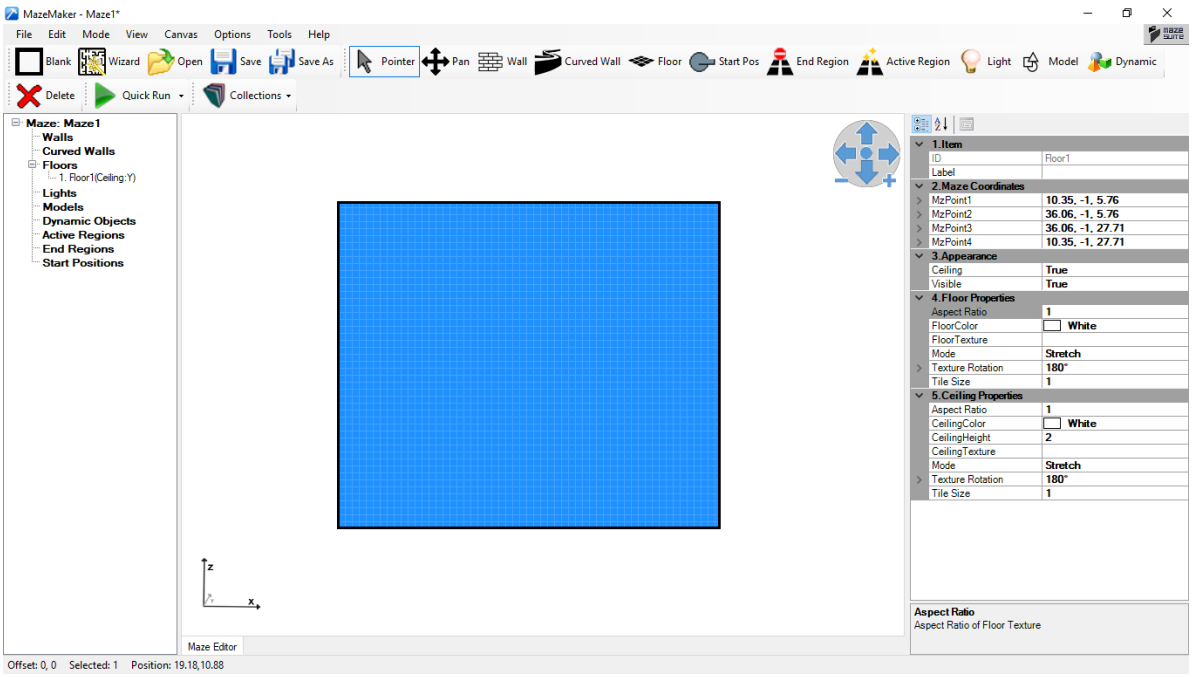
3) When you reach the desired size (rectangle), click on the "Left Mouse Button" again. The new floor (blue rectangle) is drawn as shown below.



4.2.Selecting Items (Edit/Delete)

1) To select items/objects in the drawing area, first make sure 

toolbar button is selected. Click on the toolbar button to select it, will become highlighted and “Floor” button is not highlighted anymore
2) Next, click on the object in the drawing area that you want to select. In this case, click on the blue rectangle to select the floor that you have just created. Its visual style should change and the side pane will display the properties of the selected object.



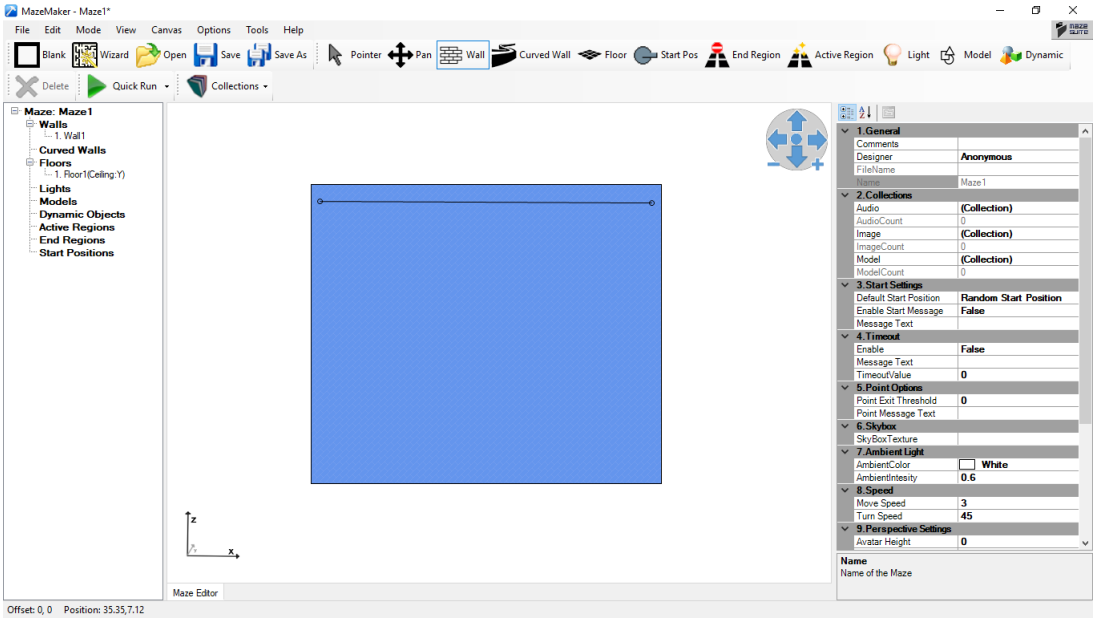
3) After selecting an object, you can edit its properties, change its color, apply texture, change its position, etc. More on these are available in next chapters.
4) When an object is selected, the 

toolbar button becomes active. It is located on the toolbar, on the lower level, left hand-side. You can use this button to delete/remove currently selected object anytime.

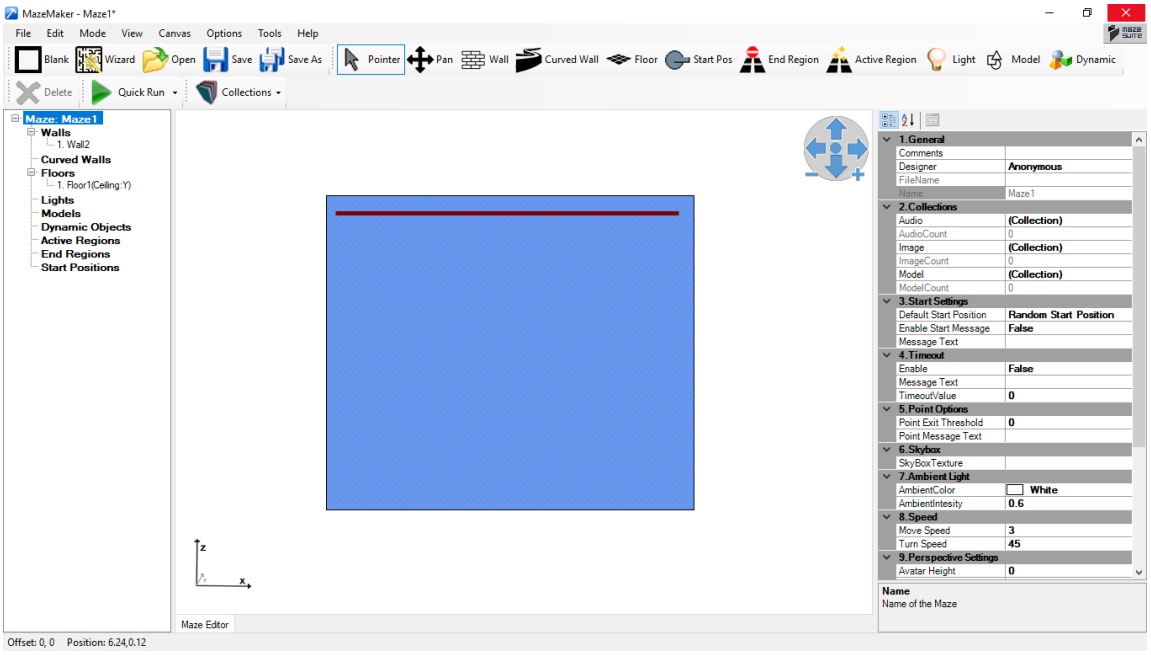
4.3.Adding Walls

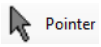
1) To add a wall, first, click on the 

toolbar button, this should highlight the button.
2) Next, move your mouse cursor within the drawing area, and click **left mouse button** to identify starting point of the wall. Move the mouse away from this first point, and a line will appear as you move the mouse (as shown below). Once you reach the desired location, click **left mouse button** again to identify the second point. A thicker, brown line will appear as shown below to depict the wall that you have just created.
3) Snap-to-grid function can be disabled by holding the "shift" key.

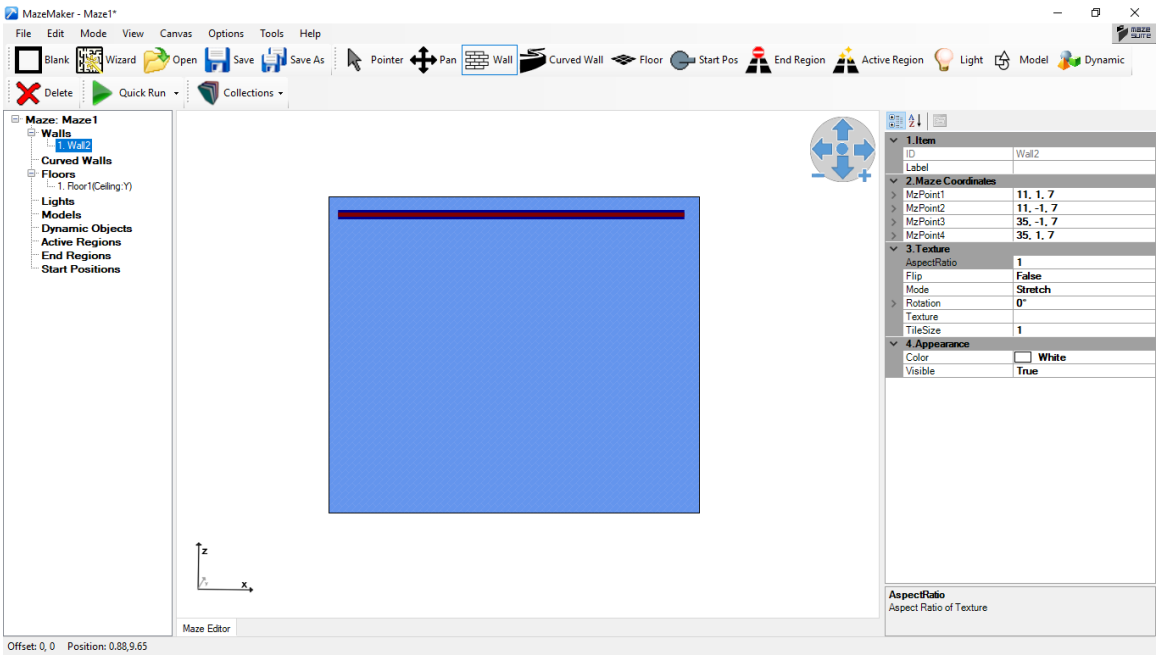


4) Once you have identified the second point and created the **wall,** as shown below, click **right mouse button** to stop creating walls. Or else, you can continue moving mouse to another point, left click to specifying points and create connected walls.



5) Walls can be selected (to view and edit is properties) similar to floor objects: First make sure 

toolbar button is highlighted (If not, just click on it.) Then, on the drawing area, click on the wall that you have just created. Its visual style will change and properties will be displayed on the side pane. See figure below.

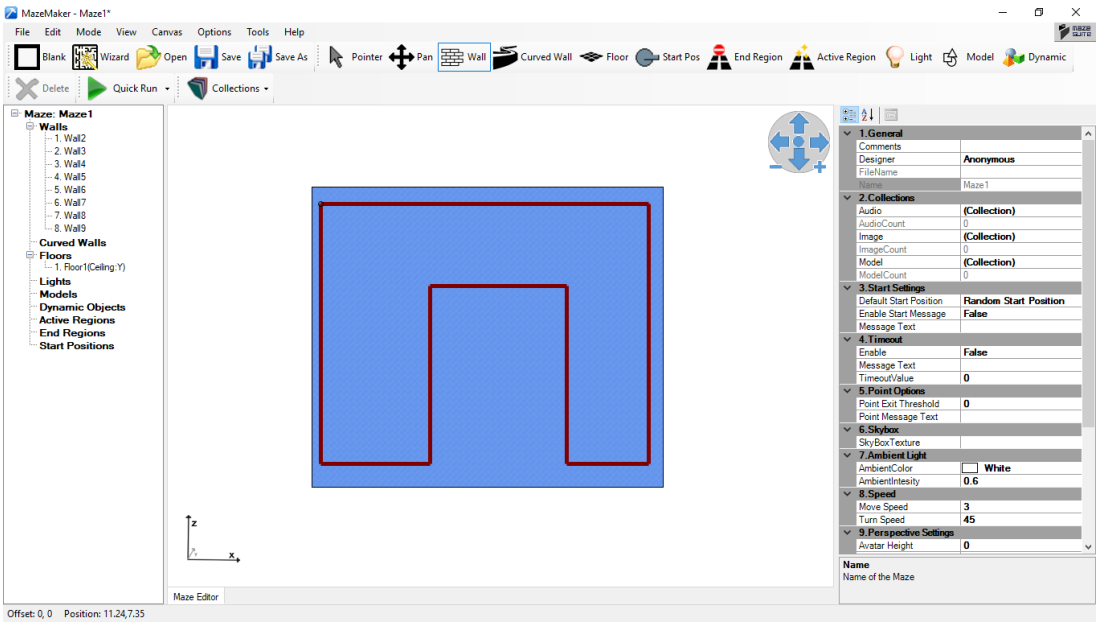


6) To create new walls, click on the 

toolbar button to switch to 

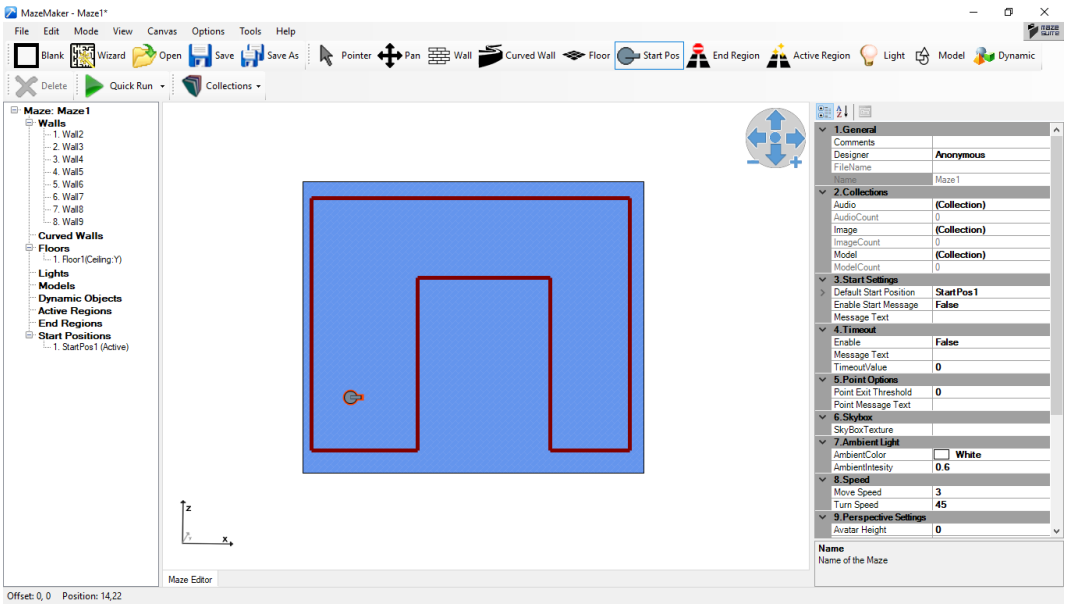
mode. Then, move your mouse cursor to the end of the wall you have created, left click and move to another

location, left click and continue to draw all the walls shown below. When you are done, right click to end creating walls.



4.4.Adding Starting Position

1) Start point is the entry location for the maze. Each maze need to have a starting point where you will start navigating. To define a start location, first, click on Start Pos toolbar button, it should become highlighted.
2) Next, move your cursor within walls and over the floor and left click to define starting position. A round circle with pointer should appear at this location. The pointer line depicts the initial view angle.



4.5.Quick Run

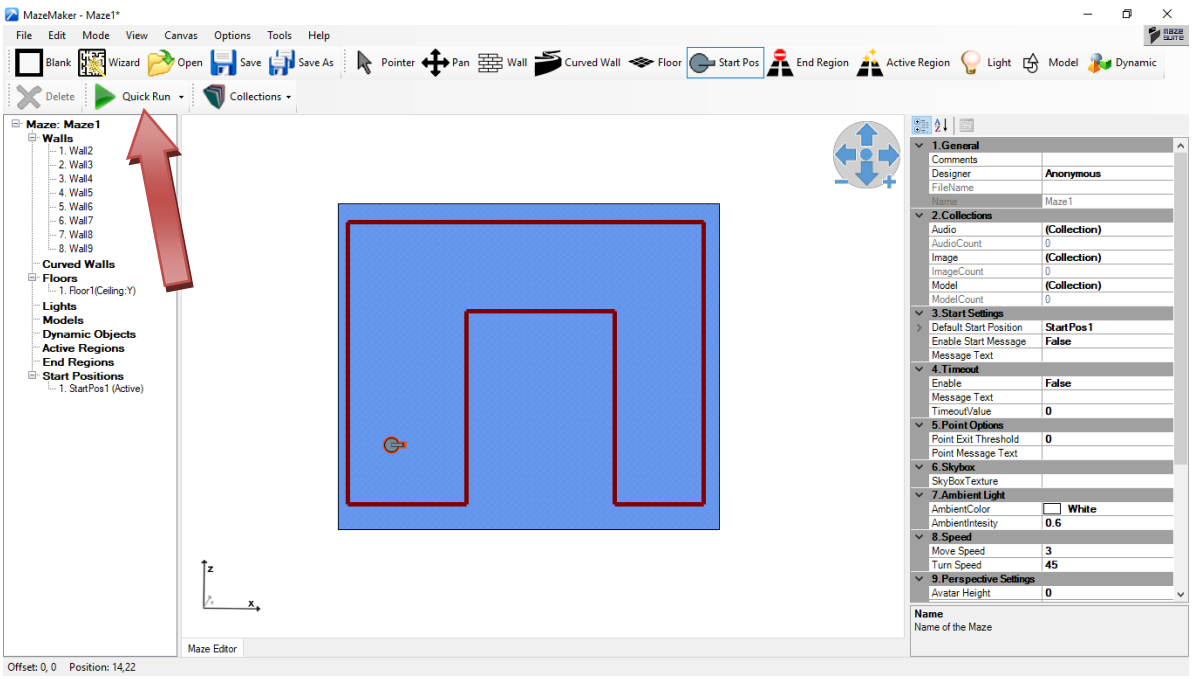
1) Now that you the essential elements in your maze, you can have a quick look at your creation.

   To do that, first, save your maze. To save your maze, click on the 

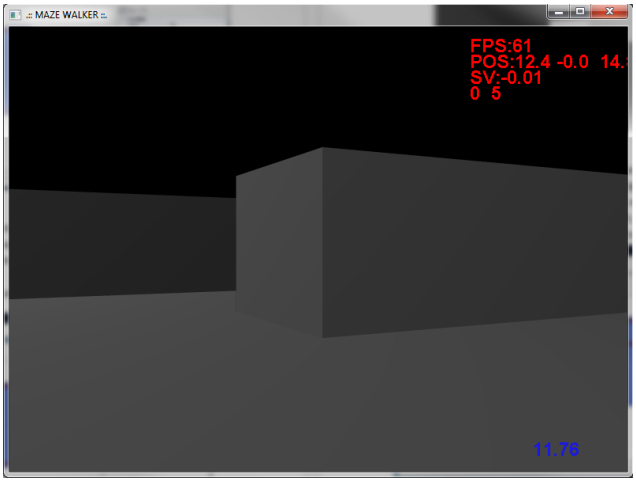
toolbar button, a popup dialog will be displayed. Choose any desired folder and file name (the default name is "Maze1.maz") and save the file.

2) Next, hit the 

toolbar button as indicated below



3) A popup window will appear as shown below. To close this window, hit "**Escape**" button on the top left hand side of the keyboard and hit "**Yes**" on the popup dialog box.

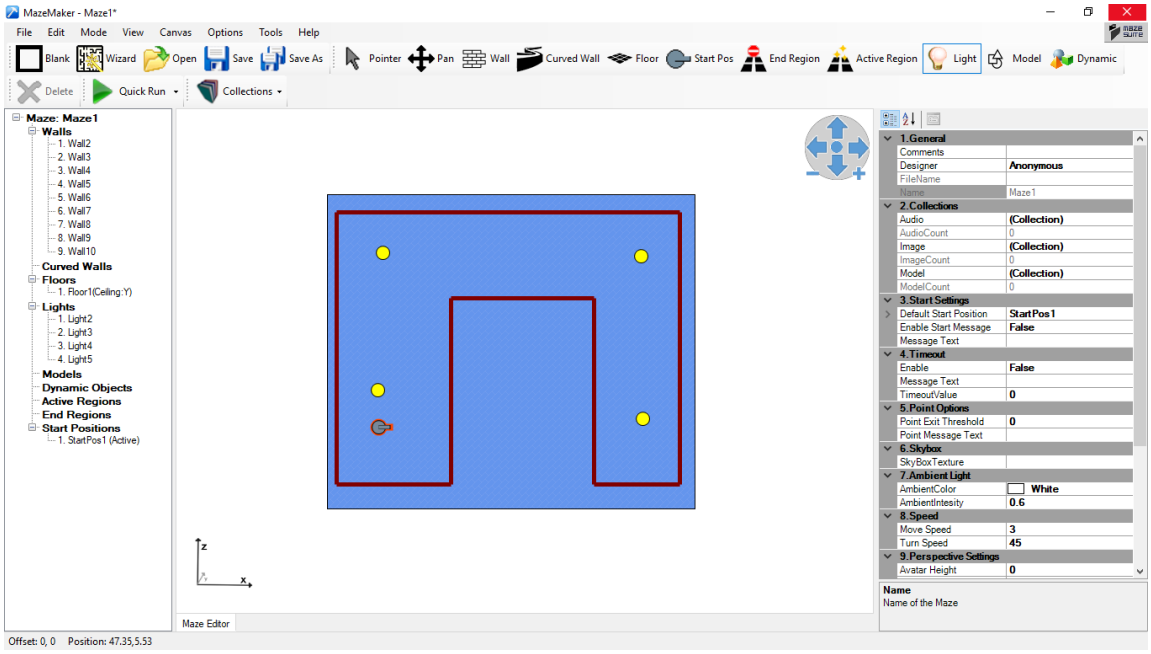


Tip: To close this window, hit "ESC" button on the keyboard and select "YES" on the popup confirmation dialog box.

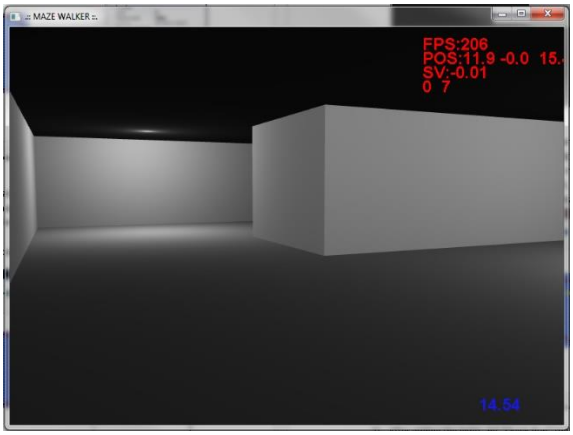
Tip: Move your mouse to look around within this window, and A,W,S,D keys to move left, forward, backward and right.

4.6.Adding Lights

1) To improve the looks of your maze, you can add lights with different properties. To do that, first, make sure, Light toolbar button is highlighted. You can highlight it by clicking on it.
2) Now that you are in "light" adding mode, move your cursor to the drawing area, and click on somewhere that you like to place the light, and click "left" mouse button. You will see a yellow circle immediately appear. Place two lights similar to shown below.

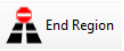


3) After adding the lights, hit Quick Run toolbar button see the maze as shown below. You can use the dropdown menu to edit the quickrun-specific graphics setting



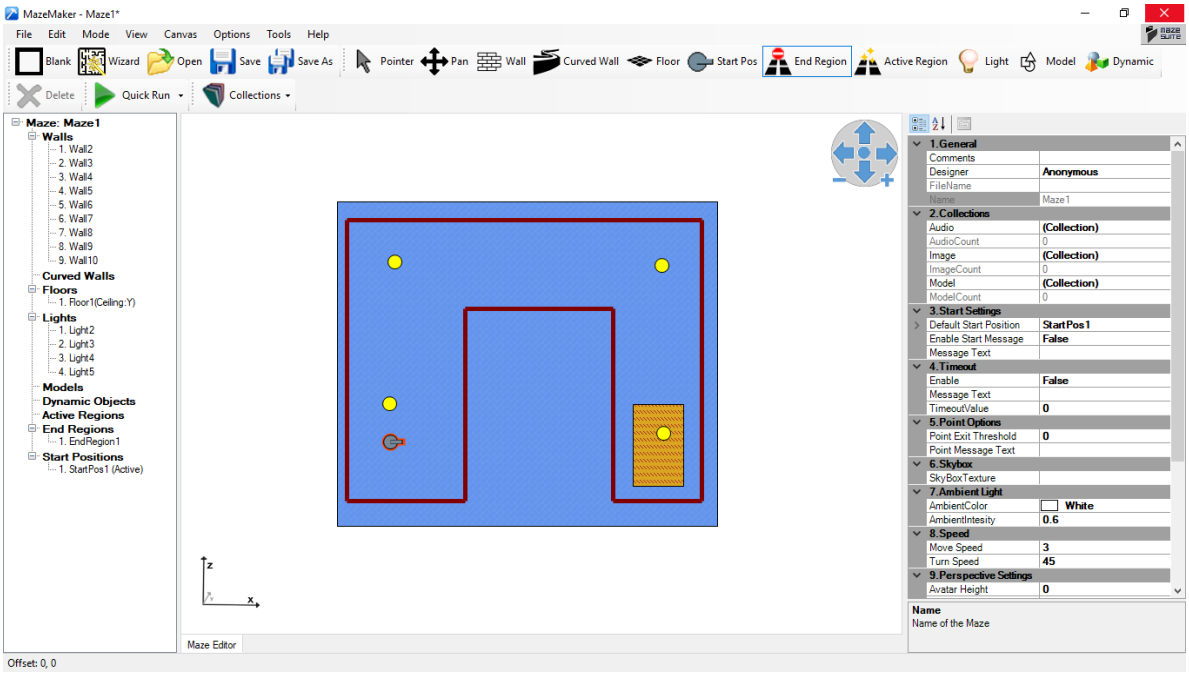
4.7. Adding End Region

1) In a maze, you can define a region to quit/end the maze. This is a rectangular region and if user navigates into it, maze will quit. Multiple end regions can be created within a single maze. A message can also be set to be displayed to the user.

2) To create an end region, first, click on the 

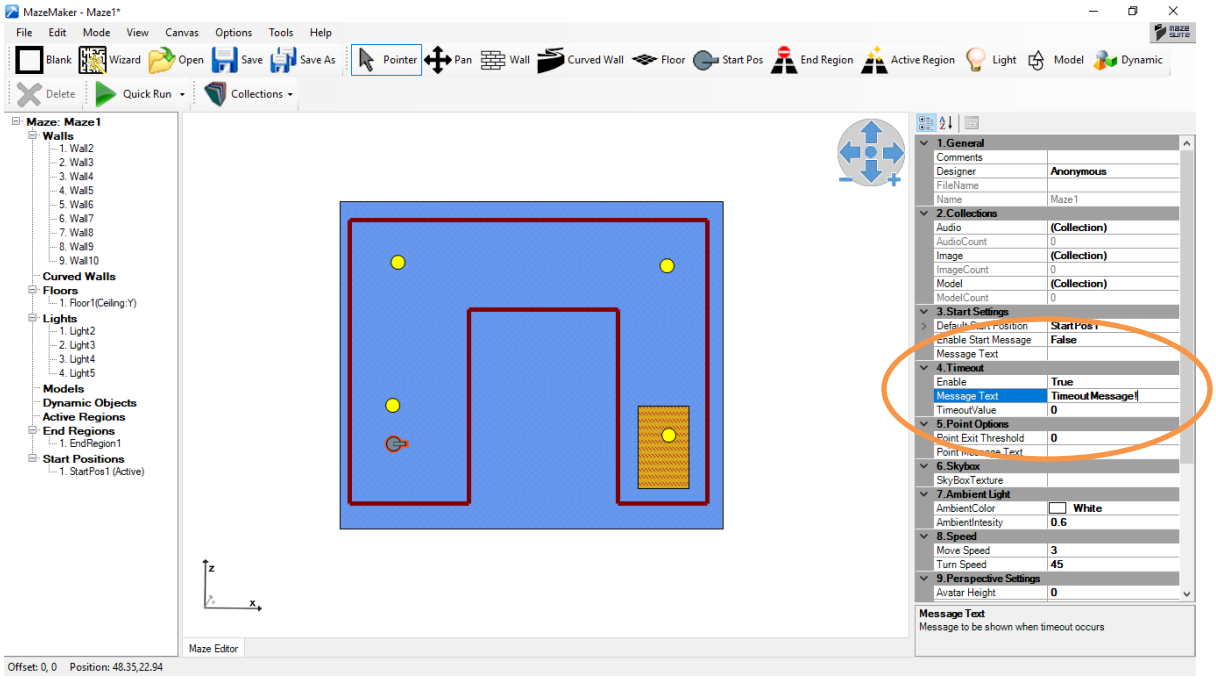
toolbar button to highlight it.

3) Adding an end region is similar to adding a floor. Move your mouse to the drawing area, and left click to select the first point and left click again to identify the second point that will create a rectangle. The new end region will be displayed immediately as shown below.



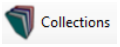
4.8.Adding Timeout

1) Other than and point, a maze can be set to quit automatically after a certain amount of time. To do that, click anywhere on the drawing area, other than an object. You will see the general maze properties on the side pane as shown below.

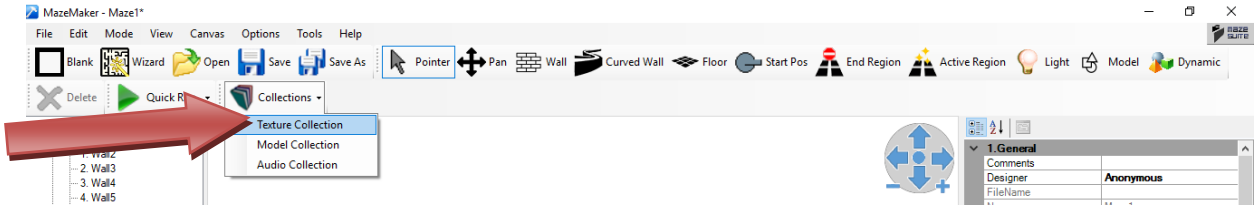


2) In Timeout->Enable, select true then edit the timeout value, you should see ‘0’ as current value. This means no timeout. Enter any non-zero number to denote the allowed time within your maze in seconds. Then, hit “Save” toolbar button to save your changes.
3) A message can be set to be shown to the user in case a timeout happens. Enter your message to Timeout>MessageText field.

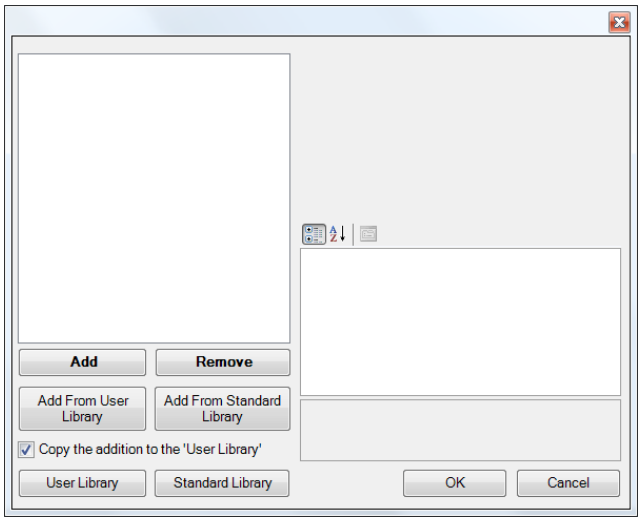
4.9.Adding Textures and Skybox

1) Textures are simply images applied to objects within the maze. Floors, Walls and Ceilings can be covered with images / textures.
2) To apply texture, first, you need to add the image file to your maze.
3) From the 

toolbar button, select "**Texture Collection**" dropdown toolbar menu item, as shown below.



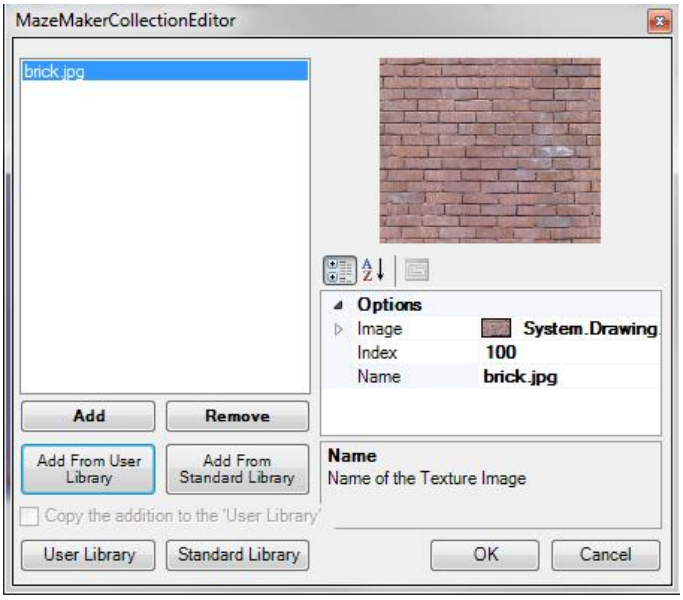
4) Next, you will see the following pop-up dialog box. Click on "**Add**" button to select an image file from any folder.



Note: Standard Library contains a set of image files that comes with Maze Suite. It is "Library" folder in the installation directory.

Tip: Image file has to be either in the same folder as your maze file, or in the user library folder or standard library folder. The check-box enables copying selected image to "user library" folder

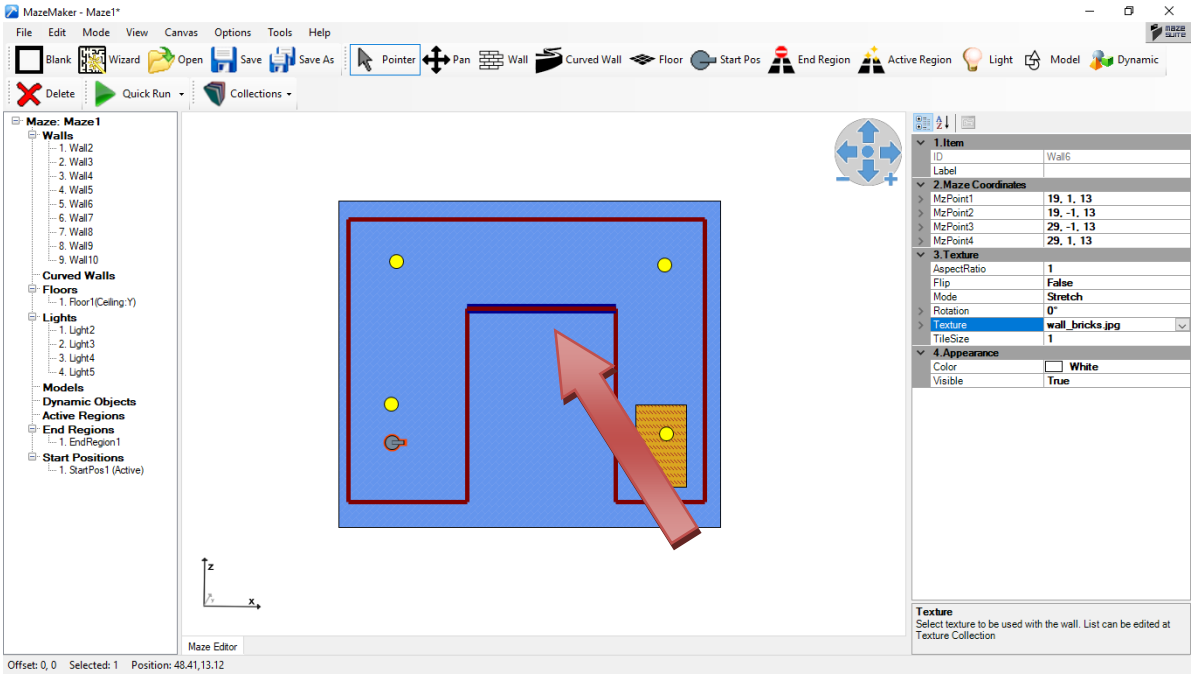
5) Once you select an image file (jpg, png, bmp, tga), it will be listed on the left and a preview will be shown on the top right-hand side, as shown below.



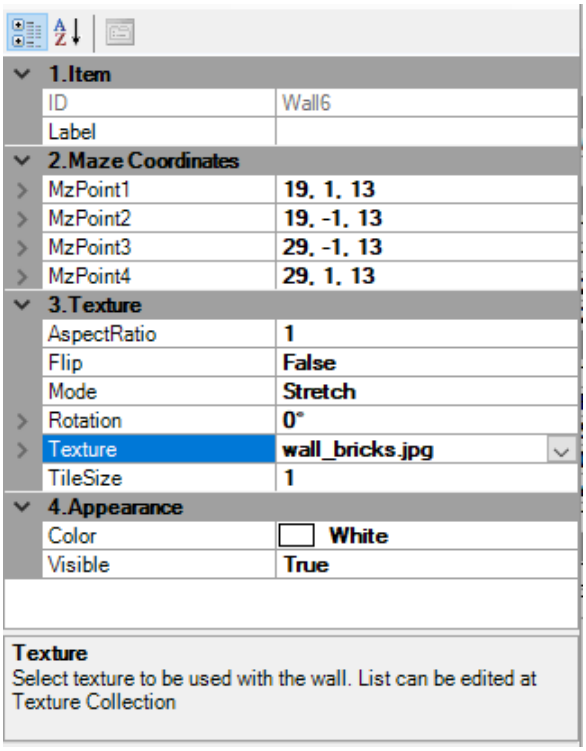
6) Next, click “OK” to accept changes and return back to main window. Now, we can apply this image to any wall, floor or ceiling.

7) First, make sure Pointer toolbar button is highlighted. If not, just click on it to highlight.

8) On the drawing area, click on the wall next to start position to select it. Side pane will display its properties.



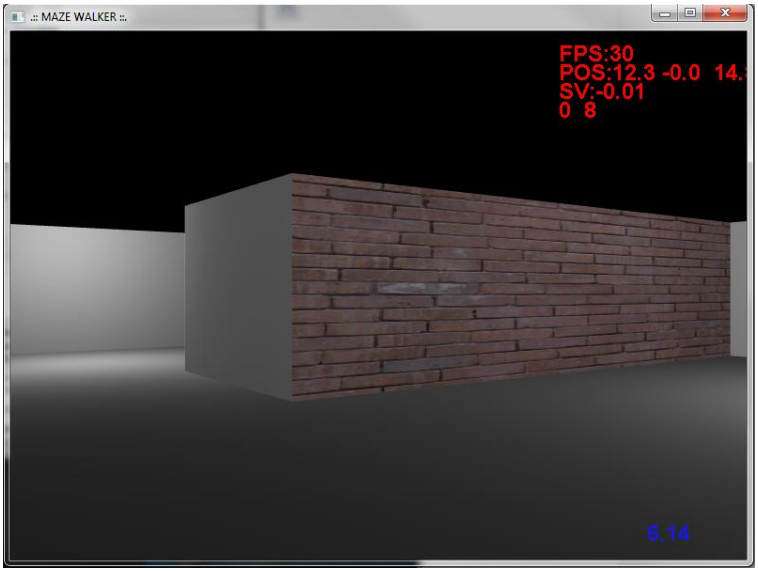
9) Next, on the side pane, click on Texture item, a dropdown list will appear as shown below that lists names of available images. Select the image that you have just added. The name should appear next to “Texture” item.



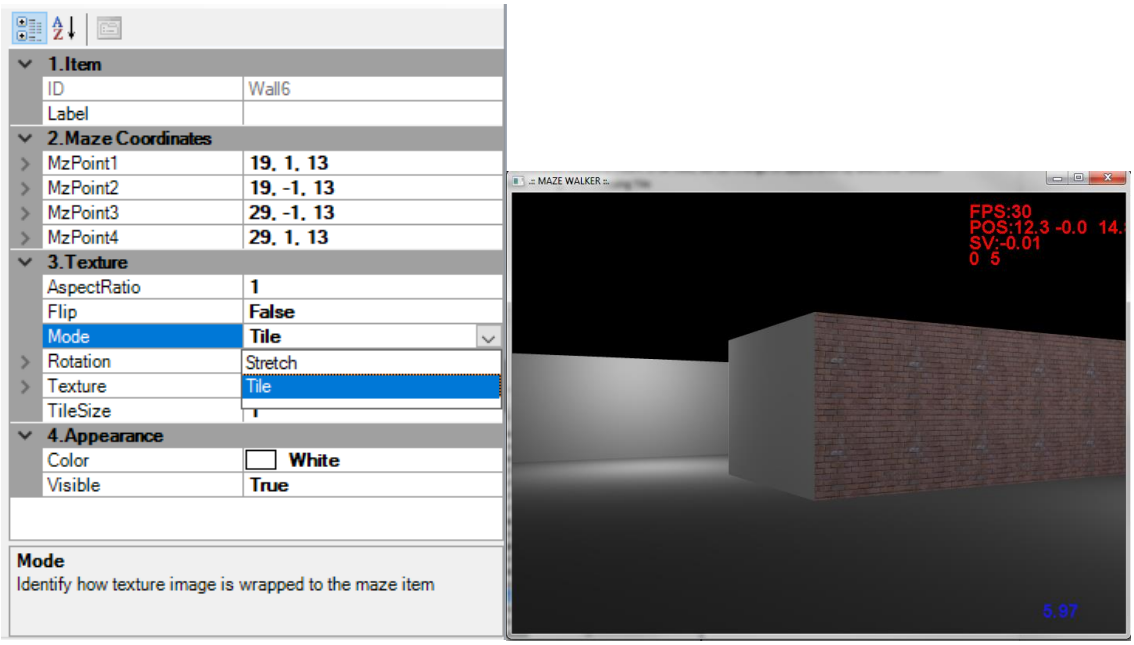
10) To save your changes to the maze file, click on “Save” toolbar button.

11) To see the changes, click 

button, the following pop-up window will appear that shows your image on one of the walls.

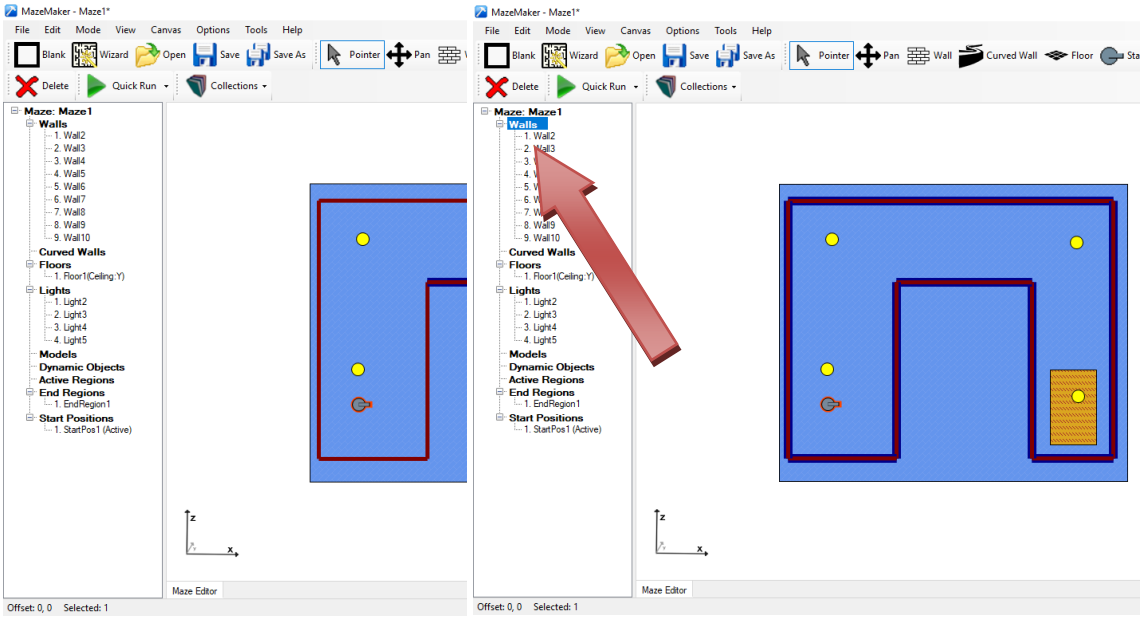


12) Since this brick texture is meant to be tiled, we can change its appearance by select the Texture->Mode settings and choosing ‘Tile’ creating a finer texture surface

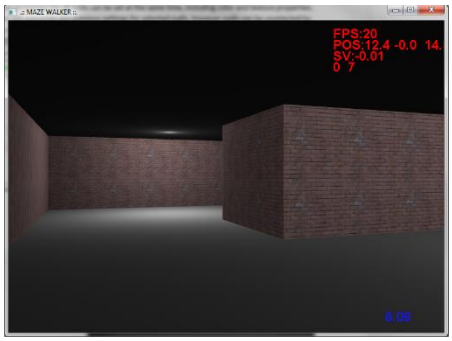


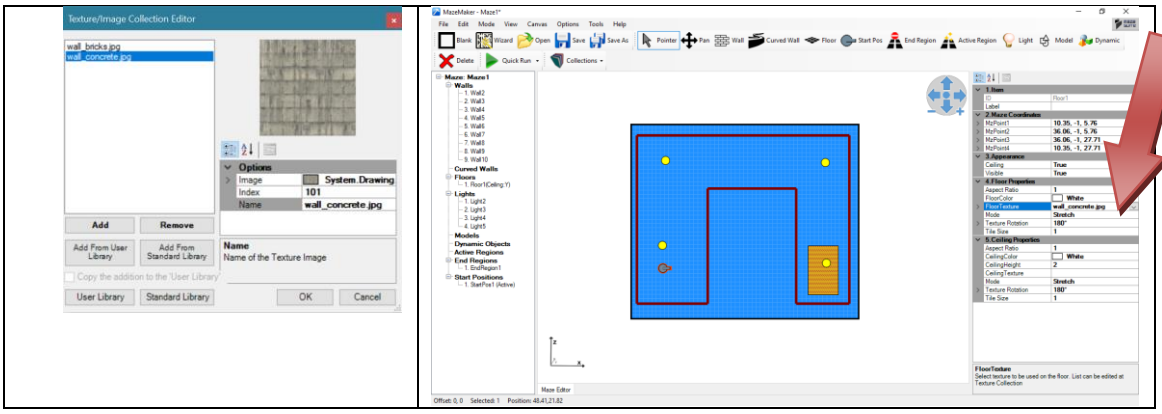
Note: Various visual effects can be achieved by changing the texture properties of the selected wall; such as tile versus stretch, tile size and aspect ratio of the image.

13) If you want to create a uniform level, you can apply one texture to ALL walls simultaneously by going to the Item List and selecting 'Walls'

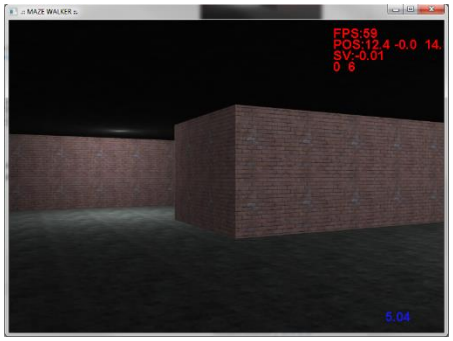


14) Then properties for all walls can be set at the same time, including color and texture properties. This will overwrite any previous settings for selected walls, however walls can be unselected by using ctrl+click or either the Item List or the Pointer tool.

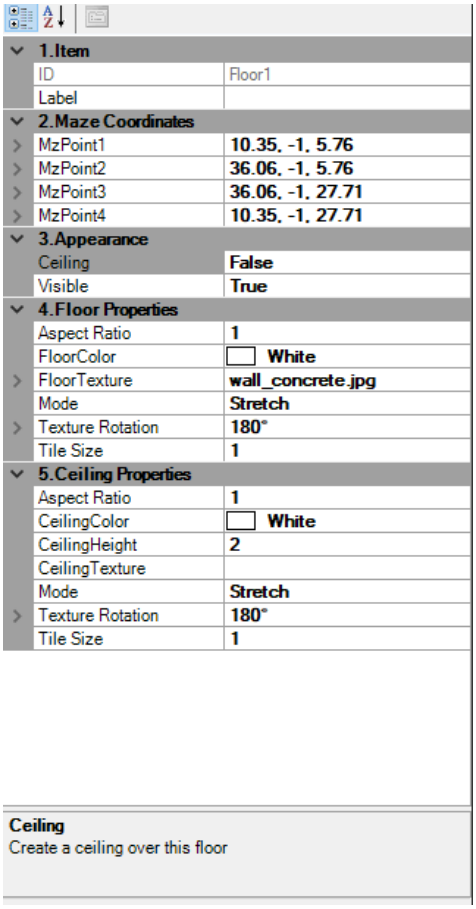




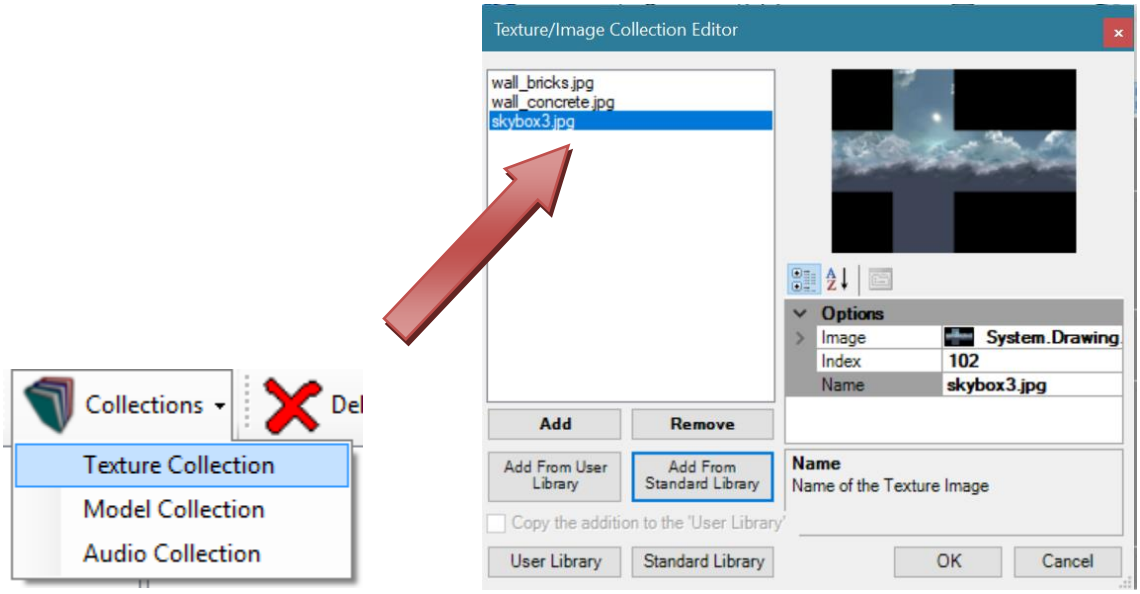
15) Textures can be applied in a similar way to floors and ceilings by first adding the texture as previously described and then setting the properties under the TextureFloor and TextureCeiling respectively



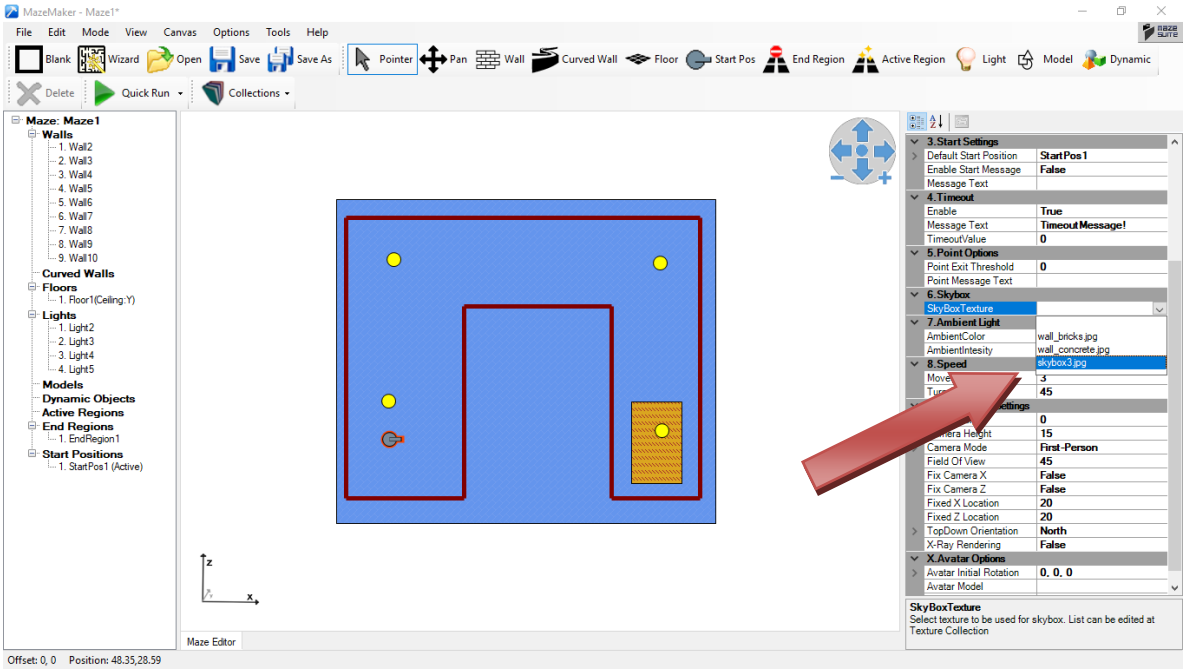
16) To create an outdoor effect, the ceiling of a matching floor can be disabled by selecting in the floor and then selecting the Options->Ceiling and setting it to false.



17) Next add a skybox texture by first adding the texture through Collections->Texture Collection.



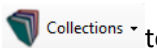
18) Finally enable the skybox by using the pointer and clicking in an empty area. Then in the global Maze Settings enable the skybox under Skybox->Texture



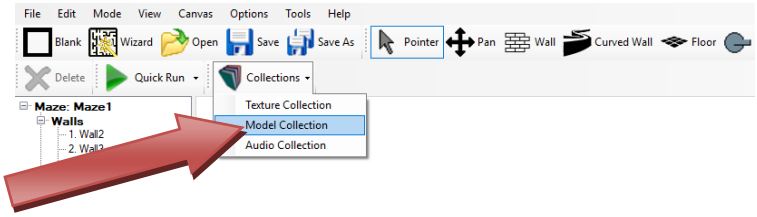
19) Finally use 

to save and view your maze!

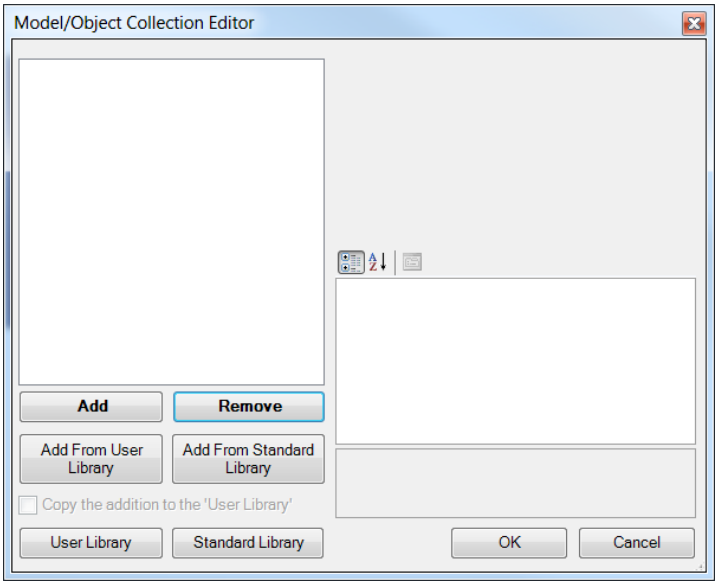
4.10. Adding Models

1) Models are 3D custom objects that can be placed within the maze. To place a model, first, the model has to be added to the maze file's collection of objects. Then, either a static or dynamic object can be placed anywhere within the maze.
2) MazeSuite comes with a set of models, located in the "library" folder in the installation directory, called standard library.
3) From the 

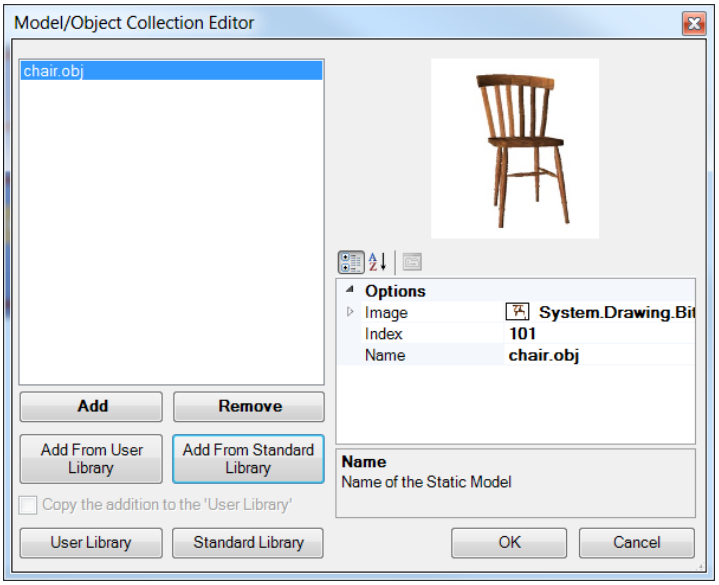
toolbar button, select "**Model Collection**" dropdown toolbar menu item, as shown below.



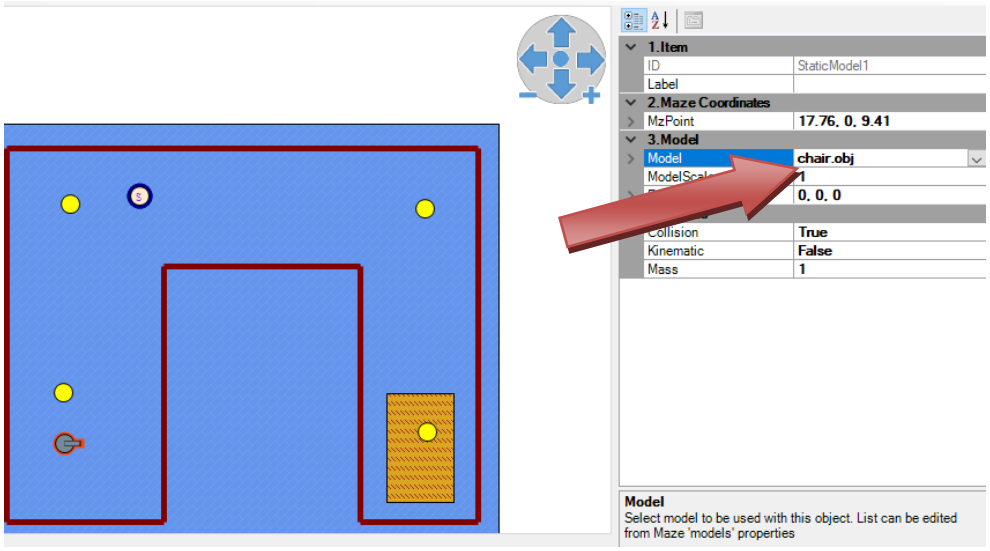
4) Next, you will see the following pop-up dialog box. Click on "Add" button to select a model file. Standard library folder contains "Objs" folder that contains a set of models that you can use. Navigate to this folder in file selection dialog. Note: To see the standard library folder location, hit "Standard Library" button, it will open the folder in explorer.



5) From the standard library folder, select chair.obj file. It will appear in the left list and also a preview of the model will be shown at top right hand side as shown below.

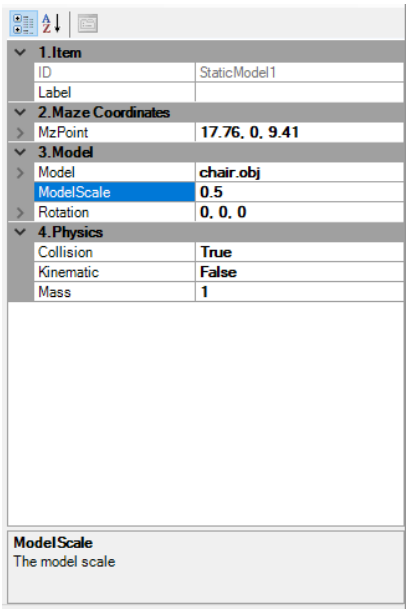


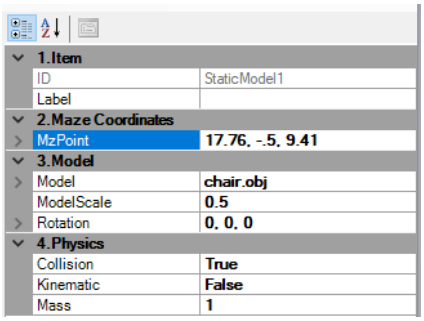
6) Click “OK” button to save the changes and return to main window.
7) Now that we have introduced a model to the maze, we can insert it anywhere. To do that, first click on Model toolbar button, it will be highlighted.
8) Move your mouse cursor to the drawing area and left mouse click to anywhere on the floor. A pink spot should appear to identify the position we want to insert our model.
9) Click on Pointer toolbar button to be able to select items.
10) Click on the pink spot (static object) that we have just inserted. Its properties will be displayed on the side pane as shown below.
11) On the side pane, click on “Model” property item, a drop-down list of available models should be displayed. Select chair.obj. After the selection is complete, the static object display will also change to include “S” to identify a model is selected.



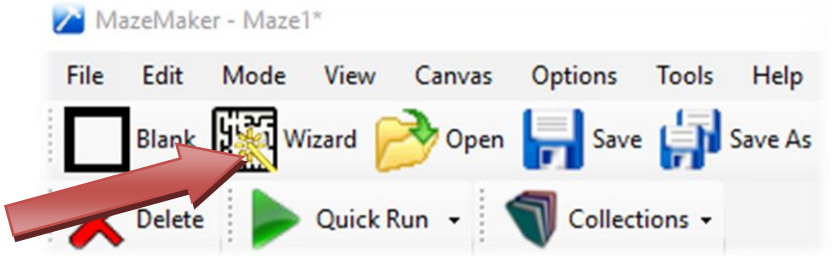
12) Finally, hit “Quick Run” toolbar button to save and see the changes.

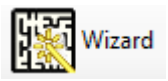
13) Nothing that this chair is very large, we can adjust its size other properties to our liking. Model size can be changed with “ModelScale” property, by default, it is 1.
14) Model rotation on x,y,z axis can be defined as well as the position. In this case, the y-coordinate is lowered to move the shrunken chair closer to the ground.





4.11. Using the MazeWizard

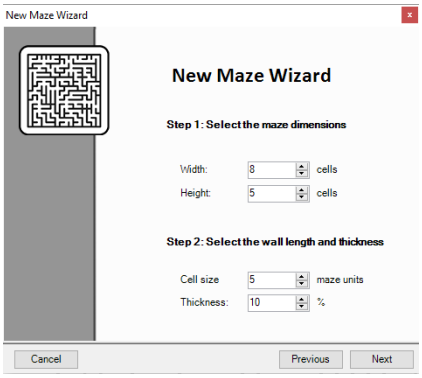


1) Simple mazes can be automatically be generated using the MazeWizard Tool. To access this, click on the 

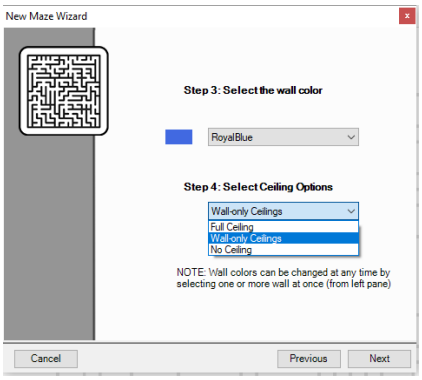
icon.

2) Then choose the style of Maze you wish to create; Either Circular or Rectangular

3) For rectangular mazes, specify the dimensions of the Maze in terms of width and height, as well as the length of each "cell" of the maze in maze units. Thickness determines how thick the walls are relative to the cell size.

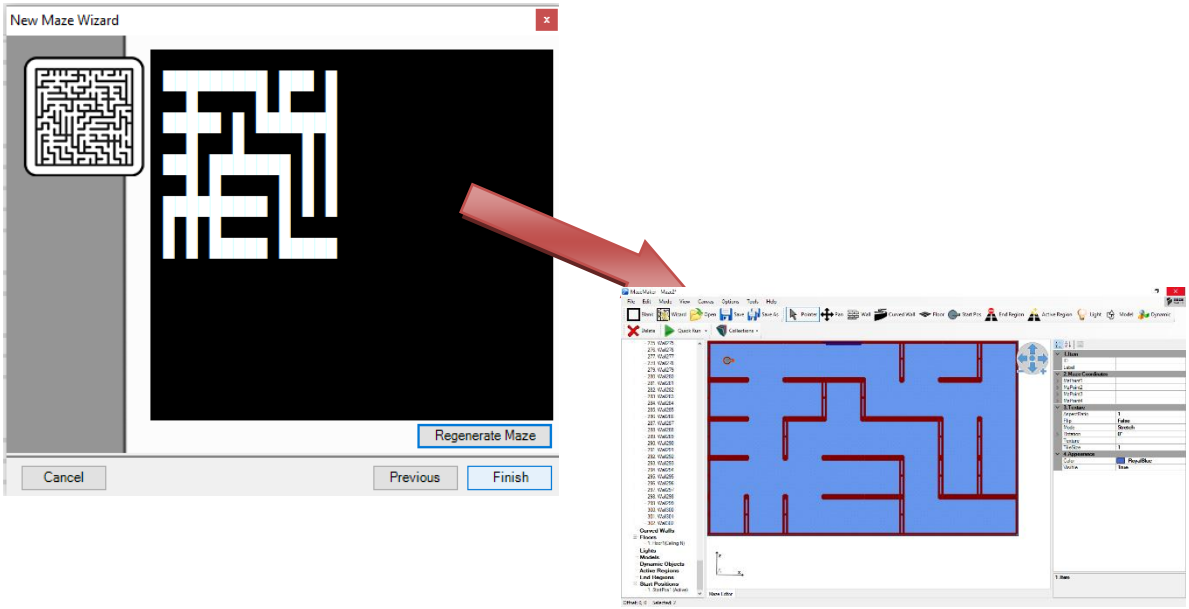


4) Next select a wall color and weather to include a ceiling

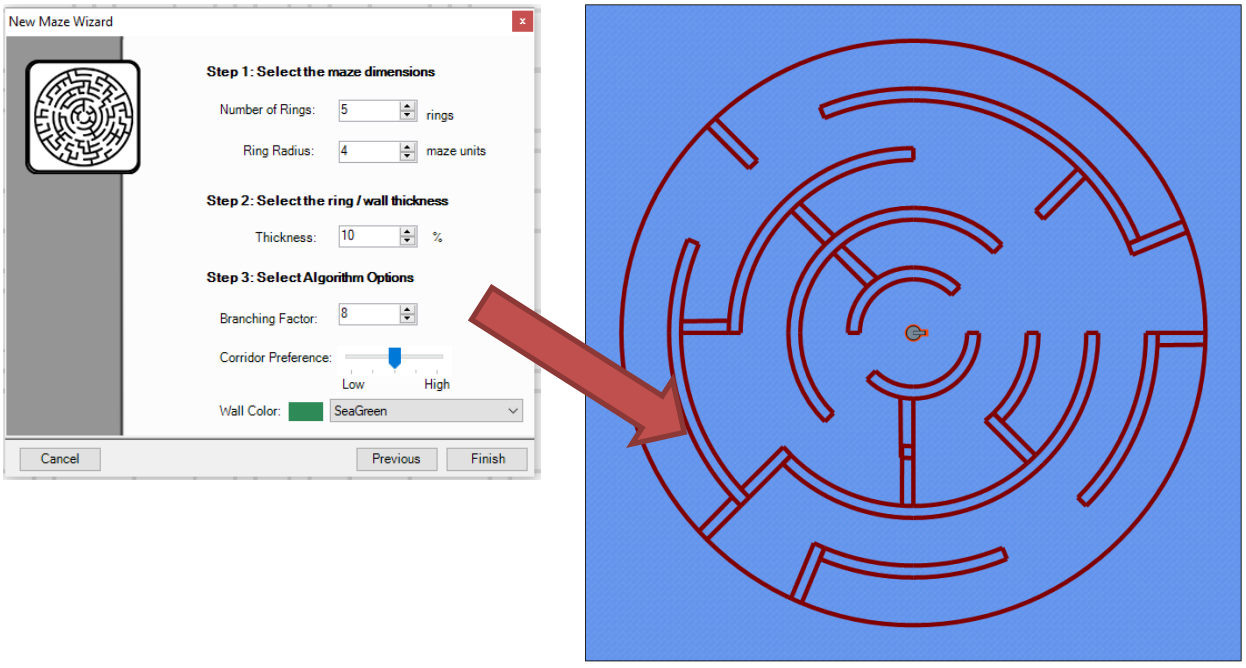


5) Then view and select a generated Maze and press finish.

6) You have just created a basic rectangular maze!



7) Alternatively, to make a circular maze, Select Circular Maze from the Wizard
8) Then, select the number of ring for your maze and the width of each ring. Choose a thickness for the walls and increase the branching factor to make your maze more complex.
9) Finally choose a corridor preference to determine how long each ring is before an exit and select a color for the maze walls.
10) Then hit Finish to build your first circular maze!



5. Maze Item Properties

5.1. Maze Point System

Maze points are new global mechanic for enhancing interactivity and keeping track of user based events. The point system allows specific maze items to add or remove points (score) from a global memory and then be used as conditional activation of *End Region*, *Active Regions* and *Dynamic Objects*. Maze point system can also be used to end the maze when a certain value is reached with an optional ending text.

End Regions have a point threshold which when set requires the user to have enough points before they allow the user to exit the maze or teleport to a new location.

Active Regions and *Dynamic Objects* have a point threshold for both the highlight (phase 1) and activation (phase 2) stages. These can be used to separately control the users' ability to highlight and activate the objects based on the number of points that they have. Additionally, both *Active Regions* and *Dynamic Objects* have a "points granted" field which can add or remove maze points when activated. By default, these are set to 1.

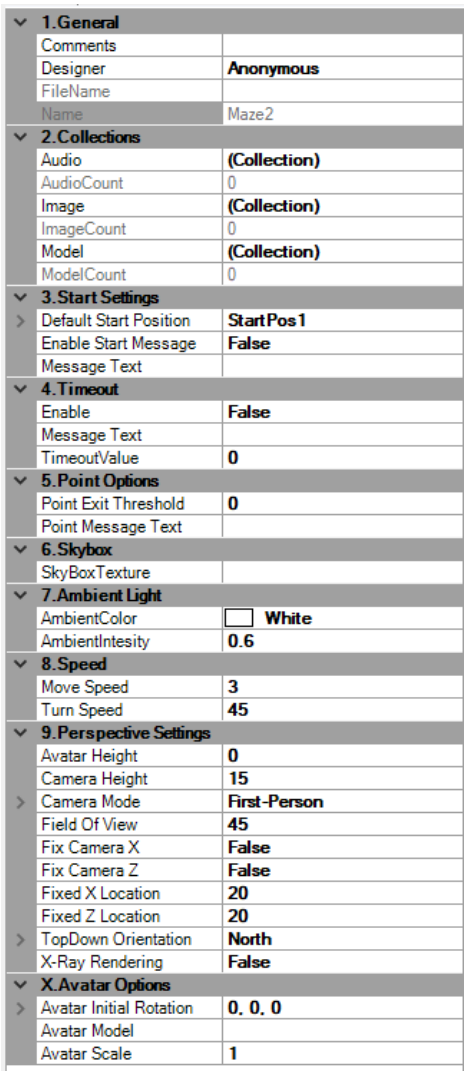
When the score bar is enabled and set to display maze points, current global memory (current maze points), the maximum bar size will be set to the global exit threshold (which can be adjusted under global maze parameters).

Some example usage scenarios include:

- Collection (e.g. shopping, gathering tokens) of a certain number of items through use of dynamic objects which disappear when activated.
- Conditional exit scenarios that require user to visit or engage with several maze features/locations before allowing the maze to be completed.
    - Enables having multiple tasks to be performed in mixed order, as success criteria
    - Enforce a specific order for multiple tasks as success criteria
- Setting up object/region interaction such that a specific sequence of actions is necessary to proceed. For example, consider the following scenario: room1 must be entered before room2 because entering room1 grants enough points to meet the threshold of room2.

Further examples and tutorials are available at mazesuite.com

5.2.Global Properties

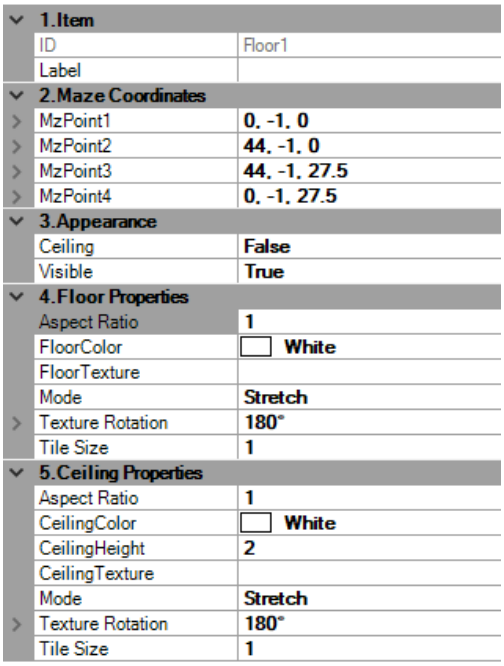


1.General	
Comments	
Designer	Anonymous
FileName	
Name	Maze2
2.Collections	
Audio	(Collection)
AudioCount	0
Image	(Collection)
ImageCount	0
Model	(Collection)
ModelCount	0
3.Start Settings	
Default Start Position	StartPos1
Enable Start Message	False
Message Text	
4.Timeout	
Enable	False
Message Text	
TimeoutValue	0
5.Point Options	
Point Exit Threshold	0
Point Message Text	
6.Skybox	
SkyBoxTexture	
7.Ambient Light	
AmbientColor	White
AmbientIntesity	0.6
8.Speed	
Move Speed	3
Turn Speed	45
9.Perspective Settings	
Avatar Height	0
Camera Height	15
Camera Mode	First-Person
Field Of View	45
Fix Camera X	False
Fix Camera Z	False
Fixed X Location	20
Fixed Z Location	20
TopDown Orientation	North
X-Ray Rendering	False
X.Avatar Options	
Avatar Initial Rotation	0, 0, 0
Avatar Model	
Avatar Scale	1

1. General	
Comments	Optional description for Maze
Designer	The author of the maze
Filename	Current filename of maze
Name	Name of maze
2. Collections	
Audio	Set of sounds accessible in maze
AudioCount	Number of items in Audio Collection
Image	Set of images accessible in maze
ImageCount	Number of images in Image Collection
Model	Set of Models accessible in maze
ModelCount	Number of models in Model Collection
3. Start Settings	
Default Start Position	“Active” Start Position where user begins
Enable Start Message	Enable Start Message in Maze
Message Text	Message to Display at start of Maze
4. Timeout	
Enable	Enable to Automatically end Maze
Message Text	Optional Message to Display at Timeout
Timeout Value	Time in seconds to automatically stop maze
5. Point Options	
Point Exit Threshold	Number of Maze Points to exit the maze
Point Message Text	Text displayed when the Points are reached
6. Skybox	
Skybox Texture	Image used to wrap the skybox
7. Ambient Color	
Ambient Color	Sets the RGB color of the Wall
Ambient Intensity	Sets brightness of the ambient light
8. Speed	
Move Speed	Movement Speed in mz units/s
Turn Speed	Turning speed in deg/s
9. Perspective Settings	
Avatar Height	Height of the first-person camera
Camera Height	Height of the non-first person camera
Camera Mode	Change camera to First, third, or 3/4s here
Field Of View	FOV angle in degrees
Fix Camera X	Fixes camera X in third person
Fix Camera Z	Fixes camera Y in third person

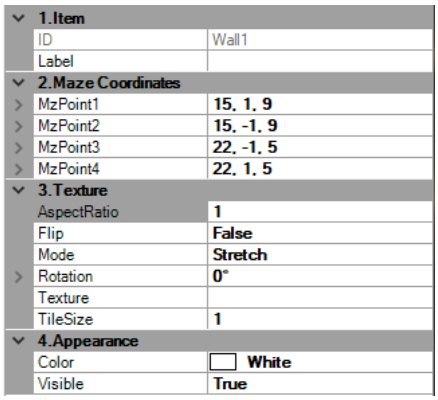
Fixed X Location	Mz position of fixed camera (X)
Fixed Y Location	Mz position of fixed camera (Z)
TopDown Orientation	Cardinal direction of Top-down camera
X-Ray Rendering	Simple line drawing of Walls for 2D look
10. Avatar Options	
Avatar Initial Rotation	X,Y,Z rotation of avatar model
Avatar Model	Obj file used as MazeWalker avatar
Avatar Scale	Size of model

5.3. Floors



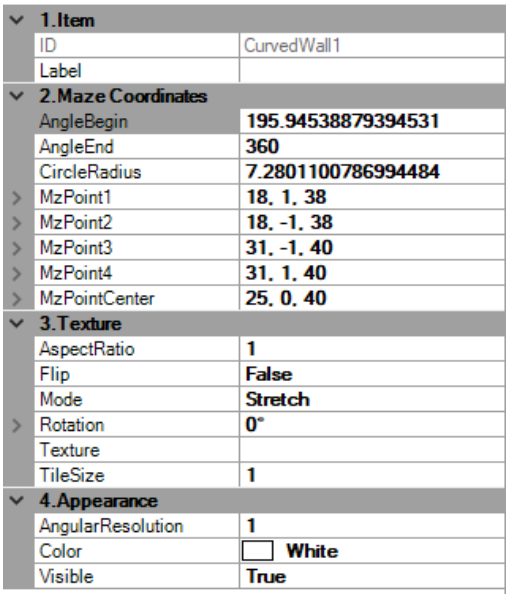
1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. Maze Coordinates	
MzPoint1	Set the XYZ position of the floor point 1
MzPoint2	Set the XYZ position of the floor point 2
MzPoint3	Set the XYZ position of the floor point 3
MzPoint4	Set the XYZ position of the floor point 4
3. Appearance	
Ceiling	Enable a ceiling parallel to the floor item
Visible	Set to false to make the floor and ceiling invisible
4. Floor Properties	
AspectRatio	Sets the aspect ratio of the floor texture when tiled
FloorColor	Sets the RGB color of the floor
Mode	Sets the Texture Mode to tile or stretch
FloorTexture	Identifies the texture used on the floor
TextureRotation	Allows the texture to be rotated
TileSize	Identifies the size of each "tile" on the texture in mazeunits
5. Ceiling Properties	
AspectRatio	Sets the aspect ratio of the ceiling texture when tiled
CeilingColor	Sets the RGB color of the ceilng
CeilingHeight	Sets the distance between ceiling and floor
CeilingTexture	Identifies the texture used on the ceiling
Mode	Sets the Texture Mode to tile or stretch
TextureRotation	Allows the texture to be rotated
TileSize	Identifies the size of each "tile" on the texture in mazeunits

5.3 Walls



1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. MazeCoordinates	
MzPoint1	Set the XYZ position of the wall point 1
MzPoint2	Set the XYZ position of the wall point 2
MzPoint3	Set the XYZ position of the wall point 3
MzPoint4	Set the XYZ position of the wall point 4
3. Texture	
AspectRatio	Sets the aspect ratio of the Wall texture when tiled
Flip	Flips the texture
Mode	Sets the Texture Mode to tile or stretch
Rotation	Allows the texture to be rotated
Texture	Identifies the texture used on the Wall
TileSize	Identifies the size of each "tile" on the texture in mazeunits
4. Appearance	
Color	Sets the RGB color of the Wall
Visible	Set to false to make the wall invisible

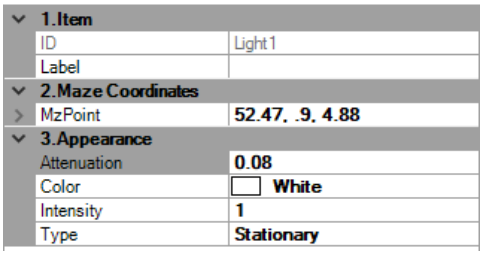
5.3 Curved Walls



1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. MazeCoordinates	
AngleBegin	Sets the starting angle of the circle
AngleEnd	Sets the end angle of the circle
Circle Radius	Sets the radius of the circle
MzPoint1	Set the XYZ position of the wall point 1
MzPoint2	Set the XYZ position of the wall point 2
MzPoint3	Set the XYZ position of the wall point 3
MzPoint4	Set the XYZ position of the wall point 4
MzPointCenter	Sets the XYZ position of the center of the curve
3. Texture	

AspectRatio	Sets the aspect ratio of the Wall texture when tiled
Flip	Flips the texture
Mode	Sets the Texture Mode to tile or stretch
Rotation	Allows the texture to be rotated
Texture	Identifies the texture used on the Wall
TextureRotation	Allows the texture to be rotated
TileSize	Identifies the size of each "tile" on the texture in mazeunits
4. Appearance	
Angular Resolution	Number of flat walls that make up the curved
Color	Sets the RGB color of the Wall
Visible	Set to false to make the wall invisible

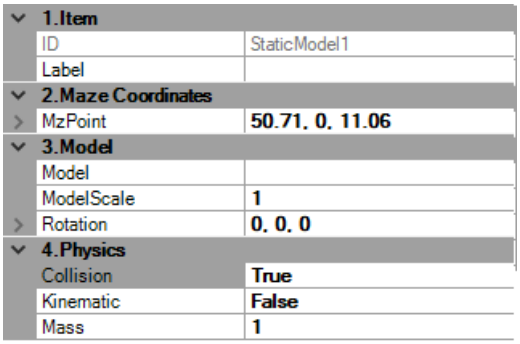
5.4 Lights



1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. MazeCoordinates	
MzPoint	Set the XYZ position of the light
3. Appearance	
Attenuation	Sets the attenuation of the light, increase to create smaller lighting area
Color	Sets the RGB color of the light
Intensity	Sets the intensity of the light
Type	Set to stationary for default static lighting, Set to ambulatory to create a light which follows the player

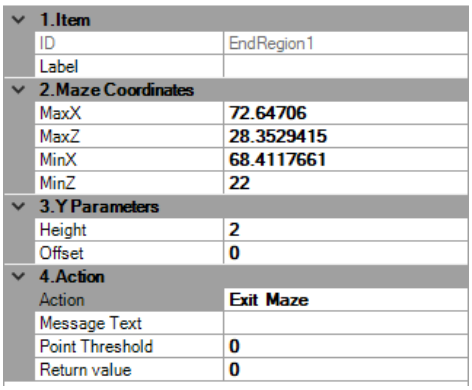
5.5 Static Models

1. Item	
ID	Unique ID of the item
Label	Custom Label for Item



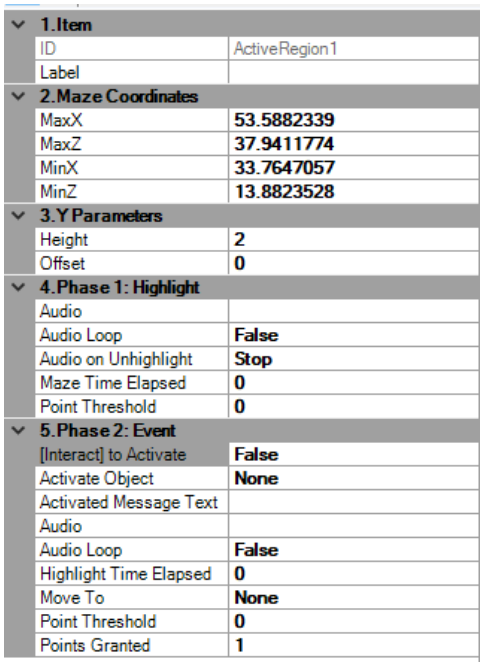
2. MazeCoordinates	
MzPoint	Set the XYZ position of the object
3. Model	
Model	Sets the Obj file to use for the static object
ModelScale	Scales the model
Rotation	Rotation for X, Y, and Z planes
4. Physics	
Collision	Specifies whether the object interacts with Player
Kinematic	Specifies whether object interacts with environment
Mass	Set the kinematic mass of the object

5.6 End Regions



1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. MazeCoordinates	
MaxX	X Coordinate
MaxZ	Z Coordinate
MinX	Min X Coordinate
MinZ	Min Z Coordinate
3. Parameters	
Height	Height of EndZone
Offset	Y- Coordinate of EndZone
4. Action	
Action	What happens when the EndZone is reached
Message Text	Message Text when reached
Points Threshold	Points required to activate
Return Value	Value that returned when maze exits

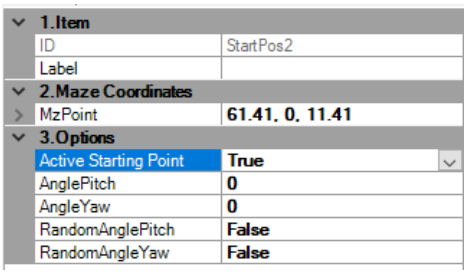
5.7 Active Regions



1.Item	
ID	ActiveRegion1
Label	
2.Maze Coordinates	
MaxX	**53.5882339**
MaxZ	**37.9411774**
MinX	**33.7647057**
MinZ	**13.8823528**
3.Y Parameters	
Height	**2**
Offset	**0**
4.Phase 1: Highlight	
Audio	
Audio Loop	**False**
Audio on Unhighlight	**Stop**
Maze Time Elapsed	**0**
Point Threshold	**0**
5.Phase 2: Event	
[Interact] to Activate	**False**
Activate Object	**None**
Activated Message Text	
Audio	
Audio Loop	**False**
Highlight Time Elapsed	**0**
Move To	**None**
Point Threshold	**0**
Points Granted	**1**

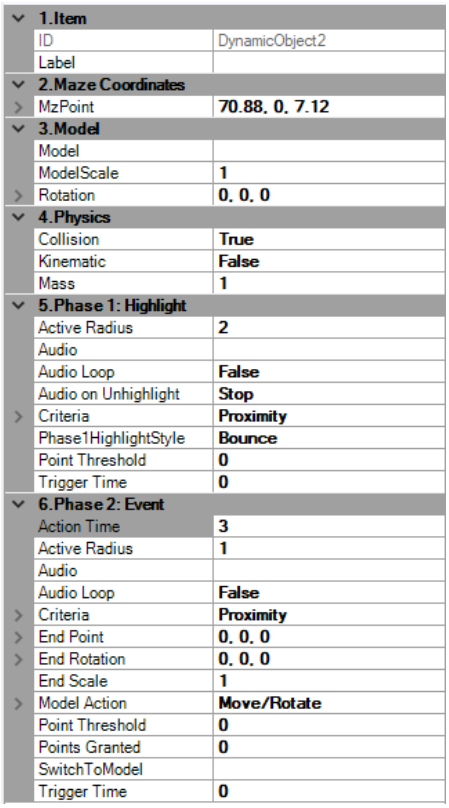
1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. MazeCoordinates	
MaxX	X Coordinate
MaxZ	Z Coordinate
MinX	Min X Coordinate
MinZ	Min Z Coordinate
3. YParameters	
Height	Height of EndZone
Offset	Y- Coordinate of EndZone
4. Phase 1: Highlight	
Audio	Audio file to play when highlighted
Audio Loop	Loop audio file while highlighted
Audio on Unhighlight	What happens when you leave region
MazeTimeElapsed	Minimum time required to highlight region
PointThreshold	Number of points required to highlight
5. Phase 2: Activate	
[Interact] to Activate	Press the [Interact] Button to activate
Activate Object	Object activated by region
Activated Message Text	Message Text displayed upon activation
Audio	Audio file to play on activation
Audio Loop	Loop audio file while activated
Highlight Time Elapsed	Time required in highlight phase to activate
Move To	Position to move avatar to on activation
Point Threshold	Points required to activate
Points Granted	Points given when activated

5.8 Start Position



1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. Maze Coordinates	
MzPoint	Set the XYZ position of the start position
MazeCoordinates	
AnglePitch	Rotation of initial starting point (Left/Right)
Angle	Rotation of initial starting point (up/down)
RandomAnglePitch	Enable randomization of starting angle (Left/Right)
RandomAngleYaw	Enable randomization of starting angle (Up/Down)

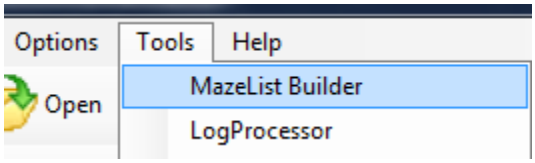
5.9 Dynamic Objects



1. Item	
ID	Unique ID of the item
Label	Custom Label for Item
2. Maze Coordinates	
MzPoint	Set the XYZ position of the object
3. Model	
Model	Sets the Obj file to use for the static object
ModelScale	Scales the model
Rotation	Rotation for X, Y, and Z planes
4. Physics	
Collision	Specifies whether the object interacts with Player
Kinematic	Specifies whether object interacts with environment
Mass	Set the kinematic mass of the object
5. Phase 1: Highlight	
Active Radius	Radius required to a highlight by proximity
Audio	Audio file to play when highlighted
Audio Loop	Loop audio file while highlighted
Audio on Unhighlight	What happens when audio unhighlights
Criteria	Requirements for object highlighting
HighlightStyle	Action to perform while highlighted
Point Threshold	Points required to highlight
TriggerTime	Time till highlighted (when Criteria involves time)
6. Phase 2: Activate	
ActionTime	Time to complete activation
ActiveRadius	Radius required to activate by proximity
Audio	Audio file to play when activated
AudioLoop	Loop audio file while activated
Criteria	Requirements for object activating
End Point	End position of object after activation
End Rotation	End rotation of object after activation
End Scale	End scale of object after activation
Model Action	Action upon being activated
Point Threshold	Points required to activate
Points Granted	Points granted upon activation
Switch To Model	Model switched to on activation
TriggerTime	Time required to pass before activation

6. Maze Lists

Maze List files (*.mel) allows creating combination of text diplays, image displays and mazes files for longer experiment protocols. To create or edit a maze list file in MazeMaker, open the "Tools>MazeListBuilder" tool. The following dialog will appear. Use "Add" button to include maze files or text displays to the list, click on them to edit their properties and finally save button to save the changes.

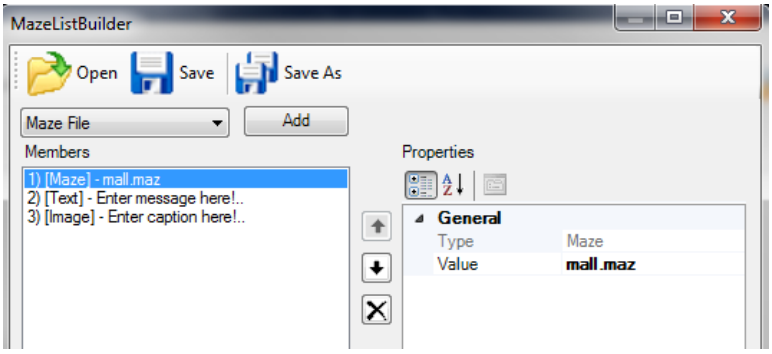


a. MazeList Items

Each Item can be selected from the presented drop-down menu. Items can be re-ordered or deleted using the arrow keys in the center of the panel.

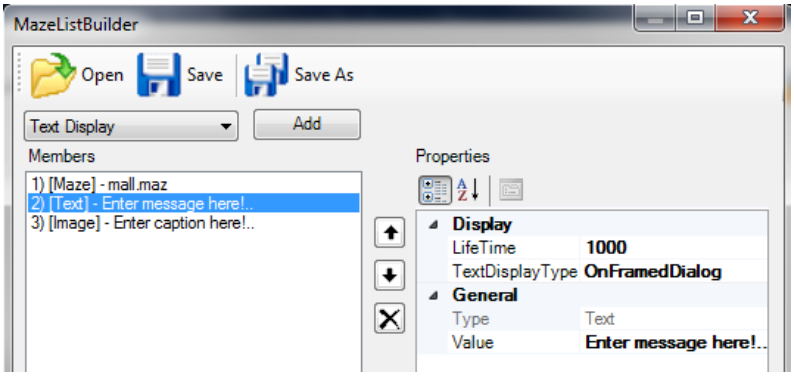
b. Mazes Files

Clicking the "Add" Button will bring an open file dialog which will allow the user to select which .maz file will be run at the particular line number in the maze. This file can also be edited in the Value property.



c. Text Display

Once the Text Display item is added, its properties on the right panel are immediately accessible. Display Lifetime determines the amount of time that a message is displayed. If set to 0 a dialog button will appear until the user is ready to proceed.

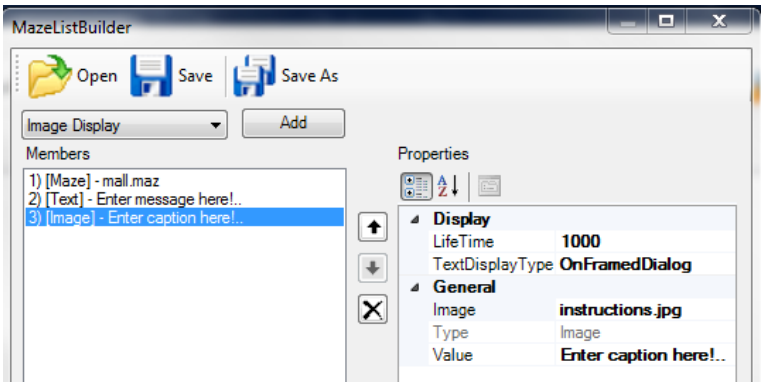


d. Image Display

Once the *Image Display* item is added, its properties on the right panel are immediately accessible. Its properties are identical to the *Text Display* item, except that an additional "Image" property is available, Set this property to the filename of the image which will be stretched across the display.

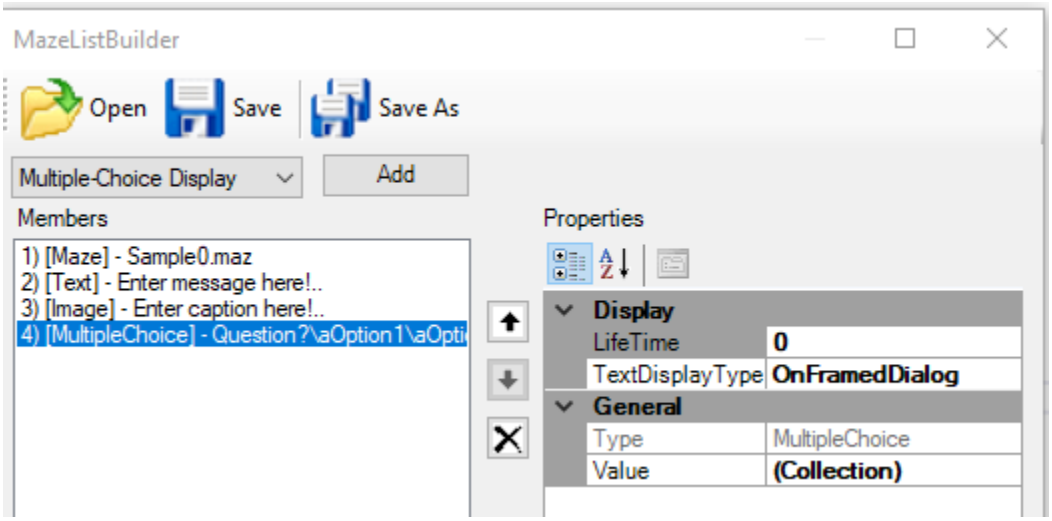
The file should be located in the same directory as the maze list (*.mel) file.

Display Lifetime determines the amount of time that a message is displayed. If set to 0 a dialog button will appear until the user is ready to proceed.

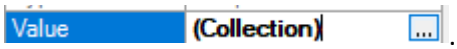


e. Multiple Choice

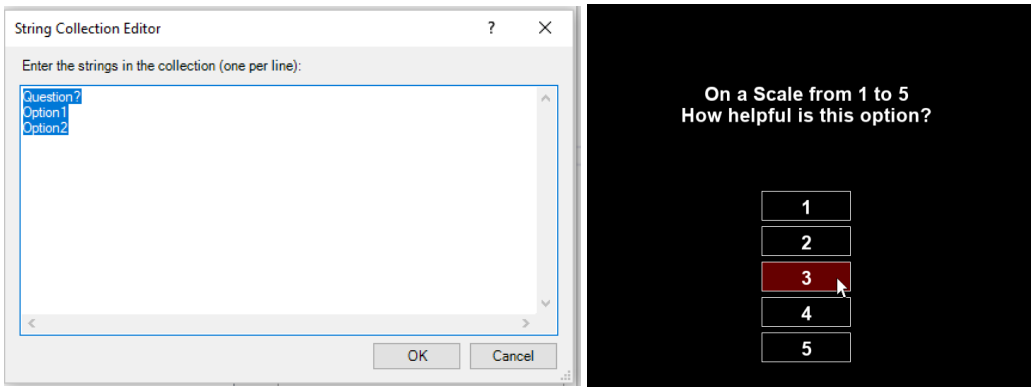
Adding a multiple choice query in a Maze List is simple. First select the *Multiple-Choice Display* item in the combo box and hit Add button shown below.



Next, edit the Value collection by selecting it on the right pane first and clicking on the '…' button that appears next to it:



In the Collection Editor, the first line will be the multiple-choice question, and each following line will represent an individual option.



Within MazeWalker, these menu items are presented as boxes which can be selected using either the keyboard or the mouse. Responses are recorded in the log file as an event containing the index of the item selected, the number of total items in the question, and the text of the response for identification purposes.

7. MazeMaker Keyboard Shortcuts

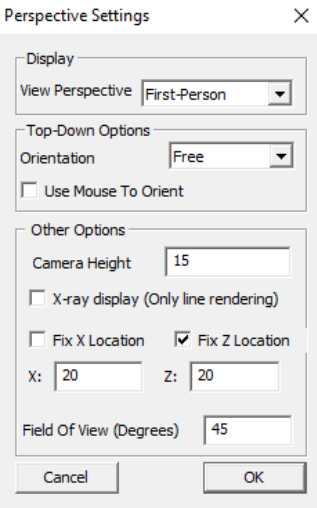
The following table lists the common keyboard shortcuts available within MazeMaker. Most of the functionality is also available by

Keys	*Function*
Ctrl + O	Open Files
Ctrl + N	Start New Maze
Ctrl + W	New Maze Wizard
Ctrl + S	Save the current file
Ctrl + A	Select all objects
Ctrl + X	Cut selected objects
Ctrl + C	Copy selected objects
Ctrl + V	Paste copied objects
Ctrl + Z	Undo
Ctrl + Y	Redo
Delete	Delete selected object
Alt + W	Change to Wall Mode
Alt + F	Change to Floor Mode
Alt + L	Change to Light Mode
Alt + P	Change to Start Point Mode
Alt + E	Change to End Region Mode
Alt + M	Change to Static Model Mode
Alt + D	Change to Dynamic Model Mode
Escape	Change to Pointer Mode
Ctrl + Plus	Zoom In
Ctrl + Minus	Zoom Out
Ctrl + 0	Reset Zoom
Shift + Up	Scroll Up
Shift + Down	Scroll Down
Shift + Left	Scroll Left
Shift + Right	Scroll Right
Ctrl + Left Cursor	Move the currently selected item to Left in the maze *(Mouse should be in "pointer" mode)*
Ctrl + Right Cursor	Move the currently selected item to Right in the maze *(Mouse should be in "pointer" mode)*
Ctrl + Up Cursor	Move the currently selected item to Up in the maze *(Mouse should be in "pointer" mode)*
Ctrl + Down Cursor	Move the currently selected item to Down in the maze *(Mouse should be in "pointer" mode)*
Ctrl + Space	Cycle through all items in the maze. Good for selecting items easily *(Mouse should be in "pointer" mode)*

8. MazeWalker Dialogs

a. Perspective Settings

Changing the perspective in this dialog will change the view that the user experiences when they are interacting with a maze.



Under **View Perspective** you can select either

- *First-Person* for the normal First-Person Viewpoint
- *Top-Down* for a view of a MazeWalker avatar as seen from the top of the Maze
- *3/4 or Fixed* for a view from a static or isometric perspective

When using the Top-Down perspective, the **Orientation** used can be fixed to have one particular direction appear to be “up”, either North, South, East or West.

When using Free mode, the you can **Use the mouse to orient** the MazeWalker avatar while navigating the Maze

When using either Top-Down or ¾ / Fixed modes, you can adjust the camera distance from the MazeWalker avatar by adjusting **Camera Height**

X-rary display will render the Maze entirely as 2-D lines, which can be useful when wanting to present a simplified top-down maze.

Use Fixed X/Z Location will prevent the camera from moving with the MazeWalker avatar during Top-Down mode and ¾ Mode/Fixed mode. However, in 3/4 /Fixed mode, the camera will continue to look at the avatar even though it is not itself moving.

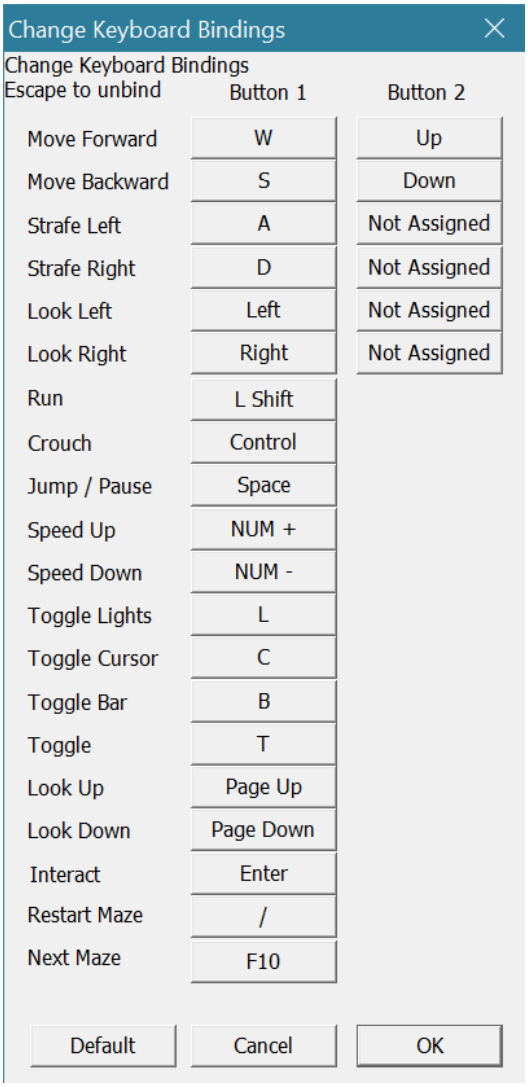
Field Of View (Degrees) will adjust the field of View to make the camera perspective wider

Many perspective settings will be overridden by the settings in the maze file

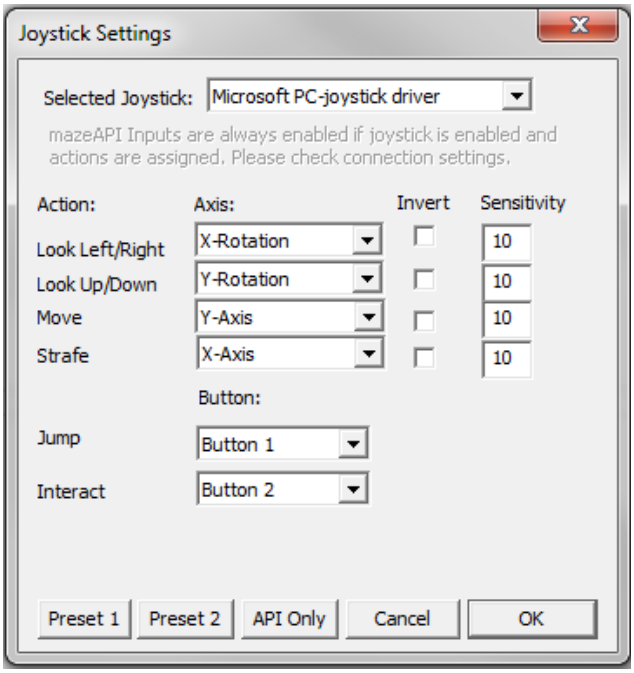
b. Keyboard Settings

MazeWalker can be controlled with keyboard buttons, joystick and mouse. Keyboard button assignment can be seen or changed in MazeWalker initial settings dialog, at the top menu, advanced > controls menu item. The following dialog displays the default settings.

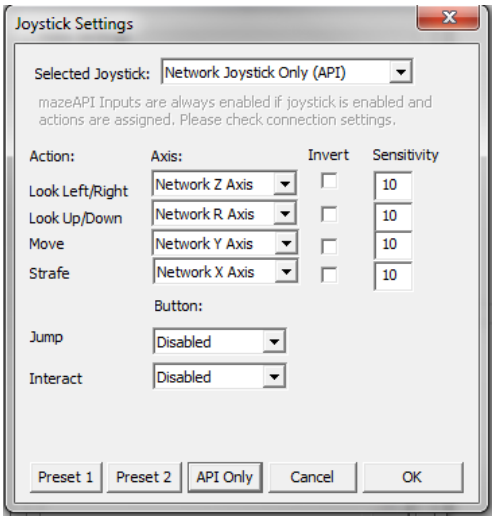
Note: Use "**Escape**" keyboard button to exit maze anytime.



c. Joystick Settings

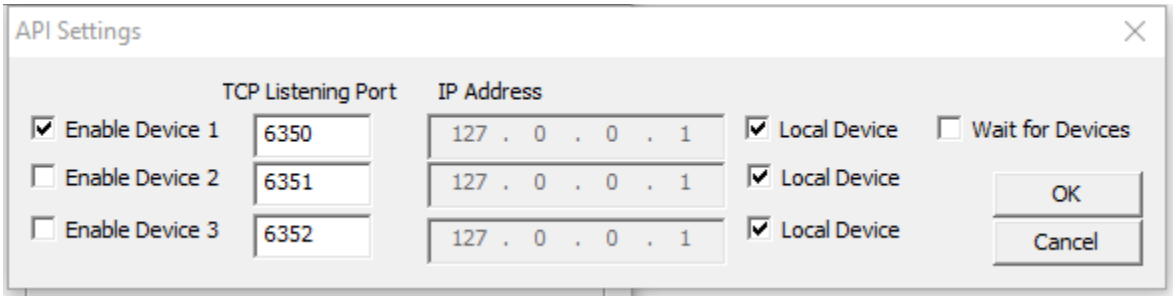


Use this dialog to select the active joystick, and assign actions to each axes. Detected joysticks will be listed from the dropdown menu. Axes can also be inverted and the sensitivity can be set as desired from this menu. Additionally buttons can be assigned for the Jump and Interact functions. Use the Preset 1 to quickly configure for a regular joystick and Preset 2 to quickly configure for an Xbox style gamepad.



Use of the API joystick can also be configured from this menu. Each network axis can be assigned values through the API and used as an analog input in MazeWalker. Functions for both physical and API axes can be assigned through this menu allowing hybrid joystick and API control if desired. Select API only to use only API functionality. To allow joystick API input, axes functions must be assigned, the API client must be connected (see API Settings), and Use Joystick must be enabled from the main window.

d. API Settings



Use this dialog to enable TCP-based interactions with MazeWalker through the API. When a device is enabled, MazeWalker will attempt to connect to the device upon pressing the Start button. MazeWalker will not allow the software to start until all enabled devices have been connected to.

Option descriptions:

Enable Device: instructs MazeWalker to connect and listen to new API devices when starting the Maze.

TCP Listening Port: Identifies the port which MazeWalker will attempt to connect with

TCP Listening Port: Specifies the IPv4 address of the API program that MazeWalker will connect to

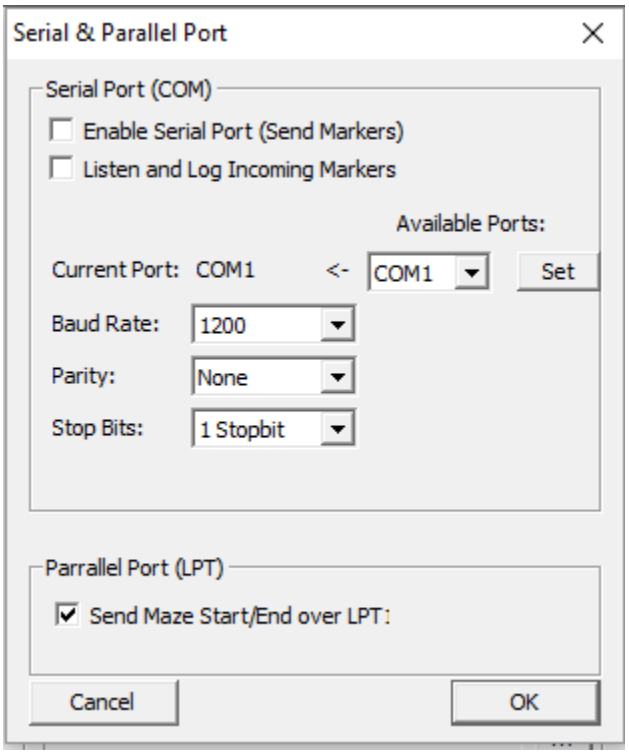
Wait For Devices: Instructs MazeWalker to require all devices to be connected before starting. If unselected API devices can connect at any time during the session.

See API documentation and sample applications for more information.

Use the API to:

- Remotely track user position in Maze
- Move user discretely in Maze or via analog input through the API joystick
- Send custom messages to the user during the Maze
- Advance the Maze remotely
- Receive markers regarding Maze events over TCP/IP

e. Serial & Parallel Port Options



Markers are single byte values sent through serial port when certain events happen. This is especially useful when correlating time of events with other sorts of data collected during maze navigation such as eye tracking, neuroimaging (EEG, fNIR), etc. If the Listen and Log functionality is enabled, MazeWalker will also listen for any markers from external sources and record them in the log file. Make sure the serial port settings match those on the external machine to ensure communication.

Serial Options:

Enable Serial Port: Enables serial output of markers to the selected device

Listen and Log Incoming Markers: Records incoming markers sent by serial in MazeSuite Log file

Current Port: Shows current COM port. To change to a new COM port, choose from Available Ports and click *Set* button

Parallel Options

Send Maze Start/End over LPT1: Enables System Parallel markers to be sent over LPT 1

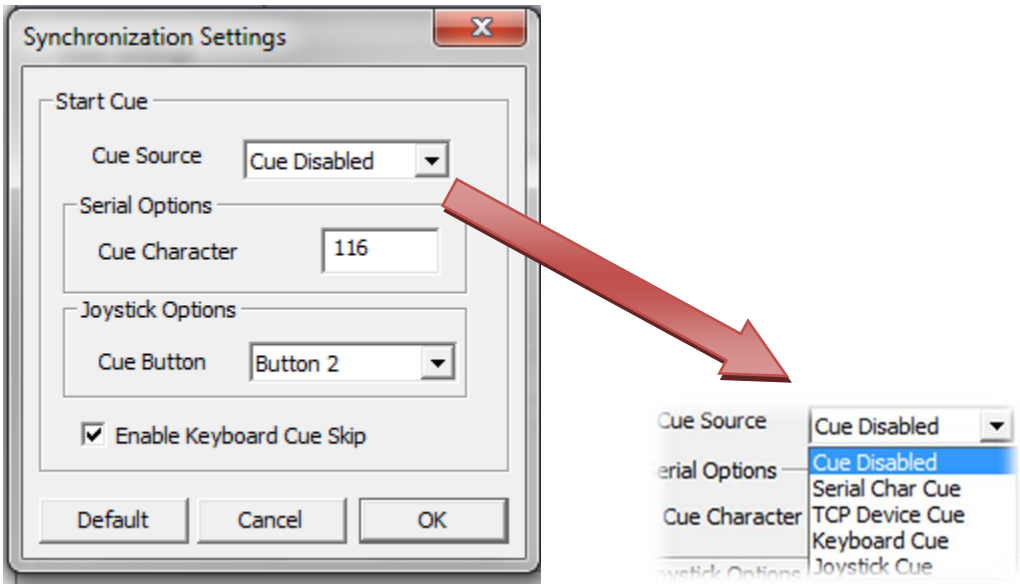
Markers are always sent via the API and no additional configuration is required to receive them.

f. COM, API, & Parallel Port Marker Values

Event markers are sent over any connected LPT (Parallel Port), COM (Serial Port), or API (TCP) devices and are also stored in the Log file with additional event information. All events are logged and sent out over TCP and COM ports, however only System Markers are sent over LPT.

Marker Type	Event	Value	Description
System (Type 1)	**Maze List Started**	50	Global session started
	Maze List Ended	51	Global session ended
	Text Message Start	80	Start of Maze List Message
	Text Message End	81	End of Maze List Message
	Maze Loaded	60	Maze Finished Loading
	Maze Start	61	Start of Maze (T=0)
	Maze Ended	70	End of Maze
	Maze Restarted	71	Maze Restarted
	Maze Skipped	72	Maze Skipped
Timing/Cue (Type 2)	Cue Skipped	40	Cue manually skipped
	Serial Cue	41	Serial Cue received to start Maze List
	TCP Cue	42	TCP/API Cue received to start MazeList
	Keyboard Cue	43	Keyboard Cue received to start Maze List
	Joystick Cue	44	Joystick Button Cue received to start MazeList
	Cue Timeout	45	Cue timeout reached
	Paused	10	MazeWalker Paused
	Unpaused	11	MazeWalker Unpaused
Maze / Internal (Type 3)	End Region Return Value	100+ Return Value	Number sent when exiting Maze
	Message Response	190 + Item Index	Multiple Choice message answer in MazeList
	Object Unhighlighted	200	Dynamic Object Unhighlighted
	Object Highlighted	201	Dynamic Object Highlighted
	Object Activated	202	Dynamic Object Activation criteria met
	Object Finished Activation	203	Dynamic Object Activation event finished
	Active Region Unhighlighted	210	Active Region Unhighlighted
	Active Region Highlighted	211	Active Region Highlighted
	Active Region Activated	212	Active Region Criteria met + Activated

g. Synchronization Settings

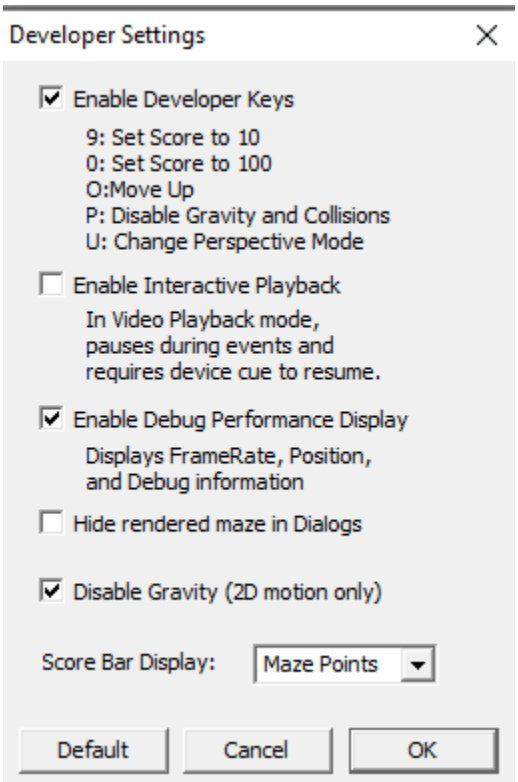


Use this dialog to allow MazeWalker to be started externally via several methods. When enabled, MazeWalker will not start unless a signal is received or optionally the cue is skipped by a keyboard press. In order for TCP and Serial cues to be accepted properly, they must be set up in their respective dialogs.

h. Developer Settings

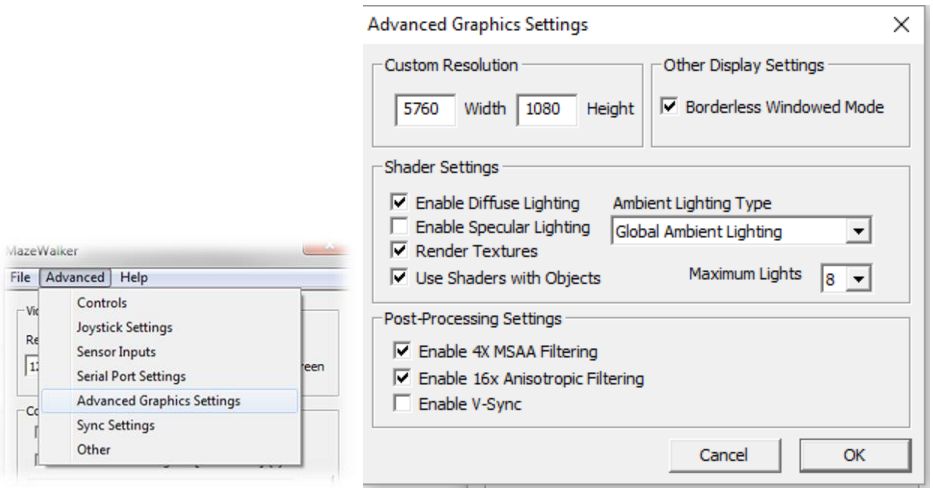
This dialog enables development options and controls to be enabled to test mazes and performance.

- Enabling developer keys allows the user to fly around the maze and examine construction or activate object features quickly.
- Enabling interactive playback creates a feed which can be used to create video walkthroughs.
- Enabling Debug Performance Display will display the framerate and position along with other debug variables for debugging purposes.
- Hide Rendered Maze in Dialogs will hide the maze from view during either the pause screen, timeout messages or messages delivered via API
- Disable Gravity keeps prevents the avatar from falling
- Score Bar Display displays the number of maze points out of the Exit Threshold or the Maze API score



i. Advanced Graphics Settings

This section describes advanced graphics settings of MazeWalker and sample outcomes of some configurations. The Advanced Graphics Options dialog can be accessed from MazeWalker (initial settings dialog), at the top menu, Advanced>Graphics Options menu item. The dialog is shown below.



i. Custom Resolution

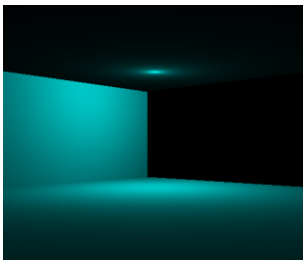
Sets the width and height of the custom resolution option in the main dialog. Please ensure your monitor supports the resolution prior to customizing this option

ii. Borderless Windowed Mode

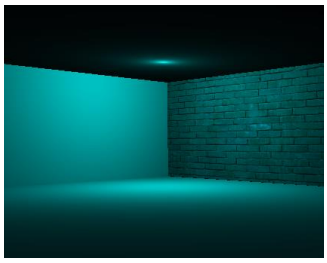
Removes boundary from MazeWalker windowed screen. Improves performance on systems with multiple monitors and need for external applications running.

iii. Enable Diffuse Lighting

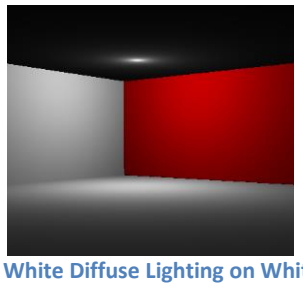
Enables diffuse lighting as a part of shader color calculations. Using a colored diffuse light on a colored wall will radically darken the wall therefore it is advisable to use textured and white walls only when using colored light sources. Enabling diffuse lighting is recommended for any standard lighting environment. Diffuse light properties are defined in model material files in addition to affecting wall appearances. Diffuse light should always be enabled unless creating particular environments that only use ambient light.



1 : Colored Diffuse Lighting on White and Red Wall (No Ambient Lighting)



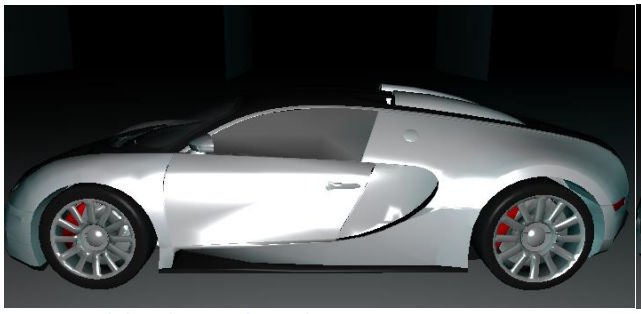
2: Colored Diffuse Light on White and Textured Wall (No Ambient Lighting)



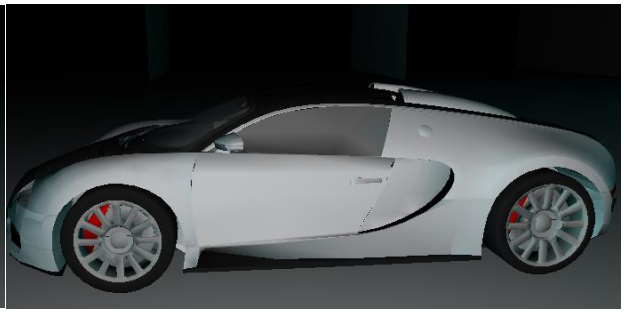
3: White Diffuse Lighting on White and Red Wall (No Ambient Lighting)

iv. Enable Specular Lighting

Enables specular lighting as part of the shader color calculations. Specular lighting has no noticeable visual impact unless 'Use Shaders with Objects' is selected as well. Will result in a performance decrease but will models will appear shiny. This shininess is specified by the model's material file along with the specular lighting values. Known issues exist with compatibility on some Intel graphics cards (HD4000).



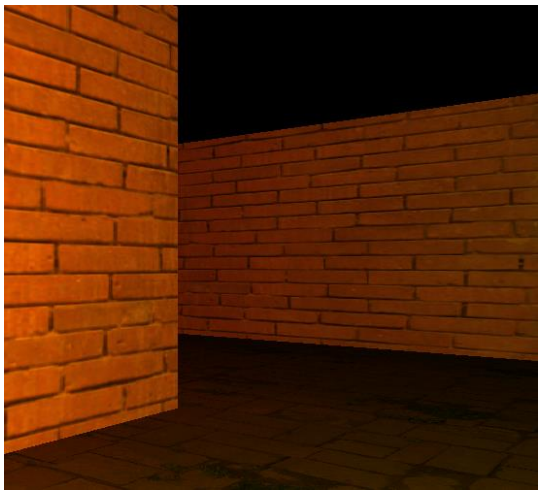
4: Car model with Specular Lighting



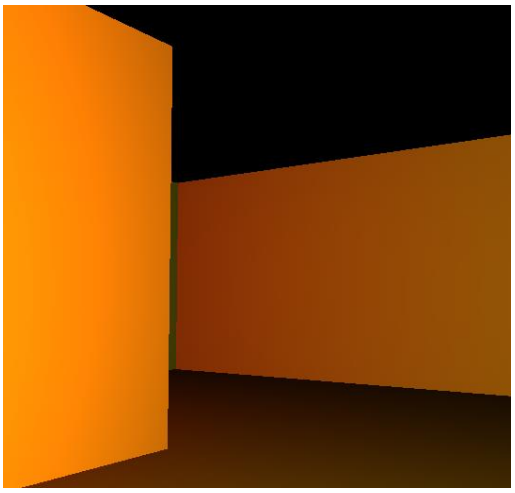
5: Car model with Specular lighting disabled

v. Render Textures

Enables texture color calculations as part of the shader color calculations. If render textures is unselected, both objects and walls will render as color material. Unselecting this option will boost performance but textures will not be displayed on walls or models. This option is recommended for default lighting environments.



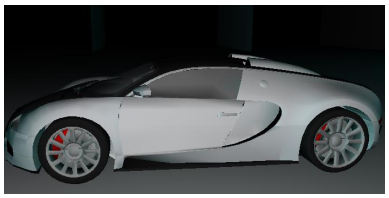
6: Scene with Texture Rendering



7: Scene without Texture Rendering

vi. Use Shaders with Objects

Uses shaders for object color calculations. Allows objects to use per pixel lighting for smoother lighting and more customizable lighting results. Allows for correct lighting when using torch lights. When using specular lighting this must also be selected. Selecting this option may significantly reduce performance with little appreciable visual gain when using large amounts of detailed objects. Object shaders in the current release may not render transparencies correctly.



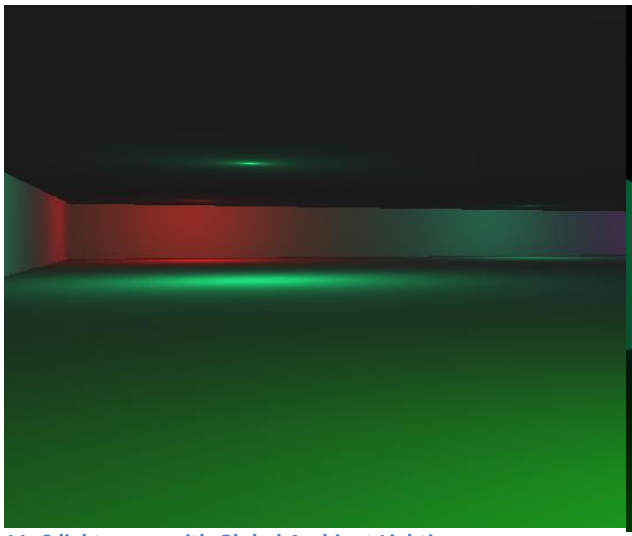
8: Car model using Shaders, lit by torch light

9: Car model with shaders disabled, lit by torch light

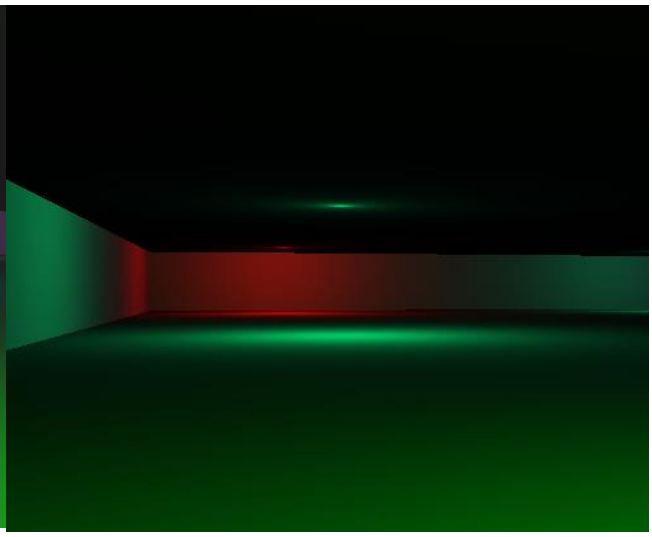
10: Car model with shaders disabled, lit by static light

vii. Ambient Lighting

Selects the manner in which ambient lighting is handled in the shader color calculations. If 'No Ambient Lighting' is selected then ambient lighting conditions are not used. If 'Global Ambient Lighting' is selected, then the global ambient lighting conditions are used during lighting calculations. Enabling global ambient lighting will prevent true black from being displayed by any wall, but will make areas in complete lack of lighting sources slightly visible. Global Ambient Lighting has no measureable performance impact.

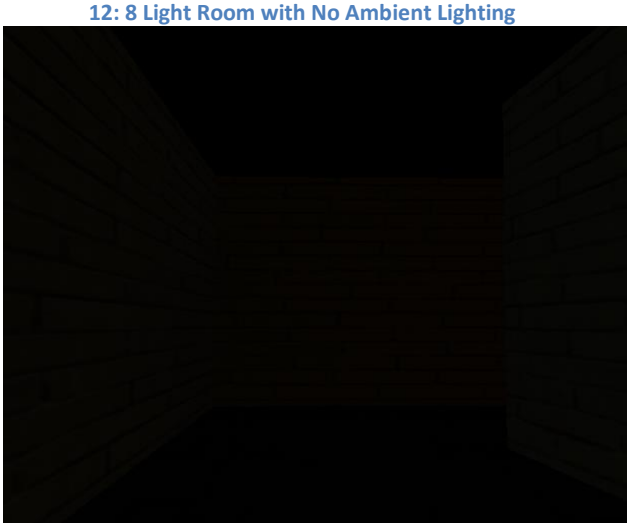


11: 8 light room with Global Ambient Lighting



12: 8 Light Room with No Ambient Lighting

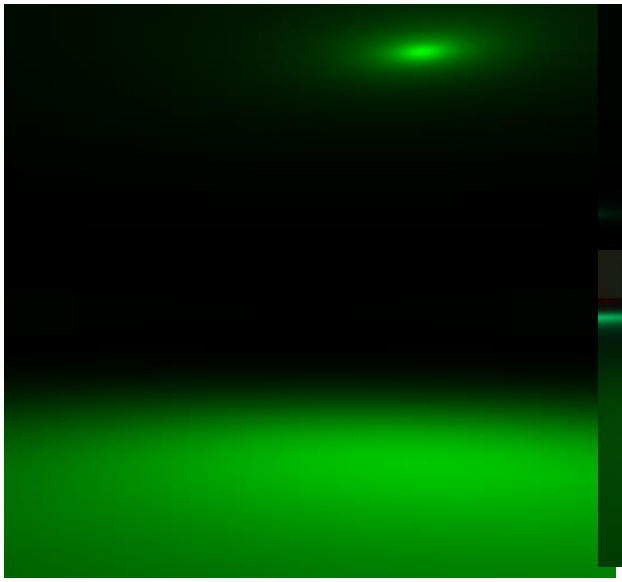
13: Unlit Hallway with Global Ambient Lighting



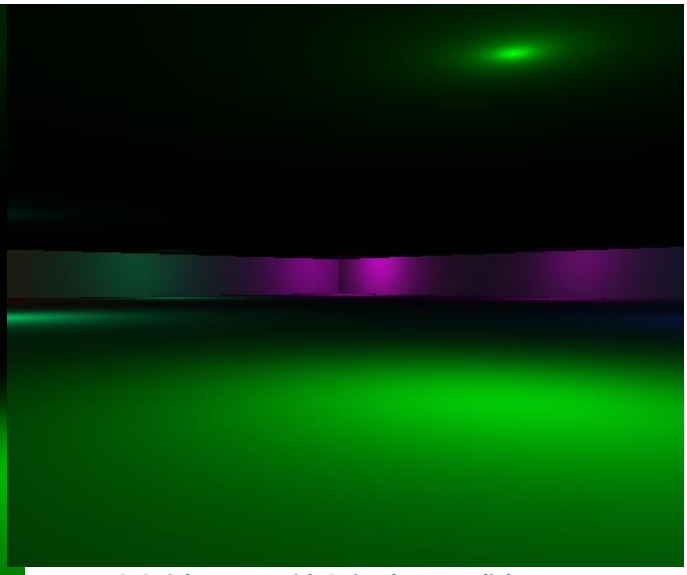
14: Unlit Hallway with No Ambient Lighting

viii. Max Lights

Selects the maximum number of simultaneous lights to be used in maze and shader color calculations. Selecting low light counts will result in light sources suddenly appearing and disappearing unexpectedly. Selecting a number smaller than the total number of lights in a maze will cause the lights to be cycled based on light proximity. Unless experiencing performance issues, this option should be set to 8.



15: 8 Light Room with 1 simultaneous light



16: 8 Light Room with 8 simultaneous lights

ix. Enable 4x MSAA

Selecting this property will prevent pixilation and jagged edges within MazeWalker. This option has significant performance impact, but is recommended for normal use unless encountering issues.

x. Enable Bilinear Anisotropic Filtering

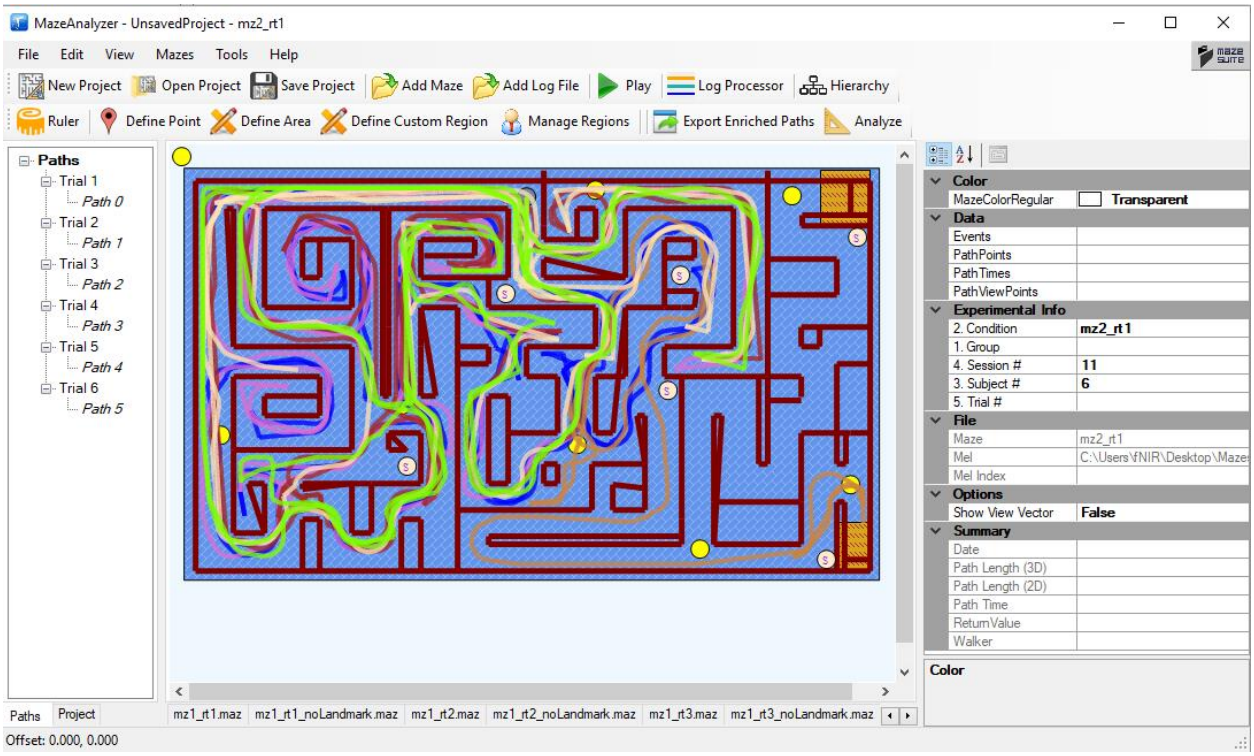
Enabling this property will prevent anisotropy associated aliasing which occurs due to viewing textures at an angle. This option has significant performance impact, but is recommended for normal use unless encountering issues.

xi. Enable V-sync

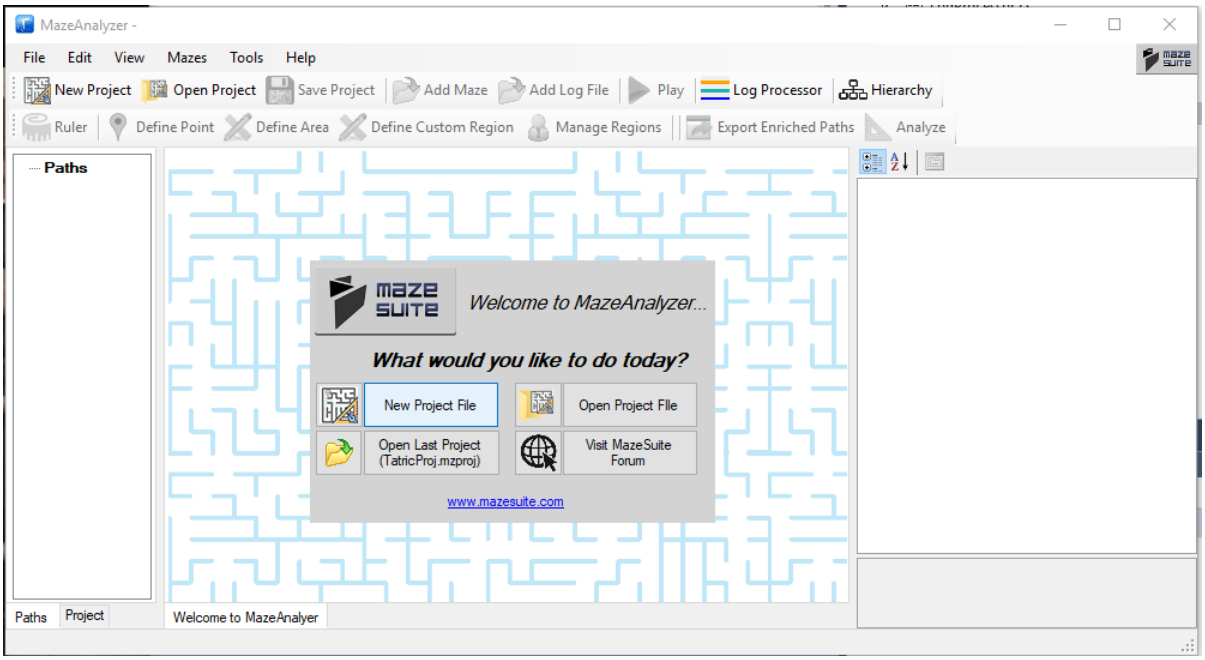
Enabling this property will prevent screen-tearing which may occur when the OpenGL is being refreshed at high frame rates. This option is not enabled by default but is recommended if the machine can handle the performance burden.

9. MazeAnalyzer Project & Tools

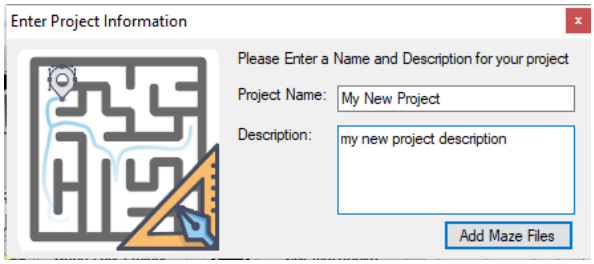
The MazeAnalyzer application is used for analysis of log files, and can run multiple overlapping paths on the same maze as well as collect together many paths from different mazes.



a. Creating a MazeAnalyzer Project



First Select “New Project File” and then fill in all your Project Information and then click “Add Maze Files” to add files to your project.



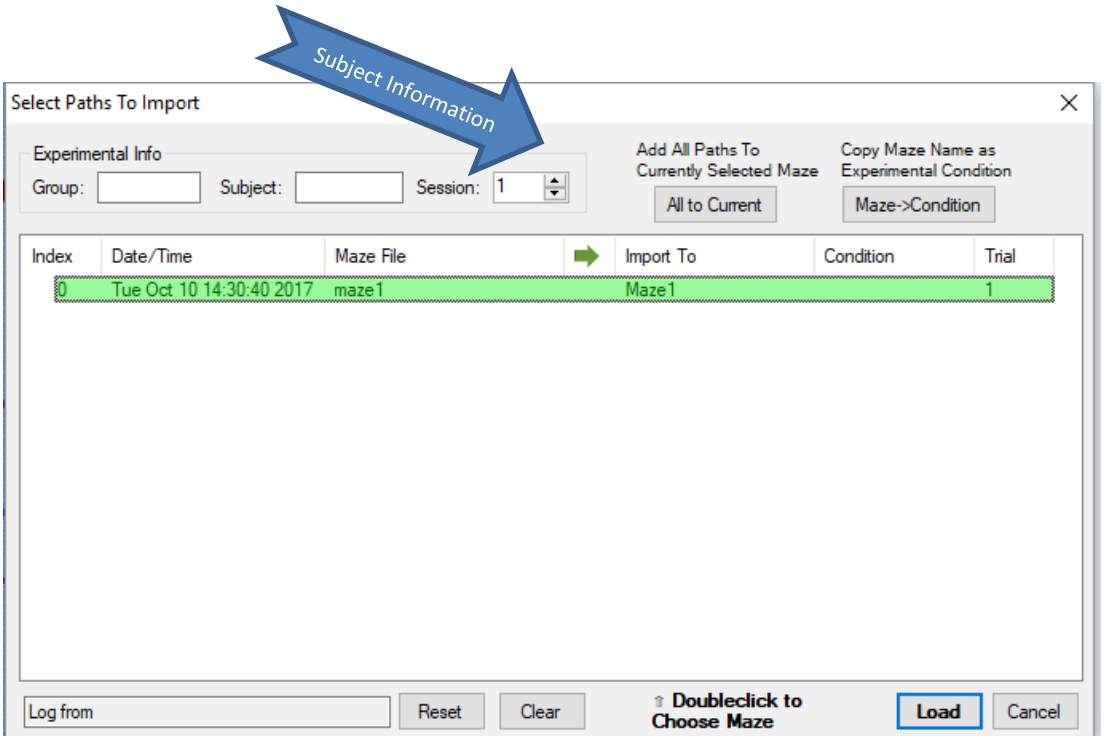
You can add new Mazes and Log Files by clicking the 

buttons, or by simply dragging new mazes onto the window.

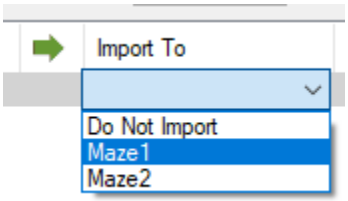
b. Path Import Tool

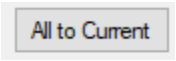
When importing paths, you should first enter the experimental information for the log file that you are importing. This information is used when displaying path information, and for path export and analysis. Paths can be visually grouped by experimental info as well as experimental condition. Additionally, paths whose maze does not match the name of the maze they are being imported to must be manually reassigned.

By Default, Subject is the MazeWalker name, Session number is assigned to 1, while trial number of times that one maze has been repeated within a log file. Double click Trial number or Condition to edit them. Group, Subject and Session apply to every path being imported. While Condition and Trial may differ for each path.

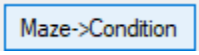


When importing a path, a mismatched name or a need to have different paths from different mazes superimposed may require to you to load a path onto a maze that is not automatically detected by the tool. To pick which maze a path is imported to you must go to the Import To column and select the maze you want to assign a path to. You may also opt not to import a maze.

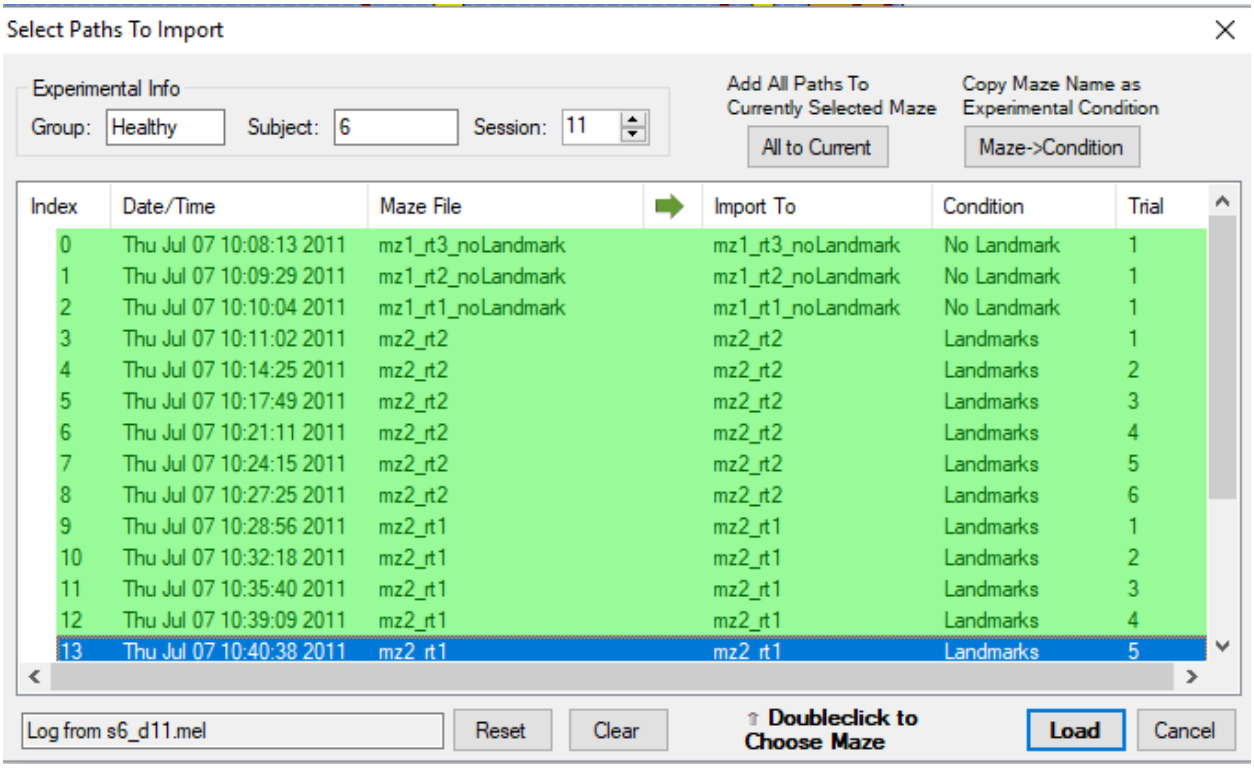


If you want to load all paths to the maze currently active in MazeAnalyzer, pressing the 

button will assign all paths in the tool to the active maze.

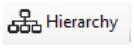
Some mazes or paths may be identical, but differ by some external condition used as an experimental label. (Ex: No reward/Reward or Clue/No Clues). This information may be reflected by the maze file name (ex: maze1_no_clues.maz). In this case it might be helpful to use the 

to automatically copy the maze filename into the experimental condition column. Condition can then be edited by double clicking the value.



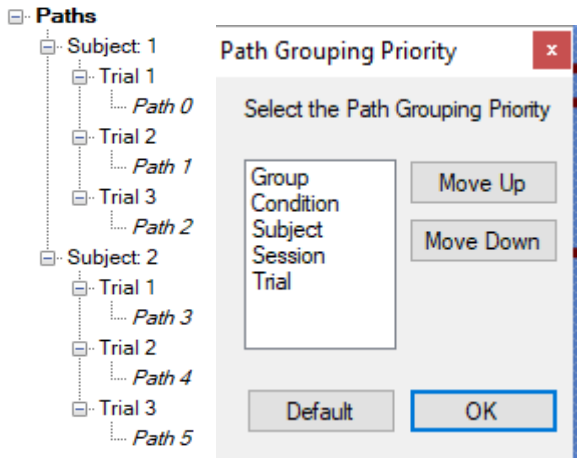
Pressing the Reset button will default all conditions back to the initial conditions (ie: mazes that match the filename will be automatically assigned. Pressing the Clear will unassign all path/maze combinations.

c. Path Grouping Priority

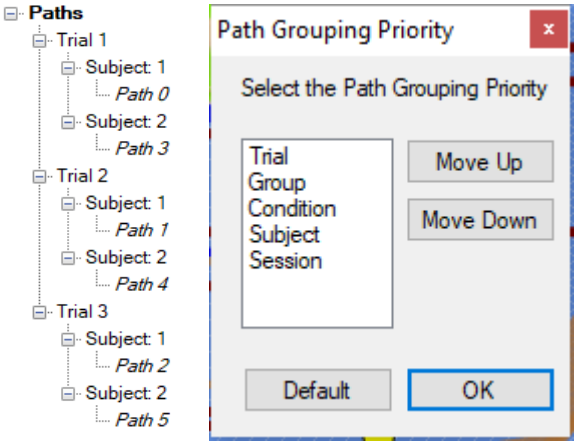
Choosing the 

will allow the Paths in the left pane to be grouped according to some hierarchy for organizational and viewing purposes. This allows paths to be plotted as groups for specific trials, groups, conditions or subjects.

When Subject is higher in the priority than Trial, paths are grouped by Subject, then trail number.

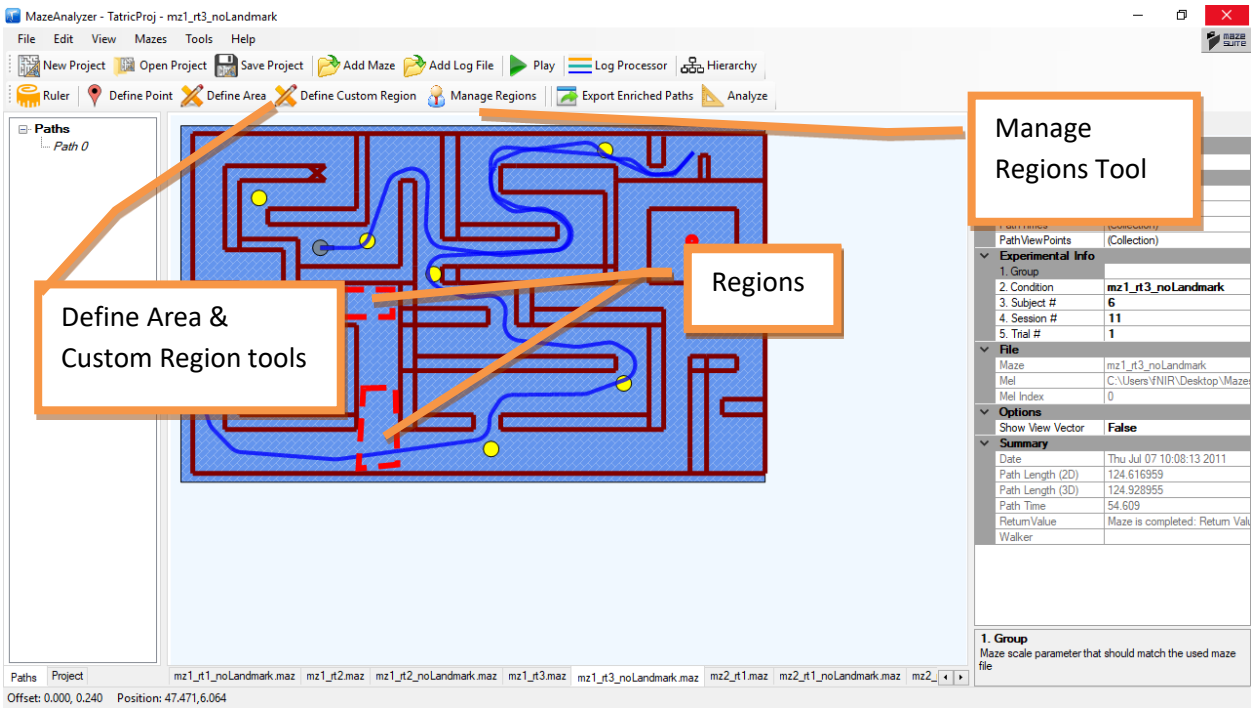


When Trial is moved up in priority above other Experimental info, paths are instead grouped first by Trial. Missing or identical experimental info is not included in the Paths tree.



d. Define Measurement Regions Tool

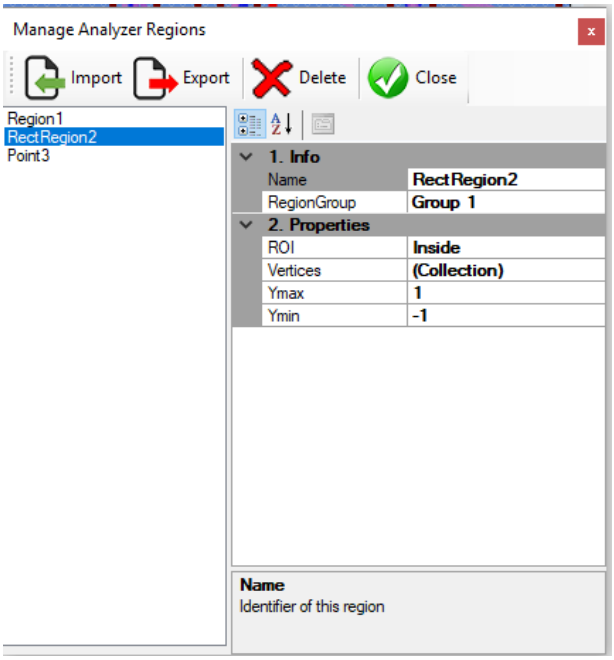
In MazeAnalyzer, you can activate the define measurement regions tool by clicking on the Define Point, Define Area, or Define Custom Region toolbar button. You can save/load region definitions to/from a file from the Manage Regions button.



Information from regions and points are included when using the “Export Enriched Paths” or “Analyze”.

In “Export Enriched Paths”, the distance from the Point or center of a Region is listed for every timepoint. “Region Check” will identify whether the user is within the given region at any one time.

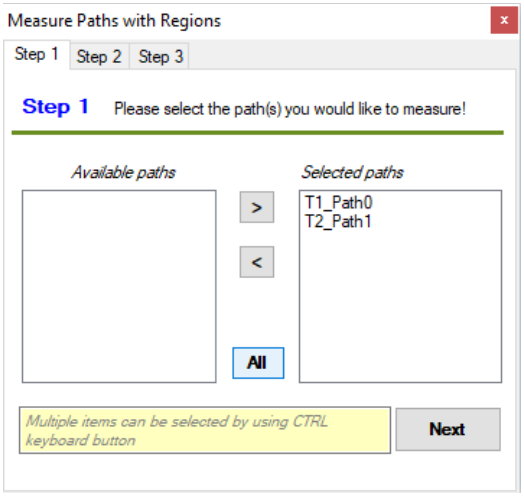
In “Analyze”, the total amount of time, the average distance, and average speed are included as a integrated sum, along with the number of times the user has entered a region.



The Manage Regions tool allows you to Import and Export regions, as well as edit and delete the ones already defined within the MazeAnalyzer Project.

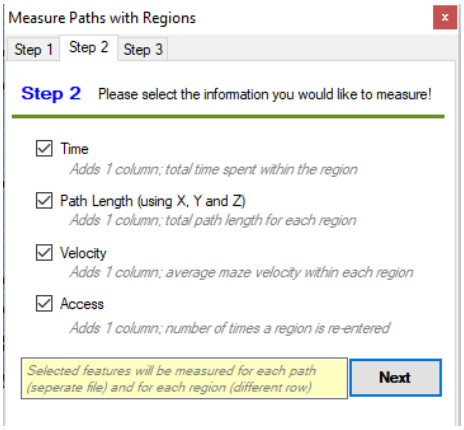
e. Analyze Tool

MazeAnalyzer features a measure tool for providing a data break down of paths from log files.



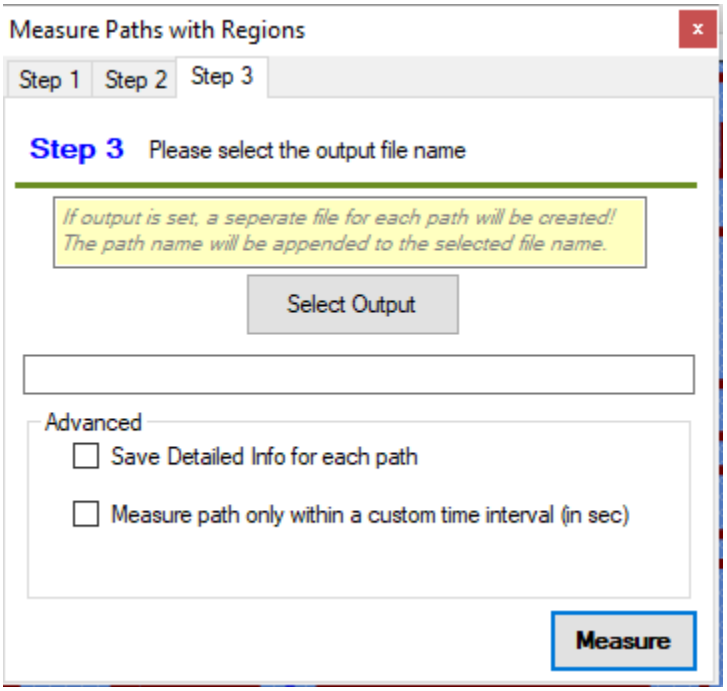
Analyze tool step 1: Select paths that you want included in the analysis.

Paths are named after the experimental information they have been assigned. Click "All" to add select all paths.



Analyze tool step 2: Select parameters that should be included in the assessment.

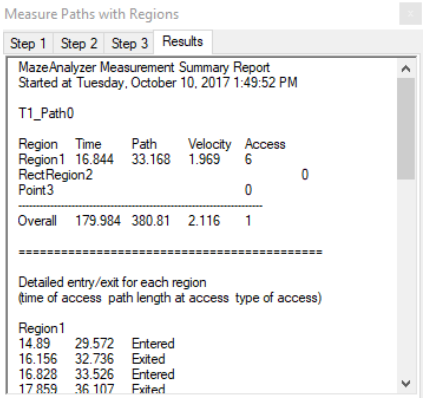
The total amount of time, the average distance, and average speed are included as an integrated sum, along with the number of times the user has entered a region. Additionally, information for the entire maze as an average is included by default even when no region has been defined.



Measure tool step 3: Select text file output.

The option "Save Detailed Info for each path" will save one text file per path containing all region information, as well as the specific times each region was entered an exited. The text from these reports are shown collectively in the "Results" tab even if this option is not selected.

The option "Measure path only within a custom time interval" will limit the analysis to only timepoints within the newly defined times.



Measure tool Step 4: Review Results.

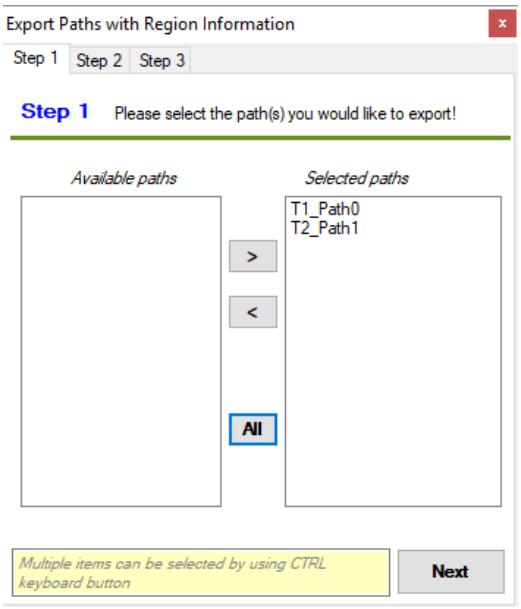
The results section provides a descriptive view of the events and statistics of each path. If the option "Save Detailed Info for each path" is selected, these path information will be separated into many individual text files.

When saved to a file, the output can be opened in Excel or any other spreadsheet program for review and analysis.

	A	B	C	D	E	F	G	H	I	J	K	L
1	MazeAnalyzer Measurement Summary v1											
2	Group	Subject	Condition	Session	Trial	PathTime	PathLength	PathLengthXZ	RectRegion1_Time	RectRegion1_PathLength	RectRegion1_AvgVelocity	RectRegion1_TimesEntered
3	Control	6	mz2_rt1_noLandmark	11	1	179.984	380.81	380.472	9.265	21.695	2.342	7
4	Control	6	mz2_rt1_noLandmark	11	2	119.86	253.5671	253.2311	1.984	4.953	2.496	1

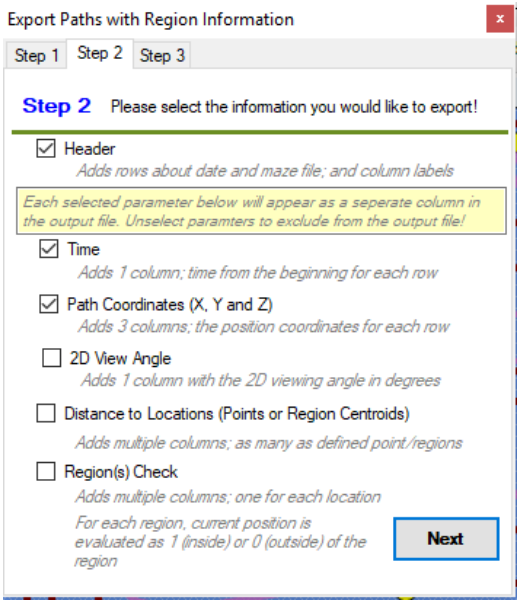
f. Export Enriched Paths Tool

The Export tool allows you to export paths with extra information that is not directly available in the log file as well as information calculated based on the defined regions. This tool can be used to simplify the log file, as well as provide additional information as necessary.



Export paths step 1: Select paths that you want included in the analysis.

Paths are named after the experimental information they have been assigned. Click "All" to add select all paths.



Export paths step 2: Select features to save.

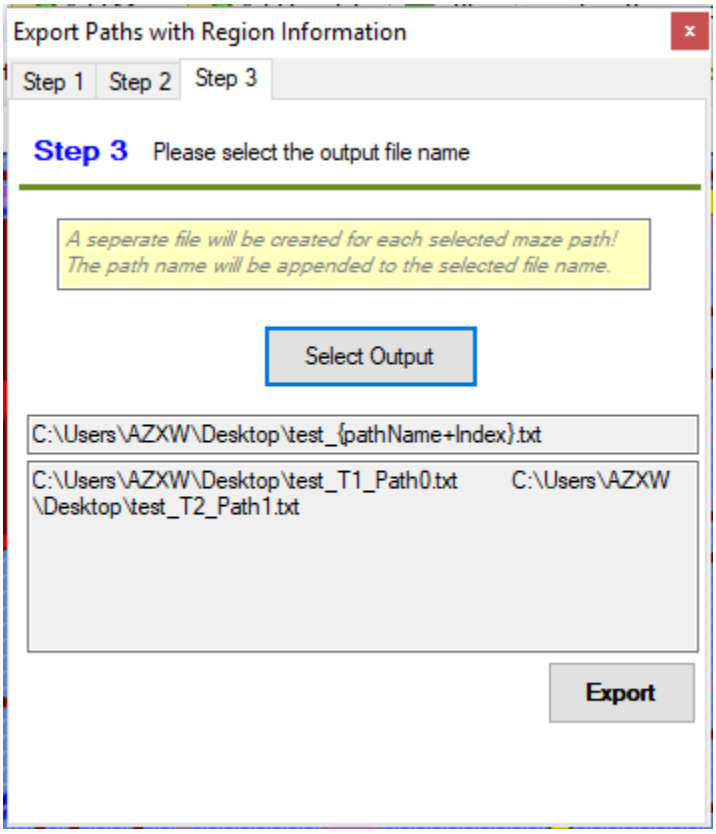
Time provides the time value from the beginning of the maze.

Path Coordinates provide the location of the MazeWalker during each time interval

2D View Angle provides a calculated angle representing the direction the user was facing at each time point.

Distance to Locations provides the XYZ distance from each Region Center and Point.

Region Check adds a column to identify whether the user was within a particular region at a particular time.



Export paths step 3: Select output file and export

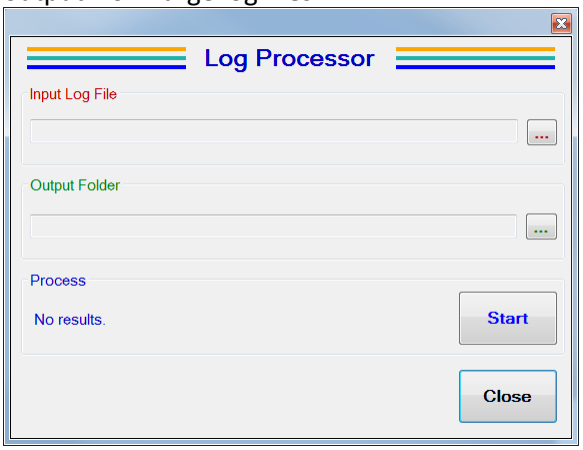
Each path will be exported to a separate text file containing a tab delimited representation of all information. This file can easily be used in Excel of any other spreadsheet program to aid in analysis.

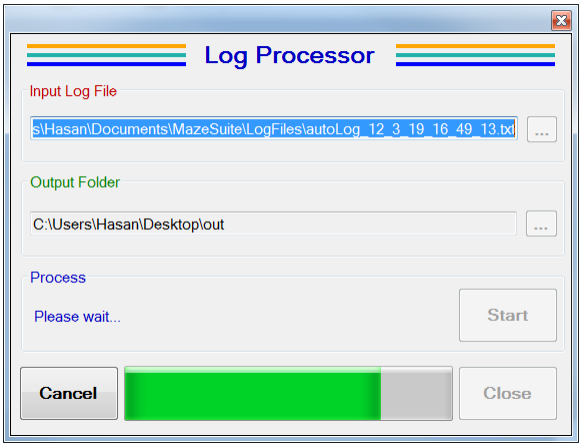
	A	B	C	D	E	F	G
1	Log Information:						
2	Maze	mz2_rt1_noLandmark					
3	Log	D:/Dropbox/Final_mazes/../Sub006_Ses11_mazeLOG.txt					
4	Index	17					
5	Walker						
6	Date	Thu Jul 07 10:53:35 2011					
7							
8	Experiment Information:						
9	Group						
10	Condition	mz2_rt1_noLandmark					
11	Subject	6					
12	Session	11					
13	Trial	1					
14							
15	Time	X	Y	Z			
16	2305627	17.65	-0.008	2.06			
17	2305658	17.65	-0.024	2.06			
18	2305674	17.65	-0.056	2.06			
19	2305689	17.65	-0.095	2.06			
20	2305705	17.65	-0.142	2.06			

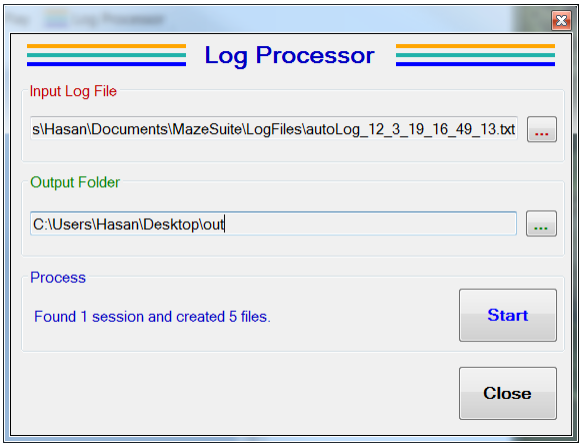
test_T1_Path0

g. LogProcessor

MazeAnalyzer also has a multi-threaded version of LogProcessor that generates reports and summary output from large log files.

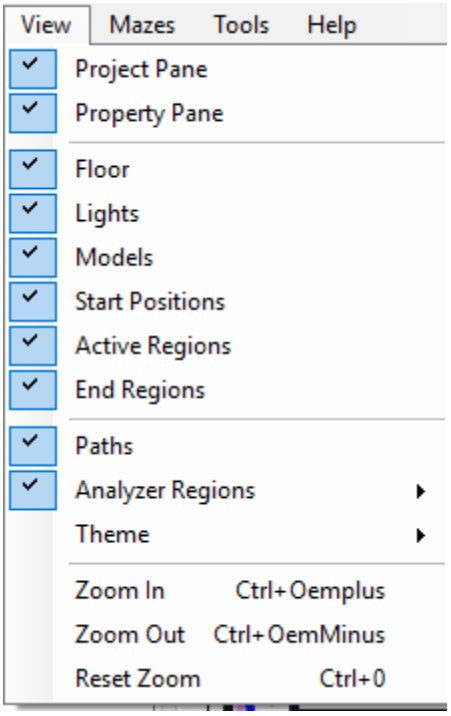




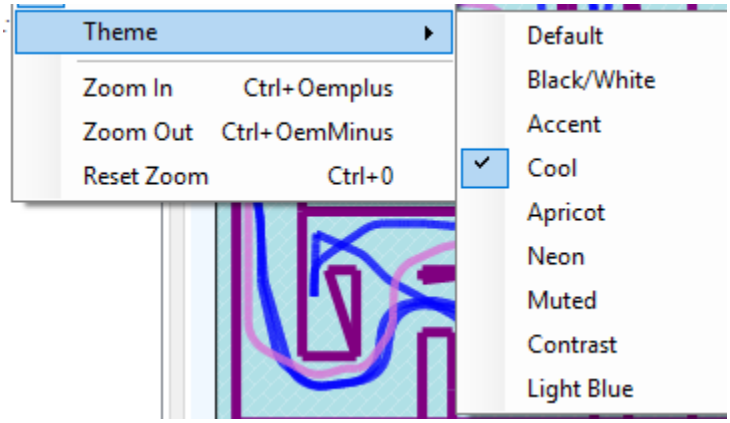


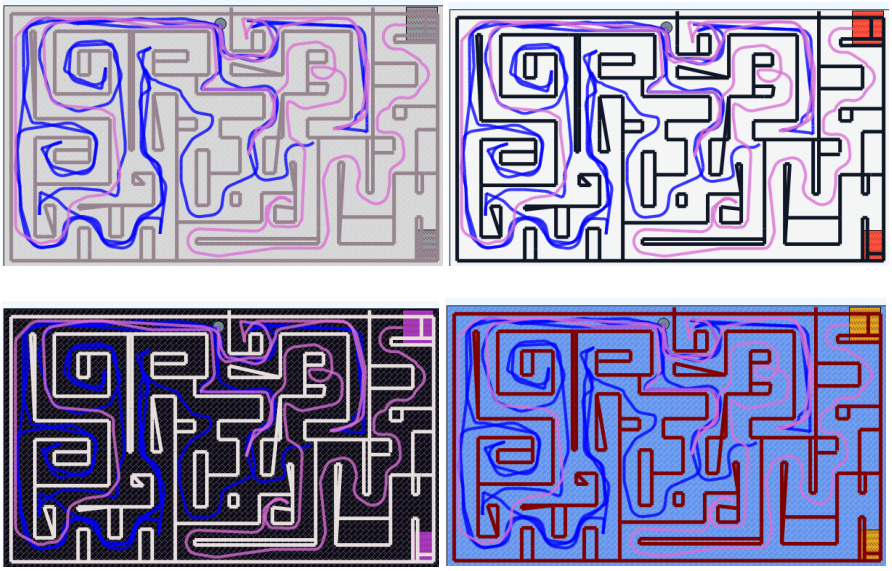
h. Show/Hide Elements & Theming

MazeAnalyzer can be made more useful by using the view menu to zoom in or out and hide elements from view that might be unimportant for interpretation.



Additionally, the Theme functionality can help make mazes and experimental conditions more presentation ready.





10. References

Ayaz, H., Shewokis, P. A., Curtin, A., Izzetoglu, M., Izzetoglu, K., & Onaral, B. (2011). Using MazeSuite and Functional Near Infrared Spectroscopy to Study Learning in Spatial Navigation. J Vis Exp(56), e3443. doi: 10.3791/3443

Ayaz, H., Levin, S., Platek, S., Onaral, B., (2008) "MazeSuite 1.0: A complete set of tools to prepare, present and analyze navigational & spatial cognitive neuroscience experiments", Behavior Research Methods, 40(1), 353-359

Ayaz, H., Onaral, B., (2005) "Analytical Software and Stimulus-Presentation Platform to Utilize, Visualize and Analyze Near-infrared Spectroscopy Measures", Masters Degree Thesis, Drexel University.