

ASSISTUM KNOWLEDGE EDITOR

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The benefits of using ASSISTUM Knowledge Editor

Allows *instant access* to the business knowledge you need to solve problems.

Enables you to create your own customised *bank of knowledge assets* which can be added to at any time.

Speeds up the time it takes to make *well-informed decisions*.

Makes group decision easier with a *clear display of all the issues*, which helps build up a stronger commitment to the final decision - and action

Supports and *empowers* teams in different locations, all working within a consistent framework that allows them to make their own judgments.

Works effectively as a tool for *training* by presenting knowledge in a memorable and interactive form.

Proves invaluable in a *learning* organization, making it easier to capture new knowledge, and share it widely throughout the organisation.

How to use Assistum

This manual describes how you can use the Business Knowledge Editor to create and modify knowledge bases. It is in three parts:

Tutorial - takes you step by step through the construction of a simple knowledge base

Reference Section - gives a comprehensive description of all the features of the Editor

Glossary of terms.

But if you just want to consult a knowledge base you can refer to the companion manual on the Knowledge Viewer.

Installing the software

Put the CD-ROM in the CD drive. Run setup.exe. Follow the instructions on the screen and it will install the ASSISTUM Knowledge Editor, Knowledge Viewer, and a selection of sample knowledge bases.

During the installation process, you will be asked to type in your registration key which you will find inside the front of your manual. When it is correctly typed in, click on "unlock" to complete the installation.

If you wish to remove the ASSISTUM program from your PC at any stage, then click **Start, Settings, Control Panel, Add/Remove Programs**. Select "Assistum" and follow the instructions.

TUTORIAL

Creating a Knowledge Base

Example

- We will create a simple knowledge base to help you choose the best means of transport for your journey. It is the example that we used in the Knowledge Viewer Manual.

*If you want to see an example, you can select **File, Open** and find **TRANSPORT** in the box then select and **Open** it.*

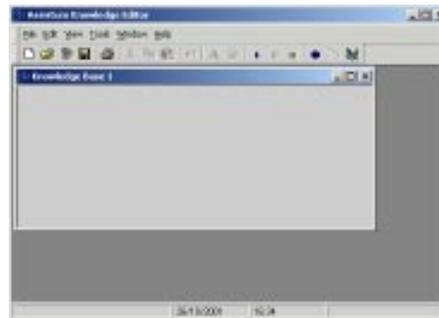
*Then select **File, Run** to consult it.*

Creating a new knowledge base

- Open the Knowledge Editor by clicking on **Start, Programs, Assistum, Assistum Knowledge Editor**
- Then click on the **New** icon (or click on **File, New**).

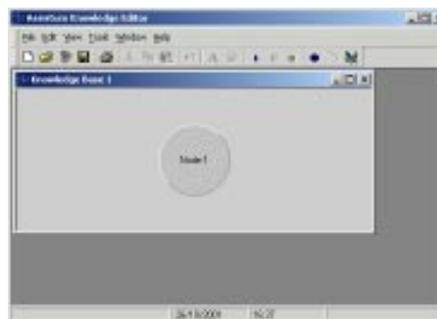


- Choose the **Normal** template from the dialog and press **OK**. The function and use of the Extended template is described at the end of the tutorial. Once you have selected your template, you will see the following screen:



Defining the key factors or issues.

- It is always worth spending some time thinking about the key question(s) you want to answer.
- We will start with one of the key questions ***“Should I walk or not?”***
- That question, possible answers to it, and background information are held together in a “node” which is displayed as a round ball.
- Click on the **ball icon** to add a new node (or right mouse click, **Add Node**). A “node” represents a factor or an issue in your reasoning.

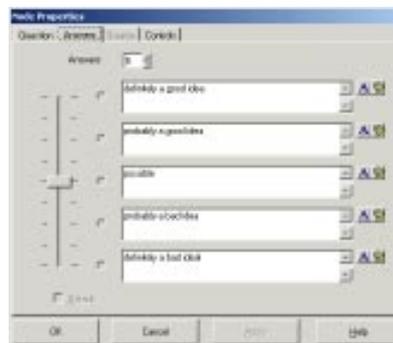


- Double click on the node to open it up. We will call this new node **“walking”**. Type in the nodename, the question, and if you wish you

can also type in the principles that will be used to answer the question, or why the question is being asked. You can change the font or colour of any item by clicking on  or 



- Then click on “**Answers**” and choose how many answers you want to allow (five in this case) and then type in the five possible answers. (You choose between one and ten answers).



- ASSISTUM uses the name of the node and the possible answers to construct sentences when it is conversing with you. These are of the form NODENAME is ANSWER. So choose nodenames and answers that make sense. For example: **walking** is **definitely a good idea**. Use lowercase letters throughout.

Defining the nodes

- The factors or issues that affect the conclusion or answers to a question can be determined in a number of ways:
 - By personal reflection based on experience.
 - By asking “what would change my mind on the conclusion?” What other factor would change it back again? And so on until no more factors are identified.
 - Finding a description of the principles involved in the literature on the subject.
 - Having a conversation with other people, especially if there is an expert available.
 - Testing hypotheses on a business data base
 - A combination of the above.
- It is best to constrain the factors which affect the conclusion to no more than five (ideally three or four) factors as it is difficult to keep more than this in mind at the same time.
- Having built the knowledge base, it may become obvious when using it that the factors need to be modified or added to.
- In this example, by personal reflection and asking what would change my mind, I come up with the following factors for whether I should walk:

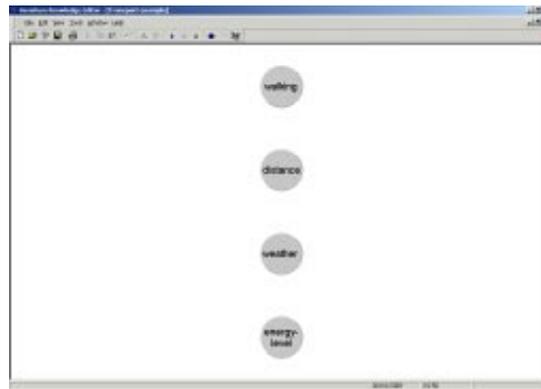
Length of journey (if its not too far, I will probably walk)

Weather (if the weather is wet, I will probably not walk)

Energy level (if I have the energy, I will probably walk)

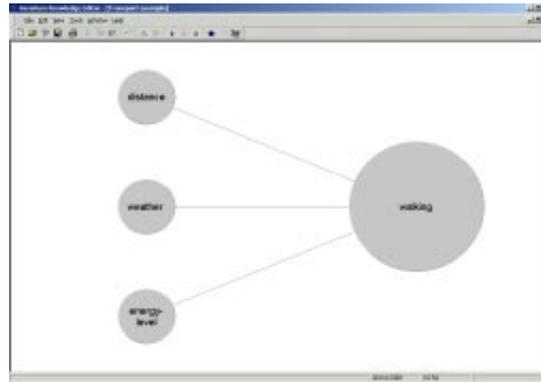
- The next step is to create three new nodes by clicking on the “Add Node” icon three times.
- Take the first new node and open it by double-clicking on it.

- Give it a name (**distance**), choose the numbers of possible answers and type them in, just as you did for the **walking** node. Add a reason for the inclusion of the factor e.g. “If the distance is very far, I definitely won’t want to walk”.
- When typing in the name of the node, note that you can use two or more lines. This is useful if the node has a long name although it does not apply in this case.
- Then open the other two new nodes and call them **weather** and **energy level** and fill in their questions and answers.

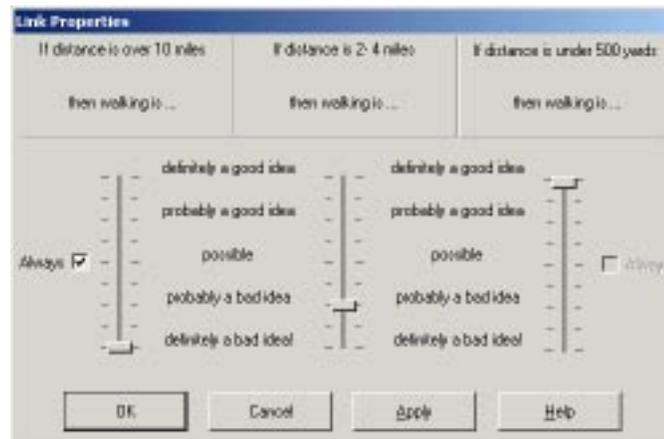


Defining the relationships or “links”

- We now need to link these nodes together to show what factors impact what. In this case, distance, weather and energy level all impact on whether I should walk.
- The easiest way to link the nodes is to click on the dependent node (in this case it is “**walking**”) and then drag the dotted red line to the node that impacts it.
- In this way, link the **walking** node to the other three nodes that impact it. You should end up with this.



- It might be a good idea at this stage to save the knowledge base in case something goes wrong! To save for the first time under a new name choose **File, Save as** and then enter a filename e.g. "transport".
- We now need to put weights on the links to reflect the importance of the relationships. Some factors are more important than others. In this example distance is more important than weather. For example, I might consider walking a very short journey, even if it is raining, but I will not consider walking more than 10 miles even if the weather is glorious sunshine! **Distance** will have a bigger weight than **Weather** in its impact on **Walking**.
- To define the impact weight of one node on another, click on the dependent node and re-drag the line to the influencing node, just as if you were re-drawing a link. Re-drag a line from **Walking** to **Distance** and then click on **Properties**.



- Move the three sliders to the positions on the scale that represents your judgement of what the answer should be *in the absence of any other information*, for each of the three possibilities.
- In this case, if the distance is over 10 miles, walking is definitely a bad idea regardless of the weather or your energy level. If the slider is pulled to the extreme end of the scale (top or bottom) then this acts as an over-ride on any other factors and the **“Always”** box is ticked. No matter how positive or negative the other factors are, the over-ride will always operate. If you do not want the over-ride to operate then click on the **“Always”** box to turn it off. This factor will still have a large effect but can now be counter-balanced by other factors.
- If the distance is less than 500 yards then walking is *almost* definitely a good idea. But the slider is not quite at the top of the scale so the over-ride will not operate and the **“Always”** box is inoperative. In this case, it will balance the positive and negative evidence. If there is a storm outside and you have very low energy, you might possibly use the car to go 500 yards.
- Click **OK** and then input similar judgements on the other links.

The screenshot shows a dialog box titled "Link Properties" with three columns representing different weather conditions: "If weather is heavy rain", "If weather is scattered (shower)", and "If weather is sunny". Each column has a "then walking is..." label. Below these are three vertical sliders. The first slider (heavy rain) has a handle near the bottom, indicating a "definitely a bad idea". The second slider (scattered shower) has a handle near the middle, indicating a "possible" outcome. The third slider (sunny) has a handle near the top, indicating a "definitely a good idea". The sliders are labeled with "definitely a good idea", "probably a good idea", "possible", "probably a bad idea", and "definitely a bad idea". There are checkboxes for "Always" and "Never" on the left and right sides of the sliders. At the bottom are buttons for "OK", "Cancel", "Apply", and "Help".

The screenshot shows a dialog box titled "Link Properties" with three columns representing different energy levels: "If energy level is very high", "If energy level is normal", and "If energy level is very low". Each column has a "then walking is..." label. Below these are three vertical sliders. The first slider (very high) has a handle near the top, indicating a "definitely a good idea". The second slider (normal) has a handle near the middle, indicating a "possible" outcome. The third slider (very low) has a handle near the bottom, indicating a "definitely a bad idea". The sliders are labeled with "definitely a good idea", "probably a good idea", "possible", "probably a bad idea", and "definitely a bad idea". There are checkboxes for "Always" and "Never" on the left and right sides of the sliders. At the bottom are buttons for "OK", "Cancel", "Apply", and "Help".

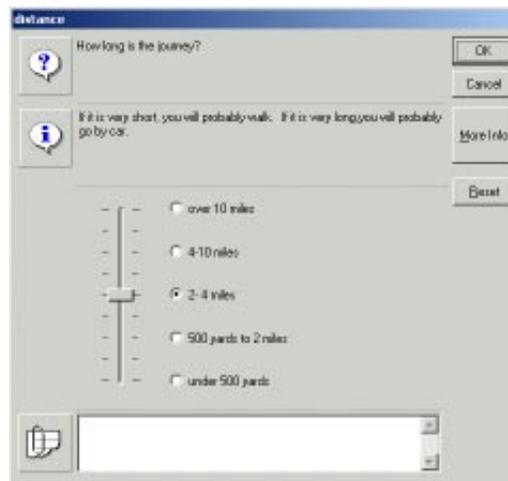
- The slider positions do not need to be symmetrical and often will not be.

Tuning the knowledge base

- The next step is to try out the knowledge base and check that the relationships are the right way round, the conclusions sound and credible, and the explanations convincing and well expressed.
- The aim is not to be 100% correct in every conceivable combination of answers but to be sufficiently credible and robust that it challenges you effectively when you are consulting it.
- Remember it is performing the same role of the human consultant who provides facilitation by asking the right probing questions, rather than the expert who is expected to provide all the right answers.



- If you click on **File, Run** or click on the “run” button, the *Viewer* mode will be activated.
- If you double-click on **distance**, you get something like this:



- You can answer the question by either clicking on the appropriate button, or by dragging the slider bar to the appropriate position (which can be between the specified answers).
- The red and green lines that start appearing are the knowledge base's response to the information you have given it. The red lines are negative, the green lines are positive. The thickness of the lines shows the relative importance it is giving to that factor.
- Next click on **weather** and on **energy-level** and choose **answers**.
- Now you can ask what it thinks about walking. Double-click on **walking**, then choose an answer and then click **OK**.



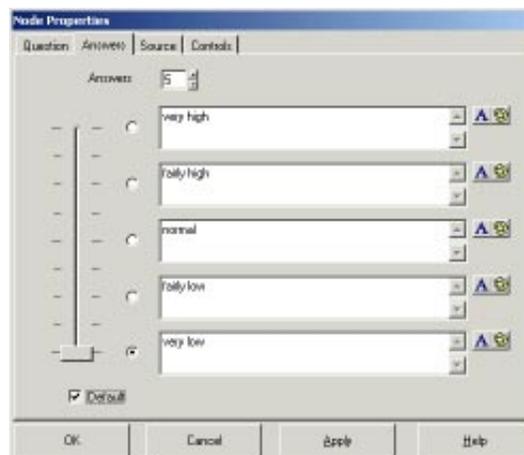
- Now ASSISTUM tells you whether it agrees with you or not, and why. At this stage, you can **Reject** any of its reasoning.
- Or you can simply over-ride ASSISTUM and carry on with your own conclusion by clicking on the **Proceed** button next to your answer. Or you can accept its answer by clicking on the **Proceed** button next to *its* answer.
- Try out a number of cases and make a note of the weights that need adjusting and the words in the answers that need to be improved.
- It is far better to “feel” your way to the appropriate weights by trial and error as if you were playing a game, than to try to calculate

what the weights should be. It is like learning to ride a bicycle: Understanding Newton's Laws of Motion is not much help. Trial and error is much better.

- When you are ready to go back to the **Editor** mode, close the **Viewer** mode by clicking on the X in the top right corner (or **File, Exit**). Or you can directly re-enter ASSISTUM in *Editor* mode by clicking on the minimised icon at the bottom of the screen. In this case, you will need to either **Pause** or **Stop** the *viewer* mode by clicking on the pause  or stop  button. **Pause** will let you edit the knowledge base and then view it again retaining the previous information. **Stop** will simply close the *viewer* mode and leave you in *editor* mode.
- You can now adjust the link weights and alter text as appropriate and then **file, save** or **run** it again.
- You have now learned all you need to know to create an effective knowledge base. The next section describes some additional features that will help you create large knowledge bases more efficiently and also improve their appearance. But you do not *have* to read it to create effective knowledge bases. You already know enough.

More editing features

Default values



- If the **Default** box has no tick in it, then there is no pre-set answer for this node and until this node's question has been answered, it will have no influence on any other node.
- You can set a default answer to any question by clicking in the **Default** box and moving the slider to the desired value. This is useful if you want to pre-set any answer so that it has an immediate effect when you consult the knowledge base. We have set the default value for **energy level** to *very low*! You can always over-ride this pre-set answer if you wish when you are viewing the knowledge base.

Changing text font and colour

- The font and colour of node name or answers can be altered by clicking on the  or  buttons. It is sometimes useful to highlight the different kind of factors by use of font and/or colour.

Useful Menus

- The two following menus are useful in helping you edit the knowledge bases.

For the first, right-click on any node

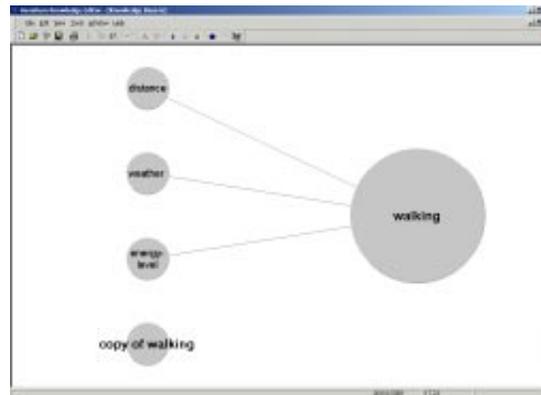


..... and for the second, right-click on the background.



Cut and Paste

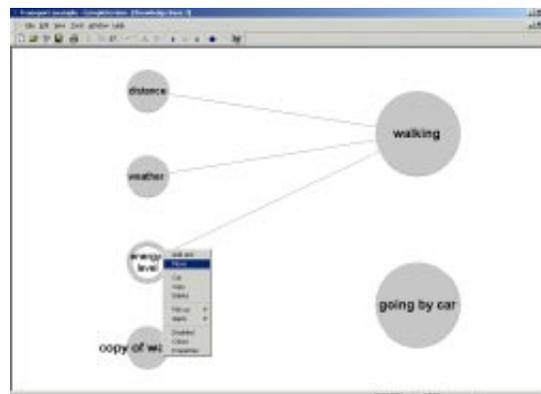
- It is possible to cut and paste nodes by clicking on a node to select it, and then choose **Edit, Copy** and then **Edit, Paste**. This is useful if you want to add a node with similar properties to an existing node.
- In this case we will copy the **walking** node and paste it. It appears as **copy of walking**. We double click on this new node and change its name to **cycling** and edit the question and supporting information. The answers do not need any alteration.



- We do the same for going by car.

Move node around

- By right-clicking on a node and choosing **Move**, it is possible to drag the node to any valid position in the same column of nodes or in a different column.
- We do this now to move the **cycling** and **going by car** nodes to the right hand column.



- We also change the colours of the **cycling** and **going by car** nodes to brown and blue.

Group formatting

- You can choose the font and colour of a number of their node-names at the same time by selecting them (using Ctrl key) and then using the  and  buttons on the toolbar to change fonts and colours.
- We will do this to change the font of the **distance**, **weather** and **energy-level** nodes.

Pick up and Apply node style

- You can transfer not only the font and colour of the node-name, but also the actual set of answers including their fonts and colours. You do this by right-clicking on a node, choosing **Pick up** and then **Answers** and/or **Fonts**, then right-clicking on another node and choosing **Apply** and then **Answers** and/or **Fonts**.
- We will use this when creating the **cycle availability** and **cycle ability** nodes. Because these two nodes have the same colour, font and answers (*yes* or *no*), we can transfer these properties from one to the other. Right-click on **cycle availability** and choose **Pick up: Answers** and then **Pick up: Fonts**. Then right-click on **cycle ability** node and choose **Apply: Answers** and then **Apply: Fonts**.

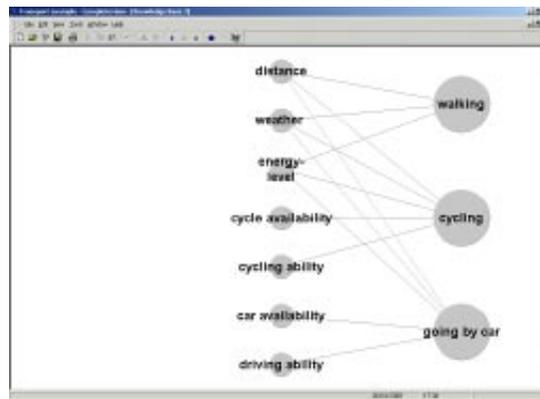
Spell check

- If you right-click on the background and select Spell check, your knowledge base will be spell-checked. N.B. This feature requires you to have Microsoft Word installed on your PC.

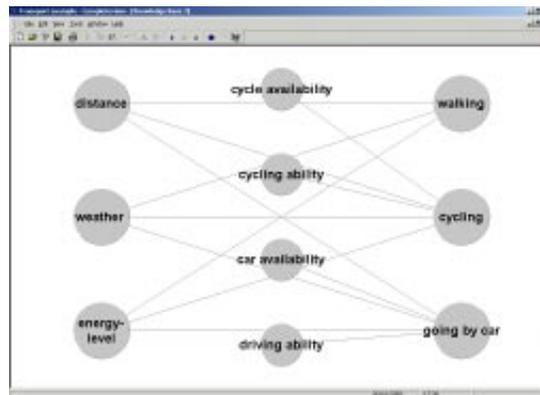
Add layer

- By right-clicking on background and choosing **Add Layer**, you can add an empty column or layer of nodes - useful for spacing out nodes.
-

- In this example, we wish to position the specific questions about cycling and cars in a middle column near those nodes. By choosing **Add Layer**, we produce an empty column on the left hand side.



- Then you can move each of the **distance, weather and energy-level** nodes into the left hand column by right-clicking on each and selecting **Move**.



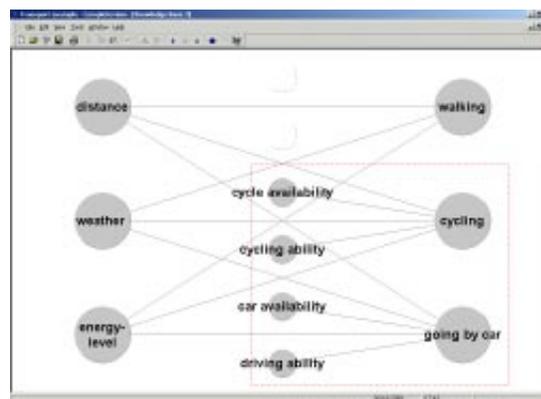
Disabled node

- By right-clicking on a node and choosing **Disabled**, it is possible to make a node and all its connecting links invisible and inoperative. This is useful for spacing out nodes so that it is clear which links connect with which nodes or to cluster nodes near one another.
- In this example, we want the **cycling** and **car** nodes to be near one other. We do this by creating two dummy nodes, moving them to the top of the central column and then disabling them.



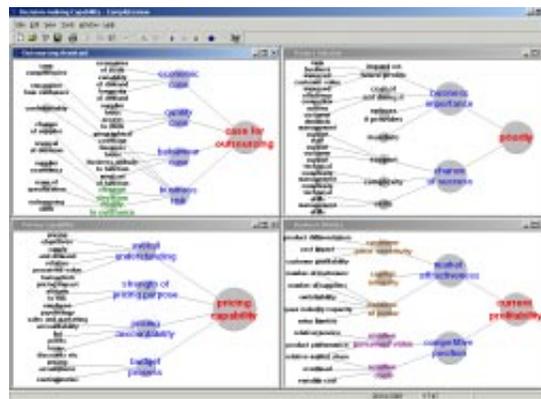
Multiple copying

- By clicking and dragging on the background you can also select multiple nodes and links for copying (into another knowledge base), deleting etc.



Multiple windows

- As in other Windows applications, it is possible to have several windows open at the same time, and to tile them or cascade them to facilitate copying and pasting from one window to another. You can copy whole chunks of nodes and links (by clicking and dragging) not just single nodes.



Restructure

- By right clicking on the background (i.e. avoiding nodes and links) you will get the options to **Restructure** (useful if you have multiple levels of nodes and you want to tidy them up!). If you don't like the results, you can always **Undo** them (see below).

Options – Auto Answer

- If you are in *viewer* mode, and you change the answer to one of the nodes, ASSISTUM will normally blank out the conclusions of any nodes that depend on the altered node, and get you to come up with your conclusion first (to get you to think).
- However, when you are tuning the knowledge base this can get tedious. You may want to try out a number of cases and see immediately how the knowledge base is responding. To turn on the “imme

diate update” choose **View, Options** and then tick the **Auto Answer** box.



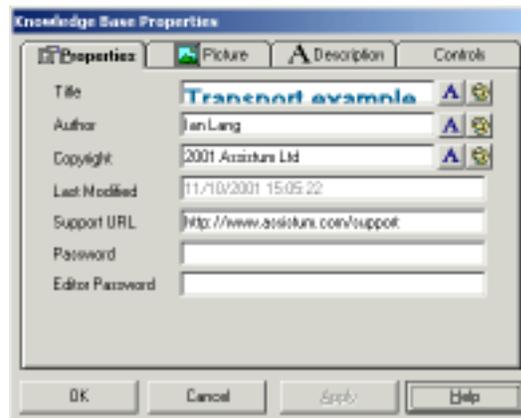
Undo/Redo

Clicking on the **Undo**  button will reverse the effect of your last action. Further Undo's will continue the process until up to 40 actions have been undone. Each **Redo**  will reverse your last Undo.

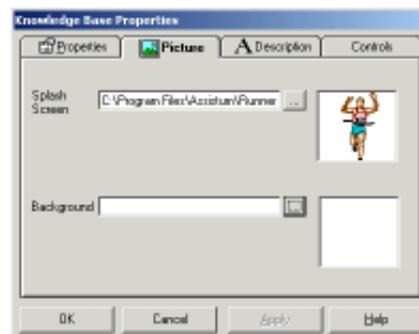
Knowledge base properties

- Finally, you might want to copyright and label your knowledge base with your own splash screen and words of explanation.
- To do this, choose **File, Properties**.



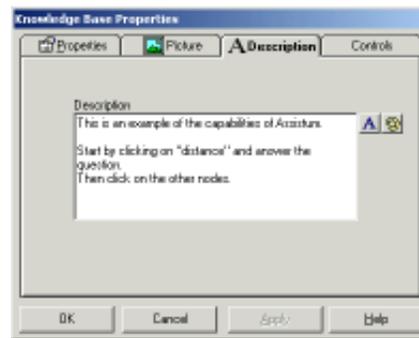


- You can then insert the title, your name, and your copyright notice. You can password protect it, either at the Viewer level so that only users with the password can consult your knowledge base- or at the Editor level so that only developers with your editor password can edit the knowledge base.



- You can insert your own splash screen by browsing and selecting appropriate clip art.
- You can also add your own background which will appear behind the network of nodes. This is useful for branding or for adding

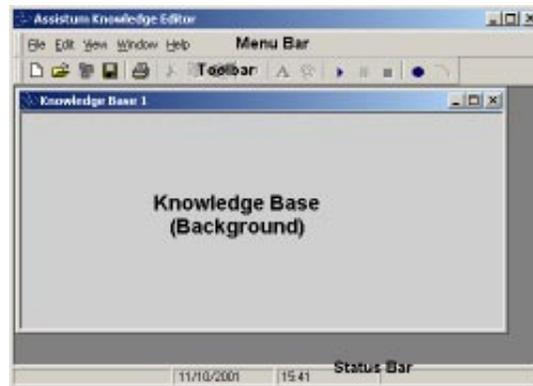
graphics and text to the network



- You can also add your own description of the knowledge base which will appear in the **Help, About** option.
- The use of **Controls** is explained in the reference section.

This is the end of the Tutorial. There now follows a reference section, a glossary of terms and an index.

Main Window



- This is what you will see when you open a new knowledge base in the Editor. It consists of the following elements:

Menu Bar/Toolbar

- This is where you manage your files and access most of the Features that help you create your knowledge bases. A thorough description of all the commands is given below in Working with files.

Knowledge Base window

- This is where the network of nodes and links that make up your knowledge base are displayed. It is sometimes referred to as the network window or network view. Right-clicking on the background will give you a shortcut menu that will let you add nodes, add links, restructure your Network, cut/paste, Delete and copy portions of your network. You can also spell check your knowledge base (Requires MS Word to be installed on the machine) and edit knowledge base properties from this menu. Once you have nodes and links displayed on screen you can access shortcut menus for these elements by right-clicking on them.
- ~~As with many Windows applications, you can have more~~
then ASSISTUM Knowledge Editor

one Knowledge Base displayed at a time. Using **Tile** and **Cascade** from the **Window** menu will help you keep them in order.

Status Bar

- This is a small information bar that displays the time and date.

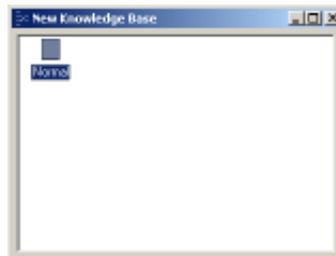
Working with files

To create a new knowledge base



- Click on **File, New** (or the New icon on the toolbar) to create a new knowledge base with nothing in it. You will see the **Template** dialog appear:

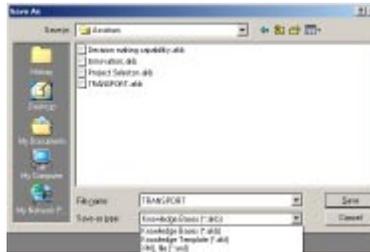
Selecting a Template



- The **Normal** (default) template will give you a blank knowledge base for you to create your network from scratch.
- See the headings "To edit a node (or factor)" and "To create a link or relationship" for information on how to populate your knowledge base.

To save a knowledge base under a new name

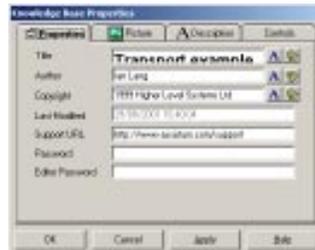
- To save a knowledge base under a new name, click **File**, **Save As**.



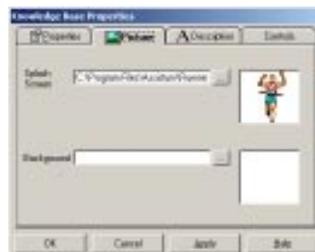
- Type in the new file name (or click on an existing file name if you wish to overwrite that knowledge base) then click on **Save**. You can save knowledge bases in their native *.akb format or in *.xml format, which is useful if you want to edit it using a text editor (see the XML entry in the Glossary for more details). Select the desired file format from the **Save as type** drop-down menu.
- You can also save a knowledge base as a template. Follow the procedure above and select **Knowledge Template (*.akt)** as the file type. Knowledge templates are more fully described under "*.akt" in the Glossary

Knowledge base properties

- To give the knowledge base a name that will appear on screen and printouts (and which can be different from the filename), click on **File**, **Properties**. This will also allow you to enter the author's name, copyright notices, passwords, splash screen, background image and a description of the knowledge base. You can also choose the font and colour of the names, copyright notice and description.
- You can also enter a support URL for your users, which they can access from the viewer by selecting the **Help: Web Site** menu option.



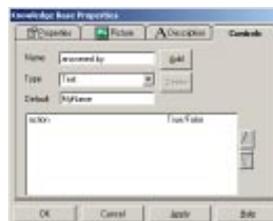
- You can add a password that will make this knowledge base password protected when published so it can only be used by people who know the password. You can also add a password to protect the knowledge base in Editor mode so that only developers who know the Editor password can edit this knowledge base.



- Click on **Picture** to add a splash screen. Browse to find the image that you want to add to this knowledge base. This will appear in the splash screen and also in the **Help About** form in the Assistum Viewer. You may also add an image to use as a background for your knowledge base in the same way.
- Please note that the preferred image format is .gif as they can be stored with the .akb format knowledge base. If you are using .xml format knowledge bases (or other image formats) and move the knowledge base to another folder you will have to reset this property
- Finally, if you click on Description, you can enter a text description of your knowledge base that will appear in the **Help About** form in the Assistum Viewer.



- In the **Controls** tab you can specify custom controls that will prompt the knowledge base user for extra information. Its function is fully described under the "Controls Tab" heading in "To edit a node (or factor)"; the only difference being that controls added from this dialog will appear in every node in the knowledge base currently displayed on the screen.

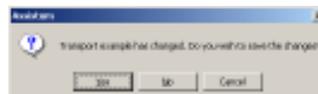


To print out a knowledge base

- To print out the knowledge base, click on **File, Print**. The standard Windows Print dialog will appear, allowing you to select your printer options in the normal way.

To close a knowledge base

- To exit from a knowledge base, click on **File, Exit**, or click on the **X** in the top right corner of the screen. The application will then close. If the knowledge base has been changed without saving, then you will be prompted whether you want to save it before exiting.



The Help Menu

Getting Help

- To get help when using a particular feature, click on the help button on that feature (if there is one) or press the F1 key. This will bring up help about the topic you are currently using.
- For more general help, click on **Help: Contents** in the Menu.
- You can also visit the Assistum Website for support, information and articles about Assistum and knowledge management in general.

The Website

- To request support on the Assistum website, click on **Web Site**. You will need an Internet browser and connection to use this facility.
- Note that in the viewer, selecting this option will take you to the support URL specified in "Knowledge Base Properties".

About Assistum

- This shows you the Assistum logo and graphic, along with version information, copyright notices and a disclaimer.

To edit a node (or factor)

- A "node" represents a factor or an issue in your reasoning.
- It is always worth spending some time thinking about the key question(s) or factors or issues that you want to organise your thoughts about.
- That question, possible answers to it, and background information are held together in a "node" which is displayed as a raised circle.

To create a new node or factor

- Click on the  icon to add a new node, or right click on the ASSISTUM Knowledge Editor

background, then select **Add Node**. Then double-click the node or select **Properties** from its right-click menu to edit the node properties.

To delete a node

- To delete a node, choose **Delete** from its right-click menu or click on it to make sure it is selected then choose, **Edit, Cut** from the Menu or the toolbar.

Question Tab

- The **Question** tab controls the Node **name, question** and **information** properties.



Node Name

- Enter the name of the node. You can change the font or colour. You can also enter the name of the node on two or more lines if it is long.
- Use lower case for the node name. This is so that the sentences that the Assistum Viewer generates when explaining its conclusions do not have capital letters in the middle of them!



Question

- Frame the key question about the factor or issue this node represents, then type it into the field. You can edit font and colour as for the node name.

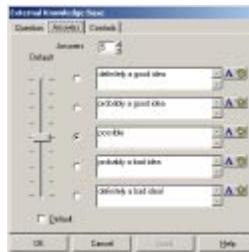


Information

- You can add extra background information that will be presented to the user when she is asked to answer this question. You may want give a reason why you are asking the question, or describe the principle you are going to use to interpret the answer, add a reference code for this node or the initials of the person or department responsible for this question.

Answer Tab

- The **Answer** tab controls what answer options the user will be provided with when consulting your knowledge base.



- Use the **Answers** box to choose how many answers you want to specify. You can have up to ten different answers. Five is generally sufficient. Type in the answers using all lower case. You can specify a

font  and colour  for each answer.

- Check that the phrase "nodename" is "answer" makes sense - i.e. "*walking is definitely a good idea*". The Assistum Viewer constructs sentences using the nodename and answers in this format.

Default Answers

- You can set a default answer to any node that has no children by ticking the **Default** box and moving the slider to the desired value. This is useful if you want to pre-set any answer so that it has an immediate effect when you open the knowledge base in the Viewer. The user can always override the pre-set answer when creating a scenario by answering the question in the normal way.
- If the **Default** is empty, then there is no pre-set answer for this node and until this node's question has been answered, it will have a Degree of Truth of 0.5.

Controls Tab



- Using this tab you can specify custom controls that will prompt the user for extra information. You can set them to appear in all your nodes (when you set the controls from the knowledge base properties dialog), but from here they are specific to the individual node you are editing. When displayed in the viewer, a text box or check box (depending on your requirements) will appear when the user is answering the node's question, and any information entered will be

saved with the scenario and can be used in XSL Reporting.

- The **Name** field sets the control's label that will appear on the question form in the Viewer. Custom controls can be specified as text boxes or a check boxes using the **Type** field. If you wish your control to have a default value enter it in the **Default** box that appears below **Type**. When you have made your selections, pressing **Add** will add your control to the list box below.
- If you wish to alter the properties of a control, click on its name in the list and the values will reappear in the **Name**, **Type** and **Default** boxes. The **Add** button will also change to read "Update"; you must press the **Update** button for your changes to have an effect.

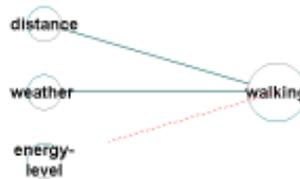
"Need Info" and "Irrelevant" controls

- These are two special types of user-defined control that have extra properties. To access them, you must enter either "Need Info" or "Irrelevant" into the **Name** field (it is not case-sensitive but must be spelled correctly!) and select "True/False" as the control **Type**.
- When a node is marked "**Need Info**" (i.e. when its check box in the Viewer is ticked) it will appear in the Viewer marked as such (under the node name) and will prevent the user from answering any question that this node influences until they untick the box. This is to force a user to provide an answer for a critical factor and not simply override it's influence further up the hierarchy. Nodes are also flagged "Need Info" in the Preconditions dialog, which appears in the Viewer when you click to answer a parent node.
- Nodes marked "**Irrelevant**" will not have any influence on their parent nodes regardless of the answer a user might give them. When answered, they always display a yellow line to signify this. Irrelevant nodes announce their status in the same way as "Need Info" nodes above.

To edit links (or relationships)

To create a link or relationship

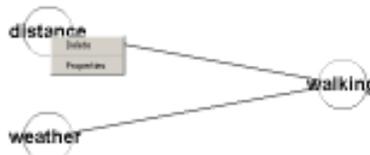
- We need to link nodes together to show what factors influence others, and to what extent.
- To link two nodes together you must first select the parent (or influenced) node. Then you can click the **link** icon or select **Add Link** from the node's right-click menu. A dotted red line will appear stretching from your mouse pointer to the selected node. Move the pointer to the child (or influencing) node and click on it to complete the link. Alternatively, a shortcut method is to click and drag the dotted line from the parent node to the child node.



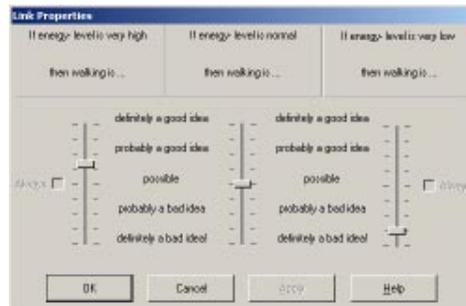
- You can then proceed to edit the link properties

To edit the properties of a link

- Some factors are more important than others. We need to put weights on the links to reflect the importance of the relationships between the nodes.
- To define the impact weight of one node on another, first select a link. To do this, click on the dependent node and re-drag the line to the influencing node, just as if you were re-drawing a link. You will then see the link popup menu appear, from where you can **Delete** the link or edit the link's **Properties**.



- Alternatively if your editor screen is not too crowded you can double-click or right click a link and select **Properties** or **Delete** from the popup menu.
- You will then be presented with the Link Properties dialog:



- Assuming both the parent and child nodes have had their Question and Answer properties properly set, you will have a straightforward set of questions to answer. Move the three sliders to the positions on the scale that represents your judgement of what the answer should be *in the absence of any other information* for each of the three possibilities.
- If the slider is pulled to the extreme end of the scale (top or bottom) then this acts to **over-ride** any other factors and the **Always** box is ticked. No matter how positive or negative the other factors are, the over-ride will always operate. If you do not want the over-ride to operate then click on the **Always** box to turn it off. This factor will still have a large effect but can now be counter-balanced by other factors.
- If more than one influencing link or relationship has an **Always** in operation they may cause a contradiction within their target node under certain circumstances; namely, when one link can "Always affirm" and the other can "Always deny" the truth of the target (influenced) node, and both over-rides have been triggered. Thus, in our Transport example, if "Distance" is ">10 miles" **Always** meant "Walking" is "definitely a **bad idea**", and "Energy Level" is "very high" **Always** meant "walking" is "definitely a **good idea**" then the

"Walking" node will be in contradiction when Energy Level is very high and Distance is >10 miles.

- Potential contradictions trigger warning messages within editor and are flagged up when they occur in the viewer and in Tree View.

To edit the network structure

To copy nodes

- It is possible to cut and paste nodes by clicking on a node to select it, and then choosing **Edit, Copy** and then **Edit, Paste** (or use the toolbar cut and paste tools). This is useful if you want to add a node with similar properties to an existing node. All the properties are the same except that "nodename" becomes "*Copy of nodename*".

To apply node styles

- Sometimes you want to copy the same style as another node (font type, colour and range of answers) but retain different questions.
- To achieve this, you select the node with the style you want to copy (by clicking on it) then right click. From the popup menu, choose **Pick up** and then either **Answers** or **Fonts** depending whether it is the range of answers or the font type and colour that you wish to apply to other nodes. Then click on the target node, right click and choose **Apply; Answers** or **Fonts** (as the case may be).
- Having picked up a style, you can go on to apply it to a number of nodes. This is useful when you want a consistent style for a subset of nodes.

To move nodes

- To move a node, select it by clicking on it. Then right click and select **Move**.



- Then move the node to the desired position, either in the same column or in a column in a different layer. A red dotted version appears so you can see what you are doing. You can only move a node to a legitimate position; i.e. you cannot have a node in the same layer as a node it influences or is influenced by.

To make a node invisible

- To make a node invisible, select it by clicking on it. Then right click and select **Disable**. This makes the node disappear and disables all its properties except for its positional properties. This is useful for spacing out nodes if it is difficult to see which nodes the links are connecting to.

To colour a node

- To give a node its own special colour, select the node, right click and select **Colour**. A colour box will then appear, with functions as described in "To change the colour scheme".

To spell check the knowledge base

- A spell checker is included. This requires you to have Microsoft Word on your PC. To check the spelling in your knowledge base, simply right click on the background and choose **Spell Check**.

Cutting and pasting

- You can select multiple nodes and even fragments of knowledge

bases (including links) by dragging a box across the nodes to be selected then **Edit, Copy**.

Using multiple windows

- You can even open multiple windows (**Windows, Vertical**) and cut and paste between different knowledge bases.

To add a new layer

- To add a new layer (i.e. space for a new column of nodes), click on the desktop then right click and select **Add Layer**. This creates a new empty column to the left of the knowledge base.

To restructure

- If you get into a real mess with the structure of your knowledge base, you can always click on the desktop then right click and select Restructure. This will rebuild you knowledge base in the simplest format. You can then juggle it around using the Move method.
- We suggest you save your knowledge base before you restructure in case you want to go back to your original!

To change the appearance of the Editor screen

The View Menu

- You can change the appearance of the screen:
- by adding or removing **Toolbar** or **Status Bar** (see below)
- by changing the colours
- If you are working on a knowledge base that consists of a network of Nested Knowledge Bases you can display it in two different ways:
- **Overview** shows the relationship between linked knowledge bases as a network of octagonal nodes. Each of these nodes

repre

sents one of the knowledge bases in the network and the links indicate their position in the overall hierarchy. Clicking on one of these nodes will take you to the relevant knowledge base. For a more detailed explanation, see the heading "Knowledge Base Overview"

- **Complete** view shows your entire network as one large knowledge base allowing you to trace a path of links all the way through the hierarchy if you wish. It can look rather cluttered with very large knowledge bases and is read-only, i.e. you cannot edit the knowledge base in this view.
- Click on **View** on the top of the screen.



To remove the toolbar

- Click on **Toolbar** to remove the toolbar. This is a toggle switch so you can click on it again to add it back.

To remove the status bar

- The status bar is the line at the bottom of the screen that gives the date and time. If you want more room to display the knowledge base, you might want to remove the status bar.
- Click on **Status Bar** to remove the status bar. This is also a toggle switch.

To change the colour scheme

- To change the colour of the background, highlights, nodes, shadows or links, click on **View, Options** and then  by the item you want to change. The **Colour** dialog will appear, giving you a choice of **Basic Colours**, or click on **Define Custom Colours** to choose your own colour. Click **OK** to apply them. Once applied, these new colours will be the default whenever you run the Editor, until you change

them again. You can have a different set of colour defaults in Viewer mode. Auto Answer is explained in the "To test the knowledge base" chapter under "To check the overall credibility".



To test the knowledge base

- The Viewer mode is activated in Editor by clicking on the  button or selecting **File: Run** from the menu.
- This launches the Assistum Viewer so that the developer can test out how the knowledge base operates and then go back to the Knowledge Editor to tune it further. All the functions of the Assistum Viewer are available apart from saving your scenarios. In practice, it is recommended that you use the Viewer simply to test out the knowledge base that is under development.
- When you have finished a testing session and wish to revert to the Knowledge Editor, you can either close or pause the Viewer session so that you can edit the knowledge base and then come back.

- You answer the question either by clicking the option nearest to your answer, or by moving (click and drag) the slider to the position that is even nearer your answer than any of the options available

Preconditions To Answering Questions

- If you click on a node to answer a question, and not all the lower level questions have yet been answered, i.e. the preconditions have not yet been met, you will get a list box like the following:



- Double click on any of the lines that are Unanswered to move to that issue. When all the subsidiary issues have been Answered, you can then proceed to answer the current question by clicking on **Proceed**. If you want to go back to the Network View to get another look at the context, click on **Navigate**.
- If you feel you do not need to examine all the subsidiary questions because you have a firm view on the current question, you can go ahead with Proceed, even though some of the subsidiary questions still have Unanswered next to them. Note; this is not the case if the need info property has been set to true for one of the influencing factors.
- Sometimes, a question may have been given a **Default** answer. This means that an answer has been assumed by the knowledge base. You can over-ride a **Default** answer by clicking on that line or you can just accept it.



Choosing Between Your Answer and Assistum's Answer

- For any factor or issue that has subsidiary issues, Assistum will reach its own conclusion using the general principles built into the knowledge base and the specific information you have given it.
- It will not reveal its conclusions until you tell it what your own conclusions are. This is to get you to think and to prevent you from using it as an "expert system" that thinks for you. Its purpose is to challenge your thinking and point out inconsistencies. The final conclusions are your responsibility!
- When it reveals its conclusion, if it disagrees with you it will explain why. You then have the option of proceeding with your original answer, (click Proceed opposite your answer) or proceeding with the Assistum answer (click Proceed opposite the Assistum answer).



To check the nodes (or factors)

- You need to check that the nodenames are correct, that the questions and answers make sense and are spelled correctly. If you have any links to external information sources or other knowledge bases you also need to check these work correctly.

To check the links (or relationships)

- The colours of the lines show whether the factors are supporting or denying the conclusion. The thicknesses of the lines show the strength of impact. Questions whose answers have a neutral impact show a thin yellow line. Those which have not yet been answered do not show any colour at all.
- The default colours can be altered using the View:Options dialog.



- It is very easy to overlook some links and forget to set weights for them. The easiest way to show this up is to set all the question slider bars at the top and then at the bottom. It is easy to see any links that are not colouring up.

To check the overall credibility

- You need to check that it is giving credible answers to a range of possible cases. It is best to concentrate on each dependent node and then methodically change the answers to the nodes that impact that node - looking for strange answers.
- To help with this, there is a very useful **Auto-answer** option in the View:Options menu. If you click on this, the impact of any answers are propagated right through the network. This enables you to test many combinations of answers very quickly. Remember to turn this option off again to revert to the normal

Assistum behaviour of

querying your answers in parent nodes.



To check the language

- To check the naturalness of the language you must answer some questions, working up from child to parent nodes so that Assistum argues with you. Go through the text and observe any clumsy constructions. You may need to change some node names or answers or remove some capital letters.



To check the properties

- Finally check the properties of the knowledge base by clicking on **Help, About**. You can see whether the splash screen is correct and the textual description fits in the box.

To close the Viewer session

- To stop testing the knowledge base and revert to the Editing mode, click on **File, Exit**, or click on the **X** in the top right corner of the screen. The Viewer will then close. If the knowledge base has been used or a scenario has been changed without saving, then you will be prompted whether you want to save it before exiting.
- You can also close the Viewer session by re-entering the Knowledge Editor session (by clicking on its icon at the bottom of the screen) and then click on the **"Stop"** button.



To pause the Viewer session

- Sometimes, you might want to preserve the data in the test case, make a minor alteration using the Knowledge Editor and then resume testing.
- To do this, you re-enter the Editor session (by using **Alt+Tab** or clicking on its icon in the Windows Taskbar) and then click on the "**Pause**" button.

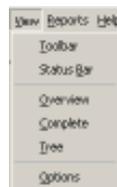


- When you have finished making the amendments, click on the "**Play**" button to resume testing.



To change the appearance of the Viewer screen

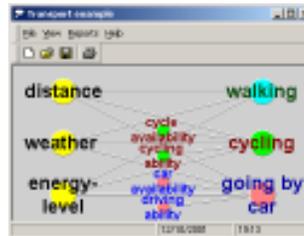
- This menu lets you change the way Assistum displays its information on-screen. It shares most of its functions with the View Menu in the Editor with the addition of the Tree View. Click on **View** in the Menu Bar at the top of the screen to access the menu.



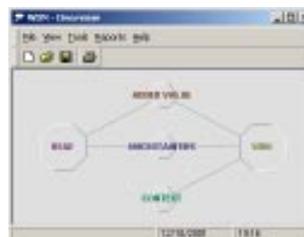
Knowledge Base Overview

- If you are viewing a simple, standalone knowledge base, selecting

this option will show you the standard Network view.



- This is the view you will use when answering questions to create a scenario.
- If you have a complex knowledge base consisting of multiple linked or nested knowledge bases, the Overview will help you navigate around the networks by presenting all the linked knowledge bases on one screen in their own familiar network style, except distinguishable from a network view by the octagonal shape of the nodes. Note that with nested kb's, this is the view you will see when first opening a knowledge base in the viewer.
- Each node represents a nested knowledge base and its position on the screen indicates its level of nesting within the overall structure. In the graphic below, "WDN Top" is the top-level knowledge base which has three other knowledge bases nested within it. It is also indicated that two of these knowledge bases also have a nested kb, in this case the same one, "HS&E".



- Clicking on one of the octagonal nodes will zoom you in to the relevant knowledge base in Network view so you can start answering

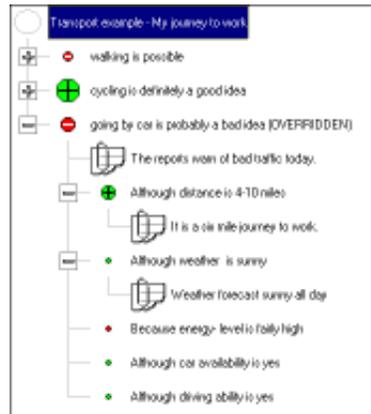
questions.

Tree View

- To look at the knowledge base in tree view, click on **View, Tree**.



- By clicking on the + sign we can drill down as far as we want to get more detailed explanations of the conclusion.
- Any notes that have been made will also be displayed. This is useful when reviewing why a particular decision or conclusion was reached.
- The red spots "pull" in one direction, and the green spots "pull" in the other. The size of the spots indicates the impact it is having on the dependent conclusion.
- Yellow spots indicate a balanced conclusion. White spots indicate that the conclusion is not yet known. You can continue to drill down on unknown nodes. You can also drill down into nested knowledge bases.
- If an answer is a default, it will say DEFAULT after it. If an answer has been imposed by the user, it will say OVERRIDDEN after it. If a conclusion is definitely true or definitely false and this ALWAYS implies the dependent conclusion is definitely true or false (regardless of other evidence), it will say ALWAYS after it.



- The view can be printed out in full by clicking on **File, Print**.

Glossary of terms

*.akb

This is the file format of a standard assistum knowledge base. It is created and editable by the Knowledge Editor and readable by the Viewer.

Alternatively, a knowledge base can be saved in XML format.

*.aks

This is the file format of an open assistum knowledge senario. It is created by a Viewer when using an akb *.akb knowledge base. It contains the description of the particular case being analysed, the answers agreed and any attached notes, plus the actual knowledge base that was used to create it.

The **Viewer** (assistum.exe plus components) can read or update any *.aks file. It will use the version of the knowledge base that was saved with it.

*.aks files can be read and the underlying knowledge base modified by the Knowledge Editor.

*.akt

This is the file format of an assistum knowledge template. The template is useful if you want to save time when developing a set of knowledge bases which share many of the same issues and factors. It is also a good way of storing VBA functionality that you want to reuse – simply save a network containing VBA extensions but no nodes, with a name such as "Export to Word VBA" and you can quickly create new VBA –enhanced knowledge bases.

Templates are otherwise identical to standard knowledge bases and once open in the Knowledge Editor, are saved in *.akb format by default.

*.asn

This is the file format of an assistum senario created using Version 4

of the Assistum software. They have been superseded in Assistum Version 5 by the *.aks format. *.asn files opened by a version 5 Editor will be automatically converted to this format.

Degree of Truth

Each node has a Degree of Truth (DOT) associated with it. The DOT varies between 1.0 (completely true) and 0.0 (completely false). It can be part true and part false. The DOT of every node in an unused Knowledge Base is 0.5. The DOT of a node changes when questions are answered by the user and corresponds to the position of the slider bar they select on the question dialog.

Export to Word

This VBA extension to the basic Assistum functionality allows a scenario to be represented in an MS Word document in a similar form and with all the information shown in the Tree View. It can then be edited and typeset with as much flexibility as MS Word allows.

This feature is accessed from the custom **Tools** menu, which appears when the necessary VBA code exists within a knowledge base.

Fuzzy Logic

This is the technology used by **Assistum** to manipulate the degree of truth of a node and compute the impact on the degree of truth of any dependent nodes.

Java Viewer

This application is designed to mirror the functionality of the Windows Viewer and allow knowledge bases to be consulted across an intranet or the Internet using any Java-enabled browser. It consists of an **assistum.jar** file, the knowledge base to be viewed and an HTML page to run the Viewer applet in. There may also be other associated files such as .xsl files to add reporting capabilities, and images for splash screens and/or background graphics.

Knowledge Base

A knowledge base is a network of nodes and links together with their properties (names, questions, answers and link weights) that represent a particular domain of knowledge and can be accessed by a user using a Viewer.

Knowledge Editor

This is an application that allows a developer to create, modify or publish a Knowledge Base. The Editor has its own built-in Viewer which is used by the developer to test and tune Knowledge Base.

Leaf node

A node with no children, or a "bottom level" node. A node with no influencing factors, but capable of being linked to another knowledge base (see "Nested Knowledge Base").

Link

The relationship between any two nodes is represented by a **link**. This is shown as a line connecting two nodes. It has properties created by the Knowledge Editor of an affirmation weight, a neutral weight and a denial weight.

Affirmation weight represents the impact on the dependent node if the DOT (degree of truth) of the influencing node is totally true. Neutral weight represents the impact on the dependent node when the DOT of the influencing node is half way between totally true and totally false, and denial weight represents the impact on the dependent node if the DOT of the influencing node is totally false.

Nested Knowledge Base

If some nodes require answers that are the properties of nodes in another knowledge base, the nodes can be linked. It is possible to link to several nodes in the same knowledge base or to nest the knowledge bases several layers deep.

Nesting your knowledge bases helps keep complex issues under control by breaking them down into smaller networks. It also pro

notes reusability and team working as existing knowledge bases can be linked into new projects even if they were developed separately.

You can only nest knowledge bases using the Business or Enterprise Editors, although you can edit and navigate a nested knowledge base in any editor.

Node

A factor or an issue that has to be considered in a domain of knowledge and impacts other issues is represented by a node, for example a price sensitivity node in a knowledge base about changing prices. A node is represented on screen by a coloured circle linked to the other nodes that either influence it (called **Child** nodes) or are influenced by it (**Parent** nodes).

A node has a number of properties which are created by the Knowledge Editor: a name, a question, information about it, possible answers and a degree of truth of the top answer being true. When first created, a node has a degree of truth of 0.5, i.e. it is half true and half false. This degree of truth can be altered by the user when using the Viewer to input information about a particular case or scenario.

Scenario

A particular case that has been analysed using the Viewer. In other words, it is a knowledge base which has already been answered and perhaps annotated by a user examining a particular case. It can be saved, reviewed later or sent to someone else who can review it or change it using a Viewer. See "*.aks" and "*.asn".

VBA extensions

Visual Basic for Applications code can be added to any Assistum knowledge base using the Enterprise Editor, allowing the basic Viewer functionality to be extended and customised.

The VBA modules are now stored together with the knowledge base as a single file.

Knowledge Viewer

This is an application that allows a user to consult a Knowledge Base

and consult and save a scenario.

XML

Assistum now uses Extensible Markup Language to store knowledge bases internally (while they are running in the Editor or Viewer) and can also save a knowledge base to .xml format. This means that a knowledge base can be read by a wide variety of applications thus simplifying its integration into any organisation's information network.

XML knowledge bases can also be edited using a text editor (such as Notepad) which can facilitate the modification of batches of properties in large networks by using a Find and Replace feature. If you then open the knowledge base and re-save it in .akb format so that it can only be modified in the Knowledge Editor.

XSL Reporting

From Version 5 onwards, Assistum knowledge bases are stored internally as XML. This means that a scenario can be exported directly to a browser as HTML thus creating a easily distributed report format.

This requires that there be an XSL document (Stylesheet) in the application directory which can correctly markup the knowledge base XML into a readable report. This feature can then be accessed through the **Reports** menu, which will show all available report stylesheets.

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