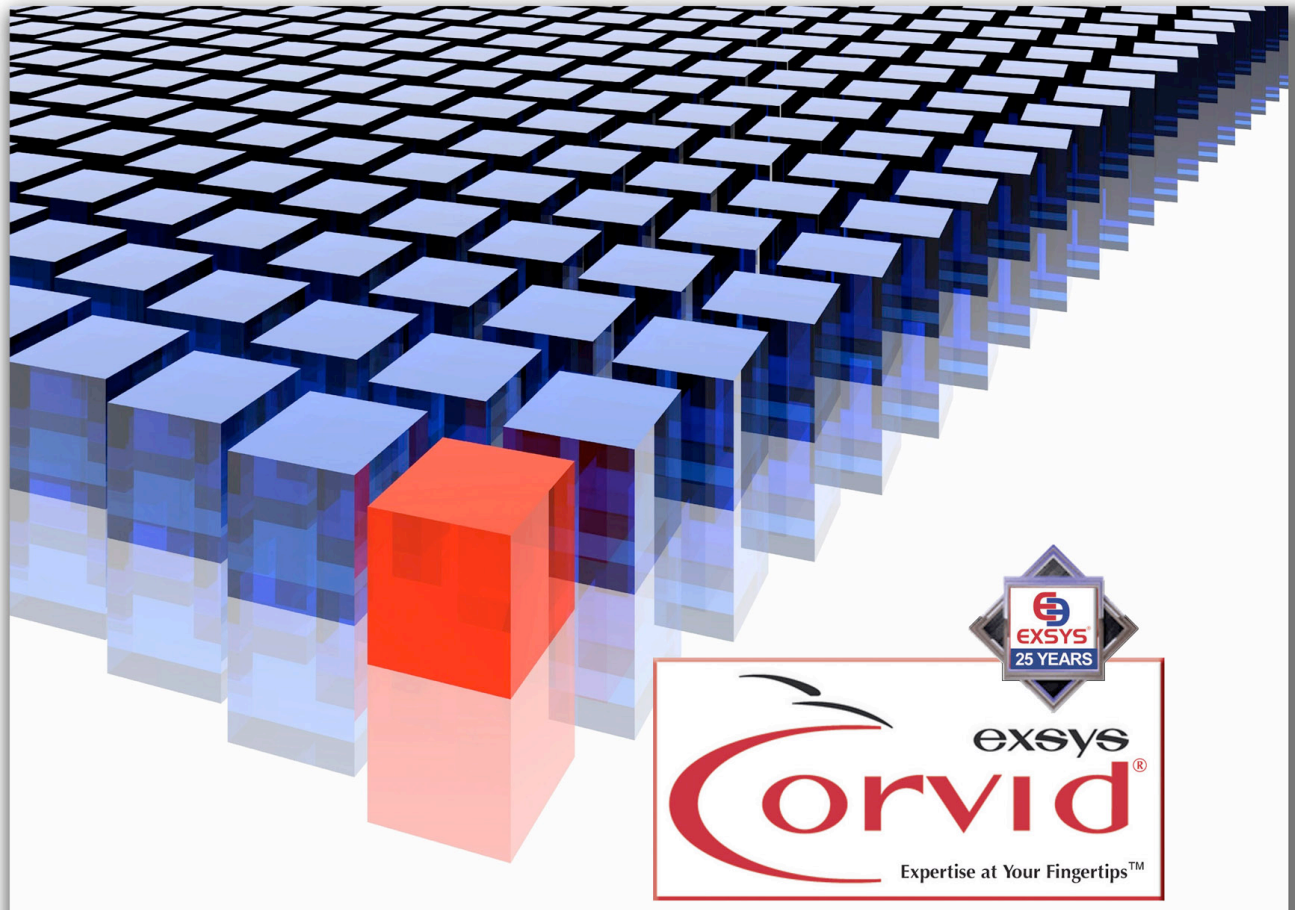


The Industry Proven Software and Services for Knowledge Automation Expert Systems

Quick-Start Guide

Building Knowledge Automation Systems with Exsys Corvid

- Quick-Start Tutorial – Using Action Blocks

Exsys Corvid is a very powerful environment for developing knowledge automation systems.

It allows the logical rules and procedural steps used by experts or business operations to be efficiently emulated in a system that is easy to read, understand and maintain. In an interactive session delivered online, the underlying Inference Engine processes the problem-solving logic to interact with the end user as if they were talking to the expert, producing situation-specific recommendations and advice on a wide range of subjects.

Decision-making knowledge is delivered to prospects, customers and employees when they need it, efficiently providing needed answers - not just data - to precisely solve their specific problem at hand. Corvid systems can provide advice, access and analyze external data, automate reports, monitor for developing problems, perform diagnostics, optimize operations, troubleshoot, alert operators to unusual situations and perform many other decision support tasks. Systems can be fielded on the Web, run stand-alone or may front-end to existing process control systems.

Proven across the enterprise and throughout organizations from broad application decision support to smarter business rules, and "best practices" implementation to knowledge asset management. Businesses using this technology are increasing productivity, cutting costs and improving customer relations - while creating new profit centers and achieving demonstrable return on investment.

SOME PROVEN AREAS FOR KNOWLEDGE AUTOMATION SYSTEMS

- Diagnostics
- Best Practices
- Regulatory Compliance
- Engineering Assistance
- Predictive Maintenance
- Troubleshooting
- Help Desk
- Customer / Sales Support
- Product Selection
- Monitoring
- Scheduling
- Smart Questionnaires
- Risk Identification
- Complex Document Generation
- Training
- Automated Visitor-Specific Web Sites

This Quick-Start document is designed to get you started using Exsys Corvid, and give you some ideas of how you can use it using Action Blocks in a tutorial – "Financial Smart Questionnaire".

It is highly recommended that you follow along with the tutorial and actually build the systems. This will give you a good background to start your own systems. In addition to this document there is the full Corvid manual. It provides much more detail on the functions and capabilities of Corvid.

The Exsys web site also includes a "How To" section that provides detailed instructions on specific commonly needed tasks, such as interfacing to databases, building dynamic web sites, saving state, running validations, etc. If your applications require these functions or you have questions about them go to: **www.exsys.com/support/howto** on the Exsys web site.

Expertise at Your Fingertips™

Working with Action Blocks

Exsys Corvid Action Blocks provide another way to describe decision-making logic. They are an alternative to Logic Blocks for certain types of systems, and can often be used in conjunction with Logic Blocks. They utilize a series of questions along with possible values that may be selected, or Boolean expressions that will be true or false based on the system users' input. Each value/expression can have one or more associated actions such as setting values, skipping over questions, running other Logic, Action or Command Blocks, executing Corvid commands, etc. This is a very simple way to describe logic that can be rapidly learned, and it is applicable to a wide range of problems – especially when combined with Logic Blocks' capabilities.

Representing simple forward-chaining logic, Action Blocks are ideal for:

- Smart Questionnaires
- Surveys
- Dichotomous keys
- Anywhere a more structured approach to the system user interaction is needed

The best way to see how Action Blocks work and how easy they are to use, is to go through the following Action Blocks tutorial. A more in-depth overview of all Logic Block capabilities can be found in Chapter 8 of the Exsys Corvid manual.

The Tutorial System

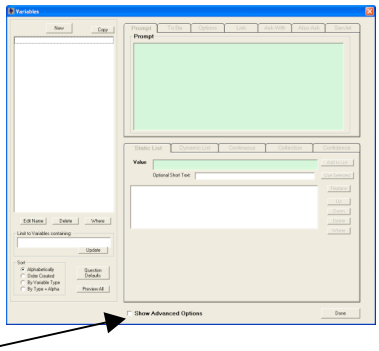
For this tutorial, you will build a system that will give a user advice on their financial status. This will be done using a "smart questionnaire" as a financial assessment created with Action Blocks. For credit cards, the system will consider how many cards the user has, their credit balance and income. It will generate a report on any potential problem areas.

Starting a System

Open Corvid and select "New" from the "File" menu. Name the system "AB_demo". It can be put in any convenient directory, or create a new one.

Adding Variables

The system will need some variables to ask questions of the user, perform calculations and build reports.



Click on the Variables icon on the command bar to display the Variables window. The Variables window is used to add and edit variables in the system.

Make sure the "Show Advanced Options" checkbox is NOT selected.

Variables can be used to directly ask the user for information that will be used in the system, for internal use to do calculations, hold values or build reports. The questions you want the system to ask the user are:

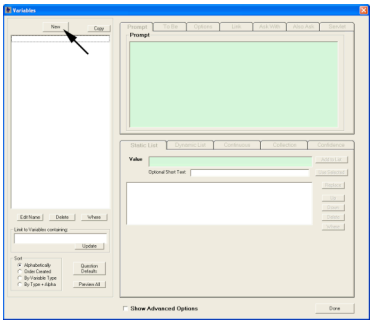
- Do you have credit cards?
- How many cards do they have?
- What is the total balance on the cards?
- What is your annual income?

In addition, checking account questions will be used to start the next section.
The system also needs a variable to hold the ratio of debt to annual income, and a variable to build a report on status. Each variable has:

- A **Name** that describes the variable. Names should be short, but descriptive and clear. Names cannot include spaces and some other special characters, but Corvid will automatically convert any illegal characters to underscores. (Underscores are not visible to the systems user.)
- A **Prompt** to use when asking the user for data or in reports.
- A **Type** that determines what type of value will be assigned to the variable. The most common types of Corvid variables are:
  - Static List - Has a multiple choice list of values
  - Numeric - Assigns a value that is a number
  - Collection - Assigns pieces of text that will build up a report

The variables in the system will be:

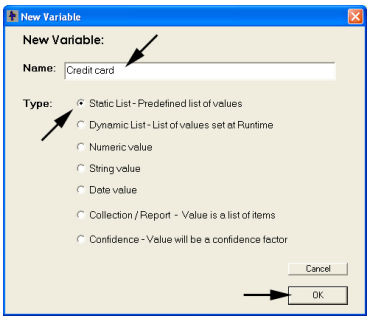
Name	Prompt	Type
Credit_Card	Do you have any credit cards?	Static List Values: Yes / No
Number_of_Cards	How many credit cards do you have?	Numeric
Card_Balance	What is the total balance on all credit cards?	Numeric
Annual_Income	What is your annual income?	Numeric
Has_A_Checking_Acct	Do you have a checking account?	Static List Values: Yes / No
Debt_ratio	Ratio of credit card debt to annual income	Numeric
Report	Report	Collection



To add a new variable, in the Variables window click the “New” button. This will open a window to enter the name and type for the new variable. Variable names must be unique and cannot include spaces, or the characters:

[! ~ ! @ ^ & * ( ) - + = " ? > < . , / : ; { } | \ `]

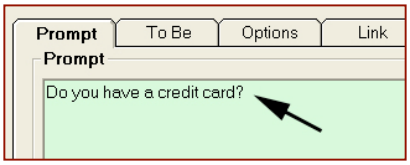
However, if spaces or any illegal character is included in the name, Corvid will automatically convert it to an underscore character.



Enter “Credit card” as the name, and Corvid will convert it to “Credit_card”.

Since this is a question that will have only 2 possible values, “Yes” and “No”, the type should be Static List. Make sure “Static List” is selected and click the OK button.

This will add the variable to the variable window. The Prompt is automatically set to the variable name. For variables that will be asked of the end user, the Prompt should be changed to a question that will be easy to answer. Here change the Prompt text to “Do you have a credit card?”



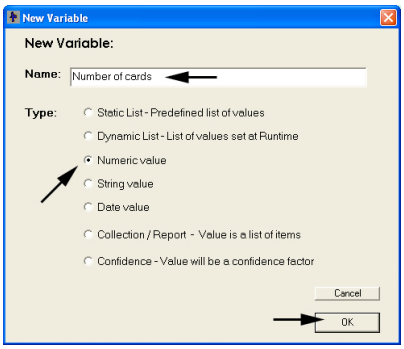
For Static List variables, the list of possible values must be defined. This question will have only “Yes” and “No” as values. Enter “Yes” in the green value edit box and click the “Add to List” button. This will add “Yes” in the list box below.

Now enter “No” in the value edit box and click the “Add to List” button again, to add that value to the list.
That is all that is needed to define the first variable.
As soon as a change is made to any parameter it is immediately applied to the selected variable.

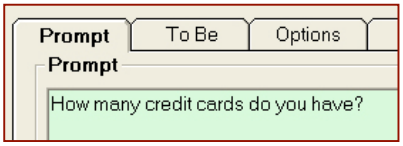
The next variable is a Numeric variable. These are even easier to add.

Click the “New” button in the Variables window to bring up the windows for entering the name and type of the new variable.

Enter a name of “Number of cards” and set the type to “Numeric”. Click the OK button.



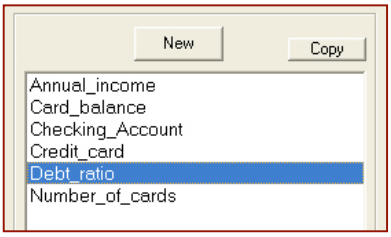
Change the Prompt to “How many credit cards do you have?” Since this is a Numeric variable, it does not have a specific value list, and it is fully defined.



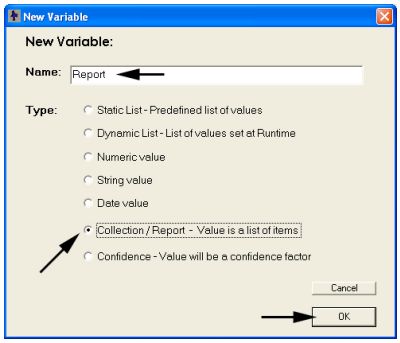
Follow the same steps to add the next 4 variables:

Name	Prompt	Type
Card_Balance	What is the total balance on all credit cards?	Numeric
Annual_Income	What is your annual income?	Numeric
Has_A_Checking_Acct	Do you have a checking account?	Static List Values: Yes / No
Debt_ratio	Ratio of credit card debt to annual income	Numeric

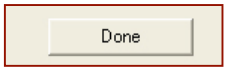
Once they are added the variable window should look like:



The last variable to add is a Collection variable that will be used to build a report. It's name is "Report". It is added just like the other variables, but the Type is "Collection / Report". In this case the Prompt can be left as "Report".



That is all the variables needed for this tutorial. When you build your own systems, it is not required to add all variables at the start. Additional variables can be added at any time. Also, all properties of the variable can be changed at any time – except the Type. The Type can be changed until the variable has been used in one of the Action Blocks. Close the Variables window by clicking the "Done" button.

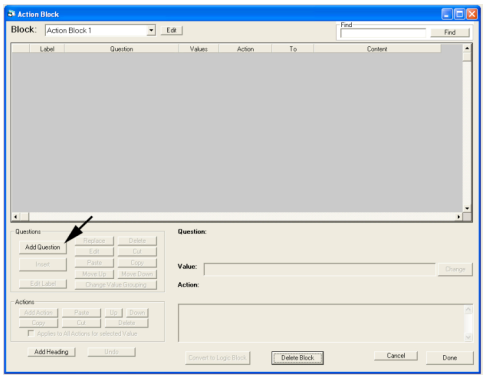


Building Rules in an Action Block

Now that the variables are entered, the next step is to build the rules in the Action Block.

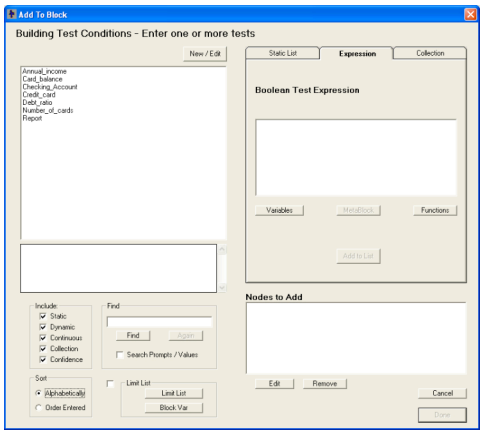
Open a new Action Block by clicking on the Action Block icon on the command bar.

Click on the "Add Question" button to add the first question in the block.



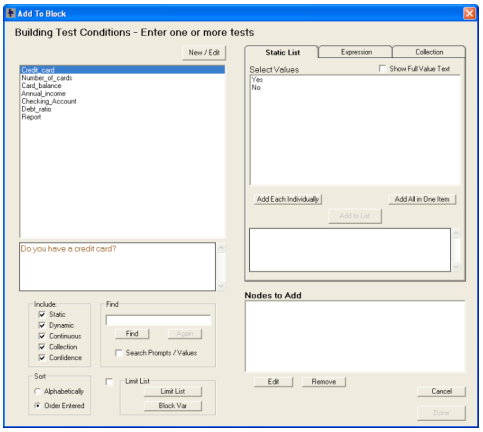
This will display the window for adding content to both Action Blocks and Logic Blocks. The variables in the list are ordered alphabetically. Since the variables were entered in roughly the order that you plan to use them, it would be more convenient to arrange them in the order that they were entered.

To do this, in the "Sort" control group in the lower left, click the "Order Entered" radio button. This will display the list in the order that they were added.

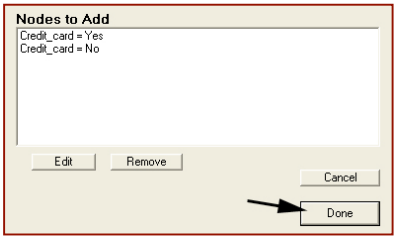


Click on the "Credit_card" variable in the list to select it. The "Yes" and "No" values for the variable are displayed in the right list box.

You want a separate rule for each value. Click the "Add Each Individually" button.



The 2 values are now seen in the “Nodes to Add” list at the bottom right. Click the “Done” button to add the nodes to the Action Block.

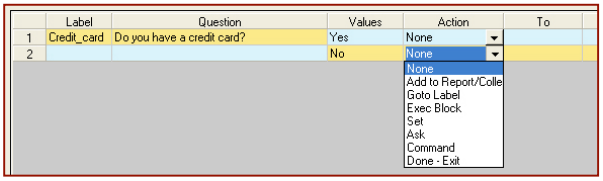


Two lines have been added to the Action Block spreadsheet for the 2 possible answers that the end user may provide. Now assign the action.

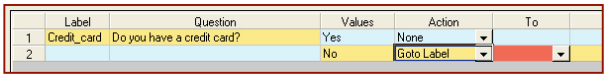
	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	None		
2			No	None		

If they don’t have any credit cards, there is no reason to ask more questions about them. So, the action for the “No” value should be to skip over the questions you will be adding on credit cards in the next section.

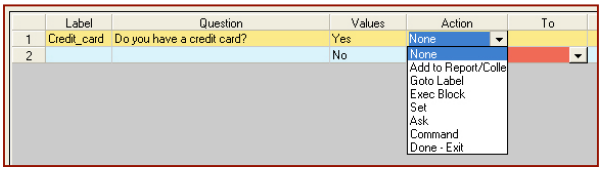
Click on the Action dropdown list next to the “No” in the values column. (*Be sure you are on the second row next to the “No”*)



Select “Goto Label”.

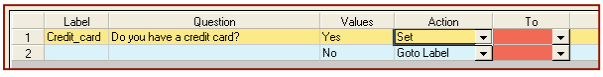


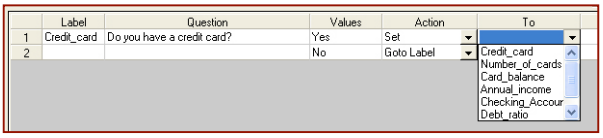
The cell in the “To” column will turn red to remind you that a value needs to be entered there. However, the other questions have not been entered yet, so just leave this as a reminder to select a label later.



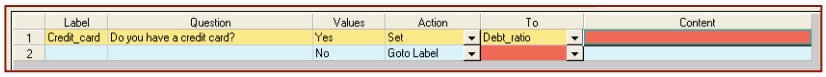
Now for the “Yes” value. There are various ways this can be approached. One option would be to not have any action associated with this value. If the user says “Yes”, it would not do anything, but would just move on to the next question that you will add. If they said “No”, the Goto Label action would skip over the credit card questions.

Here you will use a more advanced approach using the Set action to calculate a value that can be used later. In the Action column next to the “Yes” value, click the dropdown list and select “Set”. The “To” column turned red to remind you that the variable to be “Set” needs to be selected.





The “To” cell also became a dropdown list of all the variables in the system. Pull down the dropdown list and select “Debt_ratio”.



If you need to make the “To” column wider, click on the vertical divider just right of the “To” in the header, and drag it to the right.

Now add the value to assign to the variable Debt_ratio. For this system, the debt ratio is the balance on all the cards divided by the annual income. The variables Card_balance and Annual_income were already added to the system to do this calculation.

In Corvid, expressions can include the value of any variable by putting the name of the variable in double brackets [ ]. Corvid supports standard algebraic operators along with many functions. All that is needed here is division. The expression:

[Card_balance] / [Annual_income]

will calculate the value of the variable **Debt_ratio**.

Click on the Content column in the row for the "Yes" value.

Whenever a row is selected, the lower right section of the window displays the question, value, action and content.

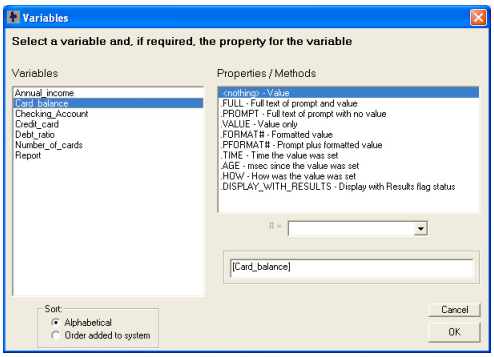
The content text can be entered either directly in the spreadsheet, or in the Content edit box. In most cases, it is easier to add and build expressions in the edit box because a special window to add variable names can be called. This makes it easier to build expressions and reduced the chance of a typographical error.

Click in the Content edit box to put the cursor there.
The expression you want to add is:

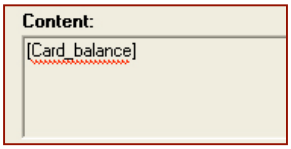
[Card_balance] / [Annual_income]

This can be just typed in, but use the window for filling in the variable's name.

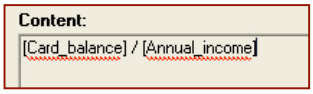
Hold the Ctrl and Alt keys down and hit the "V" key (Ctrl-Alt-v). This will display a window that will add the name of the variable to the expression. Click on "Card_balance". The properties for the variable will be displayed on the right, but you do not need those at the moment. Click OK. You can also just double click on "Card_balance", which is quicker in cases where a property is not needed.
The name of the variable in [ ] will be added to the expression window. Don't worry about the red underline of the name, that is the spelling checker, which will be discussed later.



The cursor should now be just right of the closing **]**.
Type in the division sign **/** Now hit Ctrl-Alt-v again to bring up the variable window and double click on "Annual_income". This will add that variable to the content field.



Notice that any text entered in the Content edit box also appears in the Content cell in the spreadsheet.



	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	Set	Debt_ratio	[Card_balance] / [Annual_income]
2			No	Goto Label		

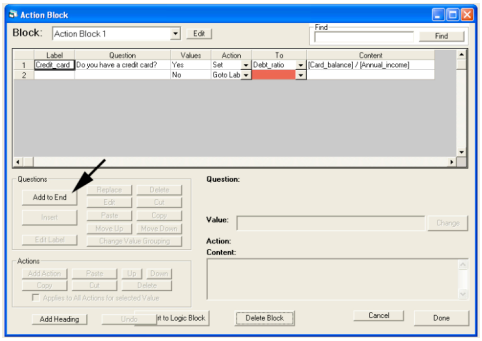
You now have the 2 actions for the first question. If the user answers "Yes", Corvid will evaluate the expression and assign the result to the variable Debt_ratio. To do this Corvid will need to know the values of the variables Card_balance and Annual_income. **Because these values are needed to do the calculation, Corvid will automatically ask the user for the values.** Whenever the value of a variable is needed, Corvid will do whatever is necessary to get the value. Here Corvid will ask the user for the information. If you had provided

other rules to derive the value, or provided a way to obtain the information from an external source such as a database, that would be used instead, but here the user will be asked.

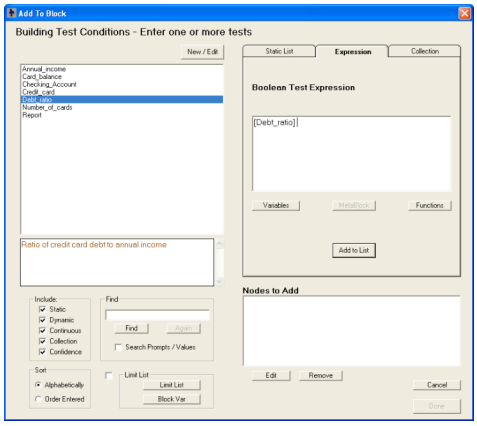
It is important to remember that Corvid will ask the user questions to obtain the data it needs, when it needs it, but will only ask if it is necessary and can't get the information from other sources.

Using Variables that Already Have a Value

Now add some rules that make use of the debt_ratio that was calculated in the first rule. If the user answers "No" to the first question, the Goto Label will skip over this question. To add a new question at the end of the list, click the "Add to End button.

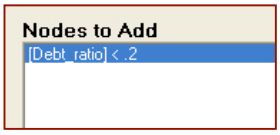


This will display the same windows you used before to add the IF conditions. This time you want to consider the value of the numeric variable **Debt_ratio**, and test which range it falls into.

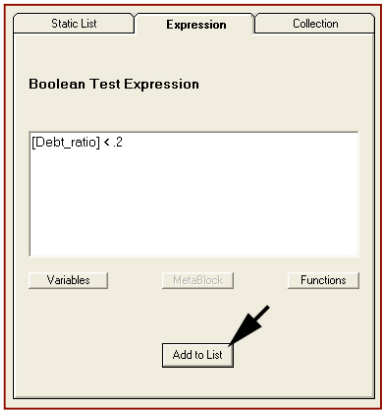


Click on the variable Debt_ratio in the left list to select it. Since it is a numeric variable, the "Expression" tab is automatically selected and the variable name in [ ] is copied over there so it can be used to build a Boolean expression.

Since the expressions you are building will become the IF parts of rules, they must be tested to evaluate to true or false. The first test if the ratio is less than 20% (.2).



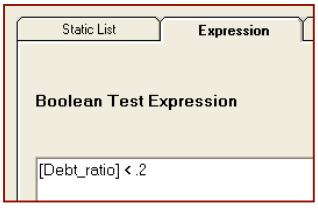
To do this enter **< .2** after the variable name. Then click the "Add to List" button. The test will appear in the "Nodes to Add" list.



In order to consider various values of the variable, you will add 3 tests:

[debt_ratio] < .2
([debt_ratio] >= .2) & ([debt_ratio] < .3)
[debt_ratio] >= .3

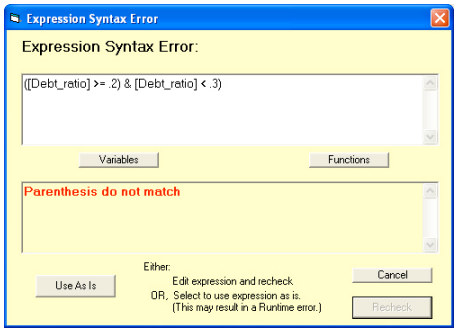
In Corvid, as with most computer languages, the & is a logical AND. It combines 2 Boolean tests, and will be true only if both of the individual tests are true.



You have already added the first. Now to add the second. Go back to edit box under the Expression tab, and type in the second expression.

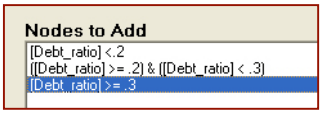
Remember: Variables can be added to the expression by clicking the "Variables" button or using Ctrl-Alt-V to display the variables window.

Once **([debt_ratio] >= .2) & ([debt_ratio] < .3)** is entered, click the "Add to List" button.



Whenever an expression is entered, Corvid checks the syntax to make sure it is correct. If there are no errors, it will be added. If any errors are found, Corvid will display a window indicating the error so you can make corrections. If the expression was correct, you should not see this window. If it is displayed, correct the text and click the "Recheck". (*In this sample one of the parenthesis was left off.)*

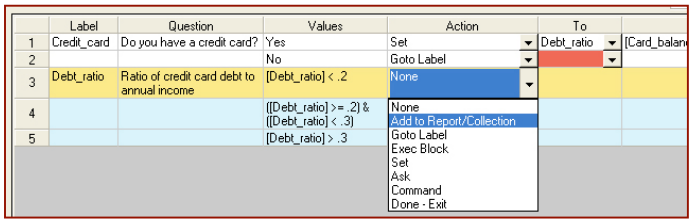
Now add the third expression, **[debt_ratio] >= .3** and click the "Add to List" button. The list of added nodes should look like:



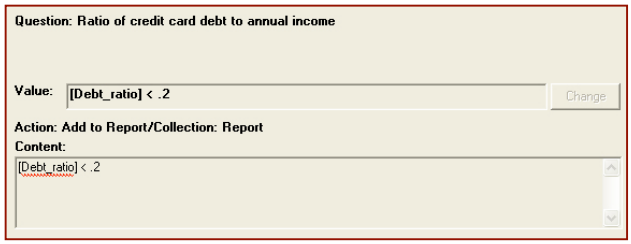
Click the "Done" button to add the tests to the Action Block.

	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	Set	Debt_ratio	[Card_balance] / [Annual_income]
2			No	Goto Label		
3	Debt_ratio	Ratio of credit card debt to annual income	[Debt_ratio] < .2	None		
4			([Debt_ratio] >= .2) & ([Debt_ratio] < .3)	None		
5			[Debt_ratio] > .3	None		

Now you will start building up a report based on the information the user tells you. To do this click on the Action column in line 3 next to **[debt_ratio] < .2** and select the Action "Add to Report/Collection".



The "Add to Report/Collection" action requires that the "To" column be a "Collection variable". Since there is only one Collection variable defined, it is automatically selected. The Content column is the text that will be added to the report. It is automatically set to the value that was used. In this case, what you want to add to the report is the note: "The amount on the credit cards is reasonable considering the income." To do this, click the Content cell for the row. This will display the information for this row.



Change the text in the Content edit box to:

The amount on the credit cards is reasonable considering the income.

Note: This text could also be directly entered in the spreadsheet cell, but it is better to use the edit box for text since it provides spell checking.

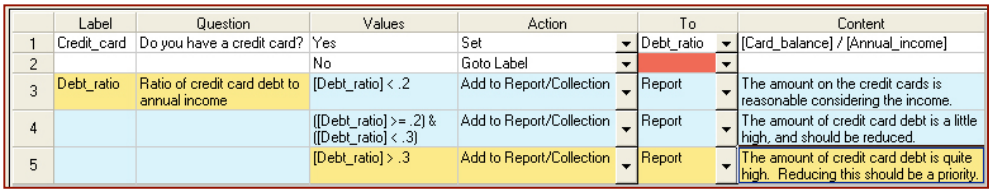
The changes made in the edit box will also appear in the spreadsheet.

	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	Set	Debt_ratio	[Card_balance] / [Annual_income]
2			No	Goto Label		
3	Debt_ratio	Ratio of credit card debt to annual income	[Debt_ratio] < .2	Add to Report/Collection	Report	The amount on the credit cards is reasonable considering the income.
4			([Debt_ratio] >= .2) & ([Debt_ratio] < .3)	None		
5			[Debt_ratio] > .3	None		

Now do the same thing for the next 2 rows, adding Content text to the Report variable.

Value	Text to Add
([debt_ratio] >= .2) & ([debt_ratio] < .3)	The amount of credit card debt is a little high, and should be reduced.
[debt_ratio] >= .3	

When done the spreadsheet will look like:



	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	Set	Debt_ratio	[Card_balance] / [Annual_income]
2			No	Goto Label		
3	Debt_ratio	Ratio of credit card debt to annual income	[Debt_ratio] < .2	Add to Report/Collection	Report	The amount on the credit cards is reasonable considering the income.
4			([Debt_ratio] >= .2) & ([Debt_ratio] < .3)	Add to Report/Collection	Report	The amount of credit card debt is a little high, and should be reduced.
5			[Debt_ratio] > .3	Add to Report/Collection	Report	The amount of credit card debt is quite high. Reducing this should be a priority.

Remember, when this runs, users will be asked: "Do you have a credit card?" first. If they answer "Yes", they will be asked for the Card_balance and Annual_income because these are needed to set the value for Debt_ratio. They will never be asked the debt_ratio directly. If it is needed, it will be calculated.

Adding Another Question

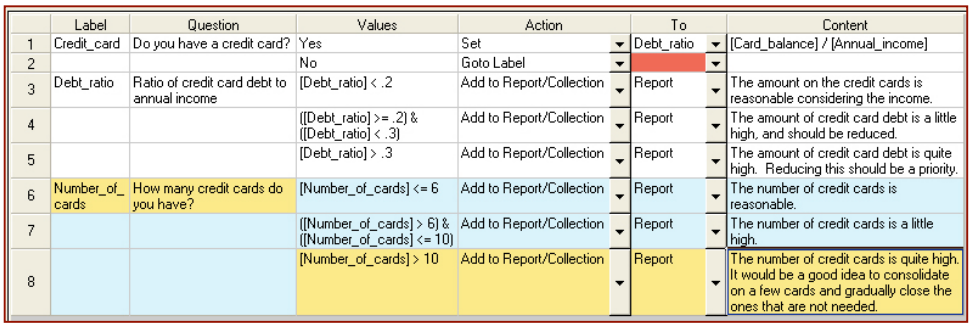
Now you will add one more question on the number of cards the user has. You will use the Number_of_cards variable that was added at the start of the system. Click the "Add to End" button and in the window for building test conditions, add 3 tests:

[Number_of_cards] <= 6
([Number_of_cards] > 6) & ([Number_of_cards] <= 10)
[Number_of_cards] > 10

Now for each value expression, add some text to the Report. For each, select the Action "Add to Report/Collection" and add the text:

Value	Text to Add
[Number_of_cards] <= 6	The number of credit cards is reasonable.
([Number_of_cards] > 6) & ([Number_of_cards] <= 10)	The number of credit cards is a little high.
[Number_of_cards] > 10	The number of credit cards is quite high. It would be a good idea to consolidate on a few cards and gradually close the ones that are not needed.

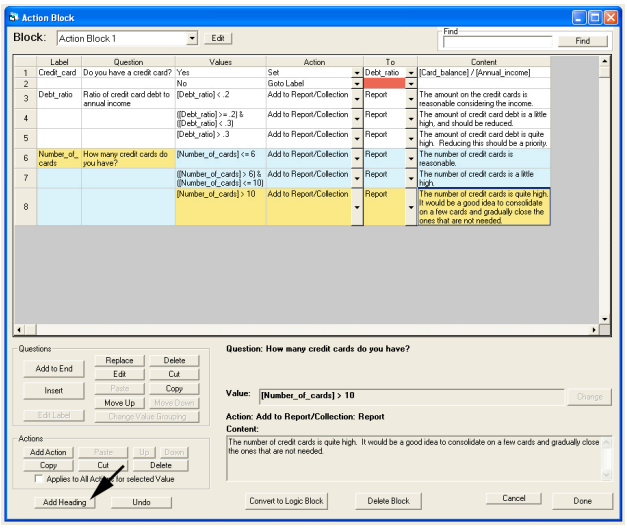
The spreadsheet Should now look like:



	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	Set	Debt_ratio	[Card_balance] / [Annual_income]
2			No	Goto Label		
3	Debt_ratio	Ratio of credit card debt to annual income	[Debt_ratio] < .2	Add to Report/Collection	Report	The amount on the credit cards is reasonable considering the income.
4			([Debt_ratio] >= .2) & ([Debt_ratio] < .3)	Add to Report/Collection	Report	The amount of credit card debt is a little high, and should be reduced.
5			[Debt_ratio] > .3	Add to Report/Collection	Report	The amount of credit card debt is quite high. Reducing this should be a priority.
6	Number_of_cards	How many credit cards do you have?	[Number_of_cards] <= 6	Add to Report/Collection	Report	The number of credit cards is reasonable.
7			([Number_of_cards] > 6) & ([Number_of_cards] <= 10)	Add to Report/Collection	Report	The number of credit cards is a little high.
8			[Number_of_cards] > 10	Add to Report/Collection	Report	The number of credit cards is quite high. It would be a good idea to consolidate on a few cards and gradually close the ones that are not needed.

Adding Headings

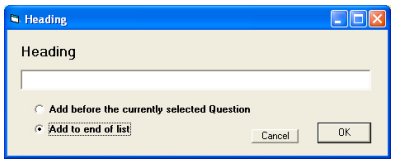
That is all you will do with credit cards in this demo. If the system was to examine many aspects of the user's finances, it could cover credit cards, checking accounts, loans, investments, IRAs, etc. For this demo, we will just show how to start the next section, but you will not fully build it.

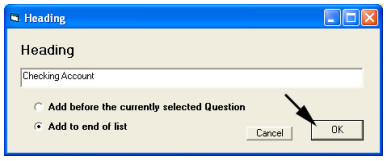


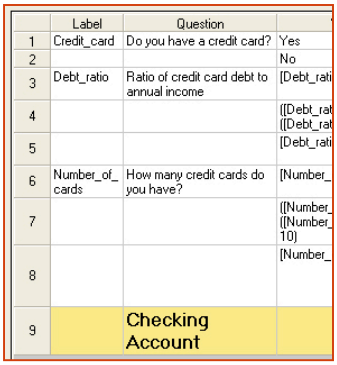
Headings are a way to divide up the spreadsheet to make it more readable. They do not have any effect on the logic of the system.

To add a heading, click the "Add Heading" button at the bottom left corner of the Action Block window.

This will display a window asking for the text of the heading and asking if the heading should be added at the end of the list of questions or added before the currently selected question. Enter the text "Checking Account" and select to add to the end of the list. Click the "OK" button to add the heading to the Action Block. The heading appears in the Question column and is the only text on row 9.





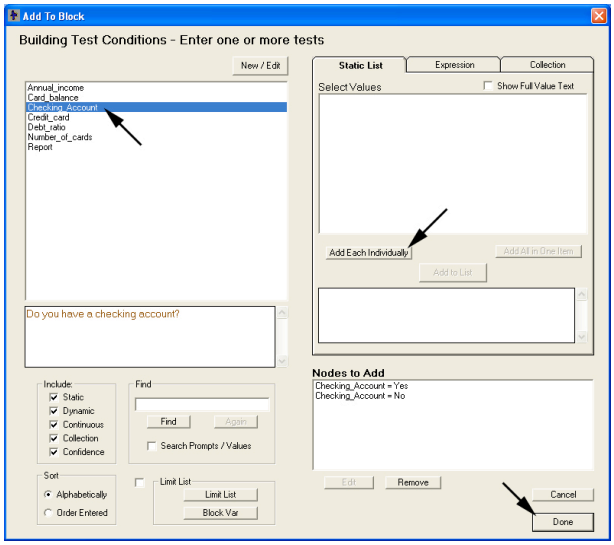


Using the Goto Label Action

There is only one step left in the Action Block (at least for this tutorial). The spreadsheet still has the red cell on row 2. Red cells indicate a cell that requires some input. Here you are not able to select the label to go to, since you do not have the other questions in place.

Now add a question under the "Checking Account" heading.

Click the "Add to End" button. Select the variable Checking_account, and click the "Add Each Individually" to add a row for each value, and click the "Done" button.

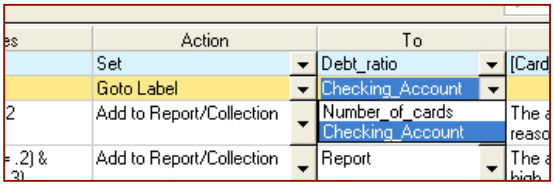


The spreadsheet should now look like:

	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	Set	Debt_ratio	[Card_balance] / [Annual_income]
2			No	Goto Label		
3	Debt_ratio	Ratio of credit card debt to annual income	[Debt_ratio] < .2	Add to Report/Collection	Report	The amount on the credit cards is reasonable considering the income.
4			([Debt_ratio] >= .2) & ([Debt_ratio] < .3)	Add to Report/Collection	Report	The amount of credit card debt is a little high, and should be reduced.
5			[Debt_ratio] > .3	Add to Report/Collection	Report	The amount of credit card debt is quite high. Reducing this should be a priority.
6	Number_of_cards	How many credit cards do you have?	[Number_of_cards] <= 6	Add to Report/Collection	Report	The number of credit cards is reasonable.
7			([Number_of_cards] > 6) & ([Number_of_cards] <= 10)	Add to Report/Collection	Report	The number of credit cards is a little high.
8			[Number_of_cards] > 10	Add to Report/Collection	Report	The number of credit cards is quite high. It would be a good idea to consolidate on a few cards and gradually close the ones that are not needed.
9		Checking Account				
10	Checking_Account	Do you have a checking account?	Yes	None		
11			No	None		

This demo does not fill out the section on the Checking Account, but now you have a row to go to from row 2. If the user answers they do not have a credit card, you want to skip the other credit card questions and go to the Checking_Account question.

To do this, click the "To" column in row 2 and select the label for row 10 "Checking_Account".



That completes the Action Block for this tutorial.

	Label	Question	Values	Action	To	Content
1	Credit_card	Do you have a credit card?	Yes	Set	Debt_ratio	[Card_balance] / [Annual_income]
2			No	Goto Label	Checking_Account	
3	Debt_ratio	Ratio of credit card debt to annual income	[Debt_ratio] < .2	Add to Report/Collection	Report	The amount on the credit cards is reasonable considering the income.
4			([Debt_ratio] >= .2) & ([Debt_ratio] < .3)	Add to Report/Collection	Report	The amount of credit card debt is a little high, and should be reduced.
5			[Debt_ratio] > .3	Add to Report/Collection	Report	The amount of credit card debt is quite high. Reducing this should be a priority.
6	Number_of_cards	How many credit cards do you have?	[Number_of_cards] <= 6	Add to Report/Collection	Report	The number of credit cards is reasonable.
7			([Number_of_cards] > 6) & ([Number_of_cards] <= 10)	Add to Report/Collection	Report	The number of credit cards is a little high.
8			[Number_of_cards] > 10	Add to Report/Collection	Report	The number of credit cards is quite high. It would be a good idea to consolidate on a few cards and gradually close the ones that are not needed.
9		Checking Account				
10	Checking_Account	Do you have a checking account?	Yes	None		
11			No	None		

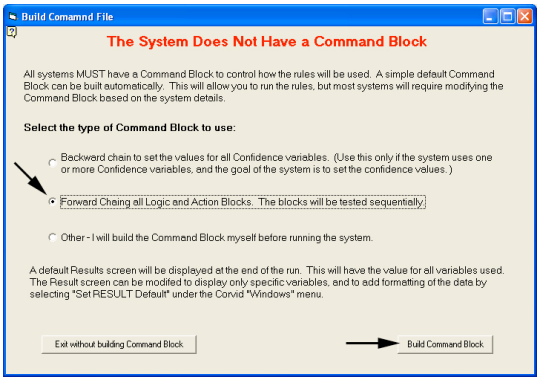
Running the System

Now you can run the system. To run a system, click the blue triangle icon in the command bar.

At this point you get a warning that there is no Command Block.

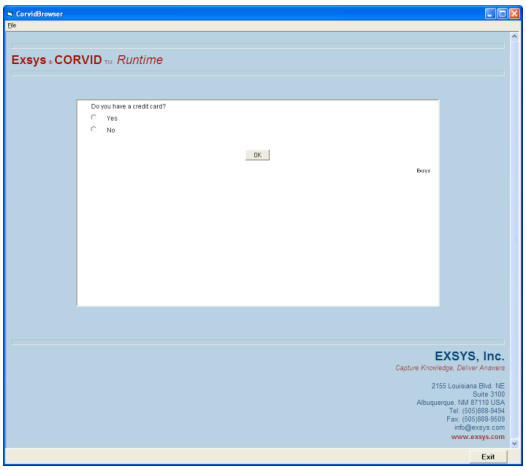
All systems MUST have a Command Block to run. For systems that require particular ways to run the rules, the Command Block must be built in the Command Block building window. However, here all you want to do is run the Action Block in forward chaining and display the results. Corvid can automatically build a simple Command Block to do this.

Click the “Forward Chaining” radio button and then the “Build Command Block” button.



The simple Command Block it will build can be later edited if needed. Corvid reminds you that the default Command Block is not ideal for all systems, but it will work well in this case, so click the OK button.

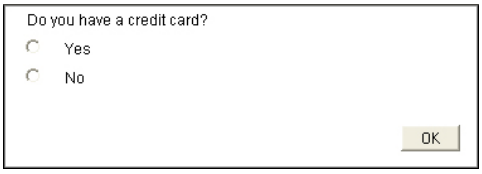
Now that there is a Command Block, Corvid will build an HTML page that uses the applet runtime to load and run the system. The HTML page is displayed in a browser window. Actually, this page is the same core program as in Internet Explorer but without browser navaigation buttons.



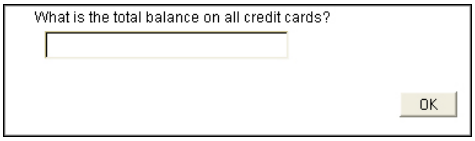
Note: Exsys Corvid systems can be run in any browser that supports Java.

The blue portion of the window is just a standard HTML template that can be easily modified with any HTML editor. The white rectangle is the Corvid Applet Runtime that is running the system.

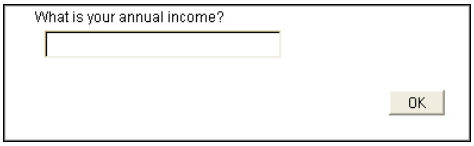
As expected the first question asks if you have a credit card. Click the “**Yes**” radio button and then the OK button.



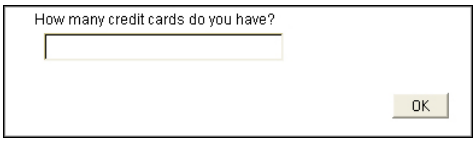
Corvid now asks about the balance on the credit cards. This is needed to set the Debt_ratio variable. Input **5000** and click OK. **Note: do not use commas.**



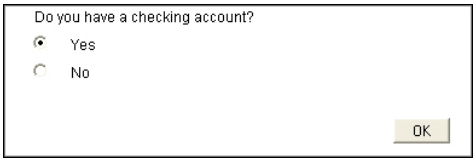
The system also needs the annual income to set Debt_ratio, so that is asked next. Input **65000** and click OK.



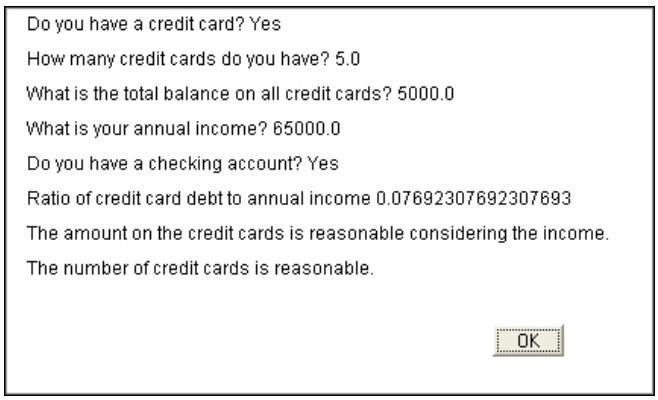
The last credit card question the system needs to ask is the number of credit cards. Enter **5** and click OK.



The system now moves on to the checking account questions. Since there are not really any rules for this section, you can select either answer and click OK.



The system now displays a default "Results" screen. This screen shows the values of all the variables used in the system. The first 5 are the variables that were asked directly of the user. The next line is the Debt_ratio that the system calculated. The last 2 lines are the report that the system generated.



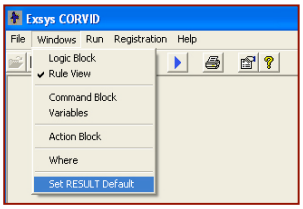
Try running the system with other values to see how the system produces different results based on the input.

While the Results screen has all the data, it is not formatted the way you would want in a system that was going to be fielded. You will next see how to format both the questions and the results.

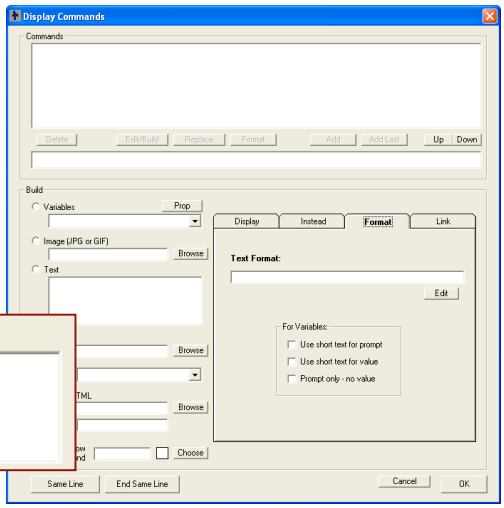
Formatting the Results

When using the Corvid Applet Runtime, screens are formatted using the Corvid Screen Commands. These allow formatting text and images when asking questions and presenting results. *(When using the optional Corvid Servlet Runtime, screens are designed using HTML, which supports the commands needed for more complex screens.)*

First you will change the results screen. The default Command Block you built uses the "default" results screen. In it's simplest form, it just has the value of every variable used in the session. This can be changed by selecting "Set RESULT Default" under the Corvid "Windows" menu.



This will display the window for building screen commands:



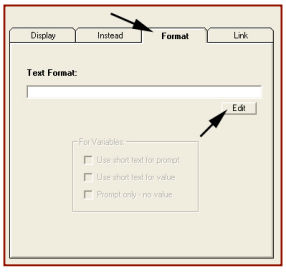
There are various items that can be added, but here you just want the results to have a title line and then just the content of the report the system built.

First select "Text" on the left side and type: "Recommendations" in the edit box.

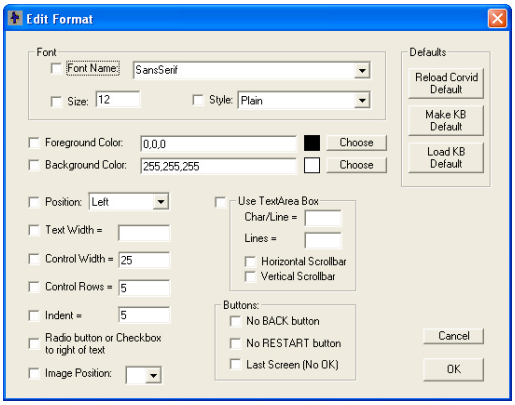
Notice that whatever you enter in the box is repeated in the top edit box, along with the "TEXT" command.

This would add the text, but it would be in the default font.

To change that, click the "Format" tab, and then click the "Edit" button on that tab.



This will display the window that is used to format text.

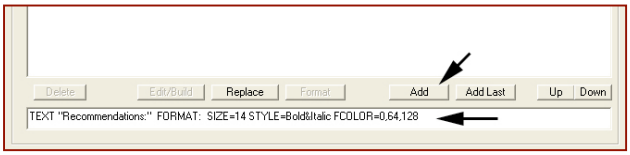


To format the text:

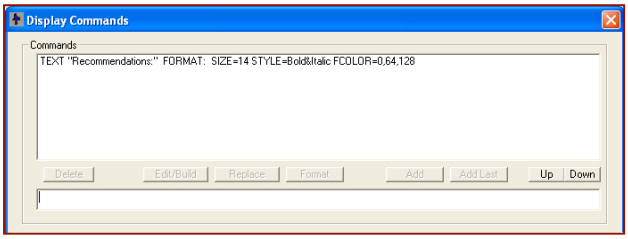
1. In the “Size” edit box enter “14”
2. In the “Style” dropdown list select “Bold&Italic”
3. Click the “Choose” button right of “Foreground Color”, and select a dark blue

Then click the OK button to close the Format window.

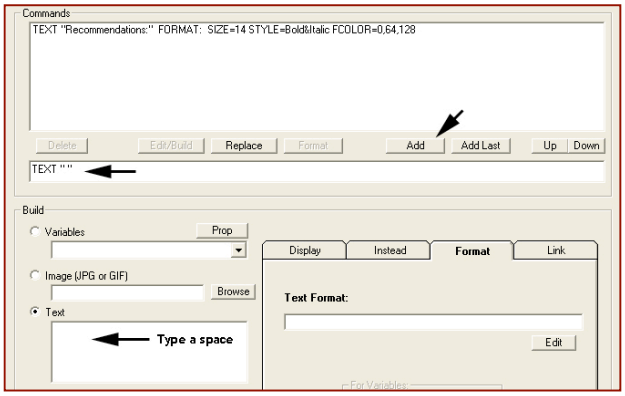
The Screen Command window should now have the full command in the edit box. Click the “Add” button to add it to the command list:



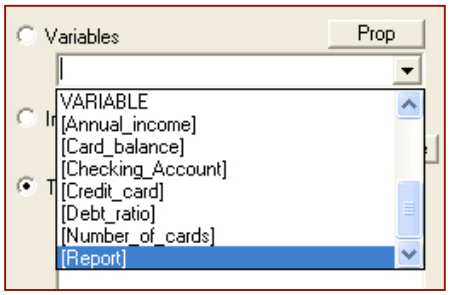
The command list now has the first command.



Now add a space below the title. Go back into the “Text” edit box and type a space. This will add a blank line to the results. The command TEXT “ ” will be displayed in the top edit window. Click the “Add” button to add it to the list.

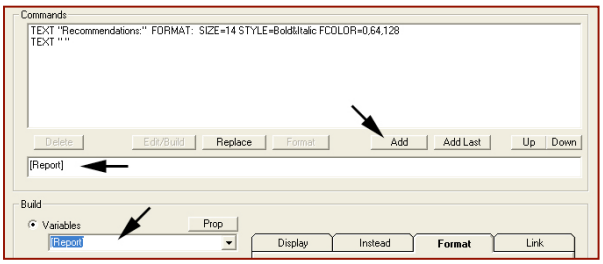


Now to add the content of the variable REPORT that was built during the run. To do this go to the dropdown under “Variables”, scroll to the bottom and select “[Report]”.



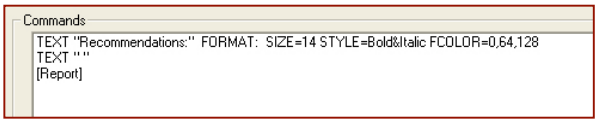
Note: Some of the variable options are individual variables and some are types. If you want all the variables of a particular type, they can be added as a group. Here only the single variable REPORT is needed.

This could be formatted with the same format commands as were added to text, but here just click the “Add” button to add it to the command list.



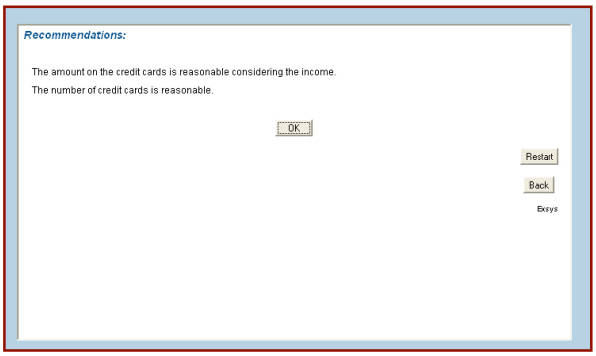
The command list should look like:

Click the “OK” button to close the Screen Command window.



Run the system by clicking the Blue Triangle in the command bar. Input some values and the results will now look like:

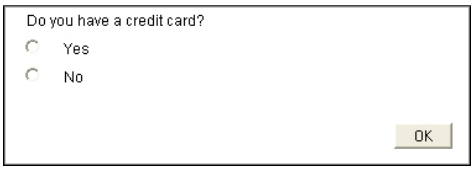
This is an improvement. Next format the way the questions are asked.



Formatting the Questions

One final step in the system is to format the way questions are asked. There are several ways to do this. Individual questions can be individually formatted, but you will use a technique that changes the look of all the questions in a consistent way that is easy to implement.

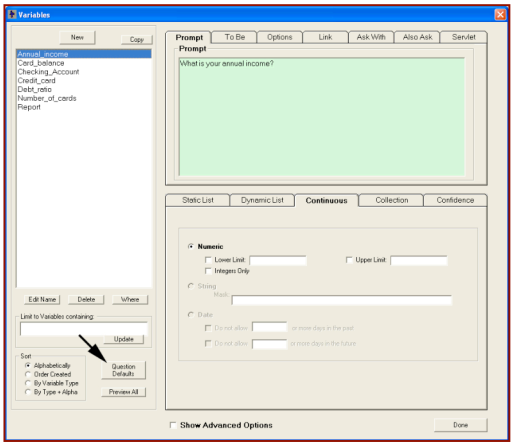
Currently the questions are asked in the default format. To change this, open the Variables window by clicking on the Variables icon on the tool bar.



This will open the Variables window. Click the “Question Defaults” button.

This will open a window for setting the default formatting for all questions.

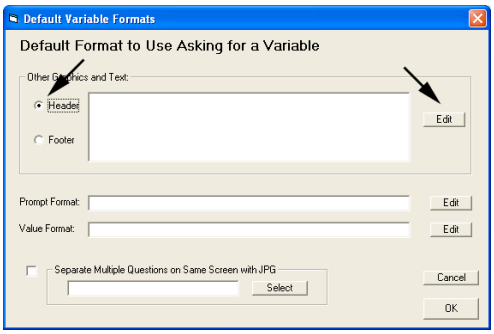
This window allows you to set the formatting and design for the parts of the question screen.



A question screen has 5 parts, although some are optional.

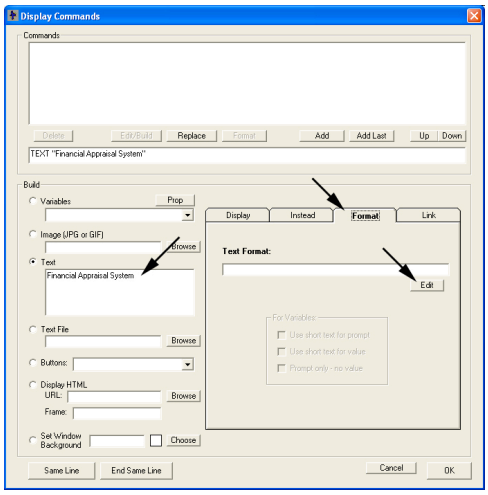
Header	Optional text and images displayed at the top of the screen.
Question	The format for the question prompt. A screen may have a single question or may have multiple questions.
Values	The format for the values. This is also controlled by the type of control used to ask the question.
Separator	An optional image that is placed between questions when there are multiple questions on the same screen.
Footer	Optional text and images displayed at the bottom of the screen.

For this system, you will add a header line, format the question prompt and indent the values.

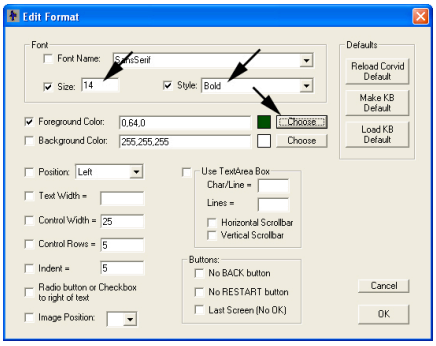


First click on the “Header” radio button, and then click the “Edit” button.

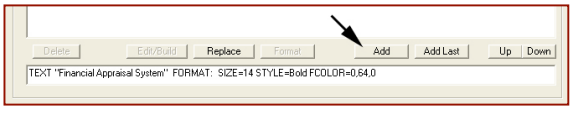
This will display the same window as you used for designing the Results screen. Enter the text “Financial Appraisal System” in the “Text” edit box. Click the “Format” tab to select it and click the Edit button.



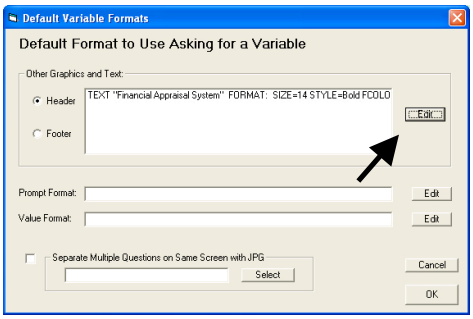
This is the same window used before to format text. Set the “Size” to 14 and the “Style” to Bold. Click the “Choose” button next to “Foreground Color” and select a dark green. Then Click “OK”.



Click the “Add” button to add the command to Command list. Then click the “OK” button to close the screen command window. This will put the command in the Header list.

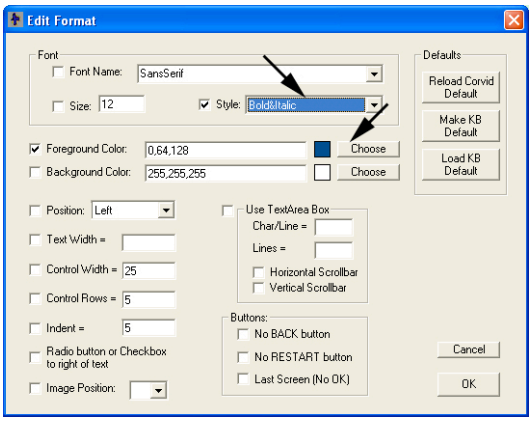


Now click the “Edit” button to the right of “Prompt Format”. This will display the text formatting window again, but this time it is to set the format for the Prompt.

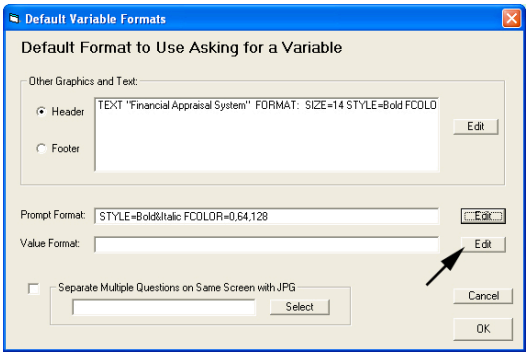


Set the “Style” to Bold&Italic, and a dark blue foreground color.

Then click “OK”.



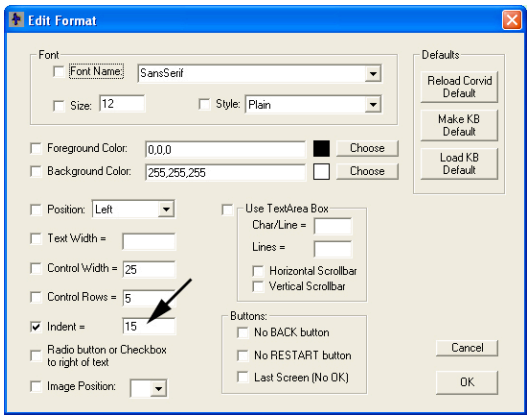
Now click the edit button next to the “Value Format”.



This time slightly indent the value controls from the Prompt.

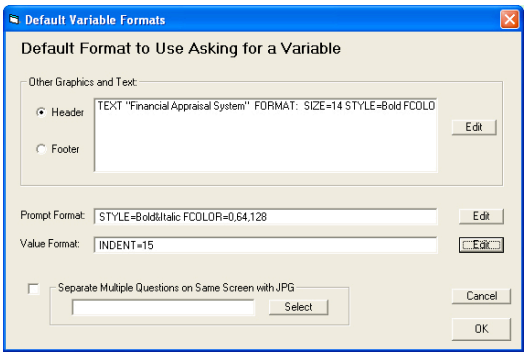
Change the “Indent” value from 5 to 15.

Click the OK button.



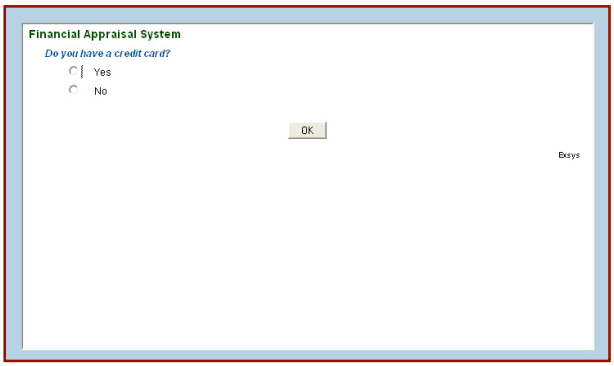
This formatting will be applied to each question, presenting a consistent look-and-feel that can easily be edited later.

Click the “OK” button to return to the Variables window, and then click “Done” to return to the main Corvid window.



Now run the system again by clicking the Blue Triangle in the tool bar. This time your question screen shows the formatting that you set.

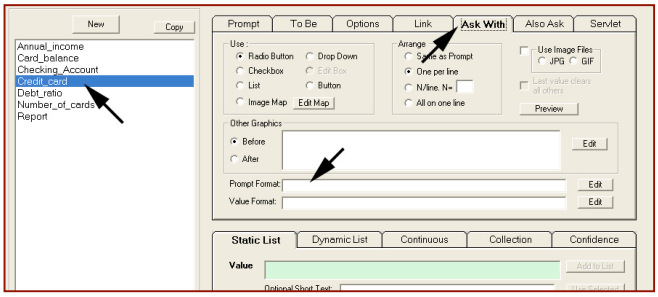
Experiment with other formatting options to see how they change the question and results screens.



Formatting Individual Variables

Setting the default format parameters for the system is all that is needed for most applications. However, if there are individual questions that need modifications to the formatting:

1. Open the Variables window.
2. Click on the variable you want to format to select it.
3. Click on the "Ask With" tab
4. At the bottom of the tab are the same type of format controls for the Prompt and Value formats. If format commands are added here, they will be used in addition to any that come from the Question Defaults that were set. (The format options chosen here will supersede the defaults, however if not superseded, the defaults will still apply. For example, if the default format for the prompt is 14 point, Bold and Red, and here you change the color to blue, the 14 point Bold will still apply.)



Fielding the System

Every time you run the system, Corvid builds all the files needed to field the system on a server. If you named the system "AB_demo", Corvid will have built 4 files:

AB_demo.CVD – The Corvid system file. This is used to edit and maintain the system.
AB_demo.cvR – The Corvid Runtime file used to run the system.
AB_demo.cvRu – An alternate form of the runtime file for some older browsers (rarely needed)
AB_demo.html – The HTML page that the system runs in.

You will also find the file ExsysCorvid.jar in the same folder. This is the Corvid Applet Runtime program. It was copied to the folder by Corvid when the system was run.

If you move the files: **AB_demo.cvR, AB_demo.cvRu, AB_demo.html, ExsysCorvid.jar** to a web server and use your browser to go to the AB_demo.html page, your system will run over the Web.

The HTML page can be edited with any HTML editor. Make sure not to modify the APPLET tag on the page, but all the other content of the page can be modified as needed. As long as the APPLET tag is in the page, it will run the system.