

# Dog Breed Advisor

## How the System Was Built

The Dog Selector is a typical Exsys Selector RuleBook system. It requires considering a variety of factors that determine the suitability of a particular breed of dog. No one breed is likely to meet all the factors perfectly. Instead the importance of the various factors is weighted, and how closely a breed matches a factor is considered. The actual data on the individual breeds is maintained in a spreadsheet. This data is analyzed to produce a "Score" for each breed on how well it matches user's requested features. The breeds with the highest score are displayed in the results.

Exsys Selector RuleBook makes it easy to build this type of system. Building a system in Selector involves 6 steps. These are the 6 tabs in the Selector RuleBook.

### 1. Attributes

The first step is to decide on the Attributes of the dog that will be considered in the system. There are several types of Attributes that can be used in Selector, but one of the easiest to use is one that has a multiple choice list of possible values. For example, each breed has an Attribute of how much exercise it requires. In the system this is handled with a multiple choice list. The Attribute has a name, "Space needed to exercise" and values of "Very large", "Large", "Average" and "Small".

Attribute

Attribute Name: Space needed to exercise

Type of Value

List of Values - Value can be selected from a list of possible values

Numeric - Value is a number

Text String - Value is text (Normally used for comments and link URLs)

Image - Value is an image file to be displayed

List of Possible Values

Value: [ ] Add New Value

Very large

Large

Average

Small

Edit Value

Delete Value

Move Up in List

Move Down in List

Description (Optional): How much space is needed to exercise

Build Corresponding Question

Cancel Done

The Dog Selector system has 29 Attributes. These cover many aspects of the breeds needs, personality and looks. The Attributes are displayed on the Attribute tab in Selector RuleBook. Some of that Attributes are images of the breed, HTML links to associate with the images.

Name	Type	Values	Description
Breed	String		The breed of dog
Picture	Image		
Link	String		
Apartment	List	Very good Good Average Poor Very Poor	Suitability for apartments
Space needed to exercise	List	Very large Large Average Small	How much space is needed to exercise
Tolerance of other dogs	List	High Average Low Very low	How well are other dogs tolerated
Suitability with children	List	Very good Good Average Poor Very poor	Is the dog good with children
Tolerance of strangers	List	High Average Low Very Low	Is the dog good with strangers
Watch dog	List	Very good Good Average Poor	Is the dog a good watch dog? Barks to warn owner.
Guard Dog	List	Very good	Is the dog a good guard dog? Actually can defend o

Add New Attribute Edit Delete Move Up Move Down Done

## 2. Questions

The next part of the Selector system is the Questions. These are very similar to the Attributes, but the Attributes describe the breed, and the Questions describe the user's requirements. In some cases these may be the same, but often the user's requirements are stated in terms of the user, rather than in terms of the dog. For example, the "Exercise" question deals with the availability of a good area for the dog to exercise. This is not directly related to the dog, but will later be compared to the breeds exercise needs.

Here too, a multiple choice list is used. The Questions in the system are the ones that will be used to ask the user for input about their requirements.

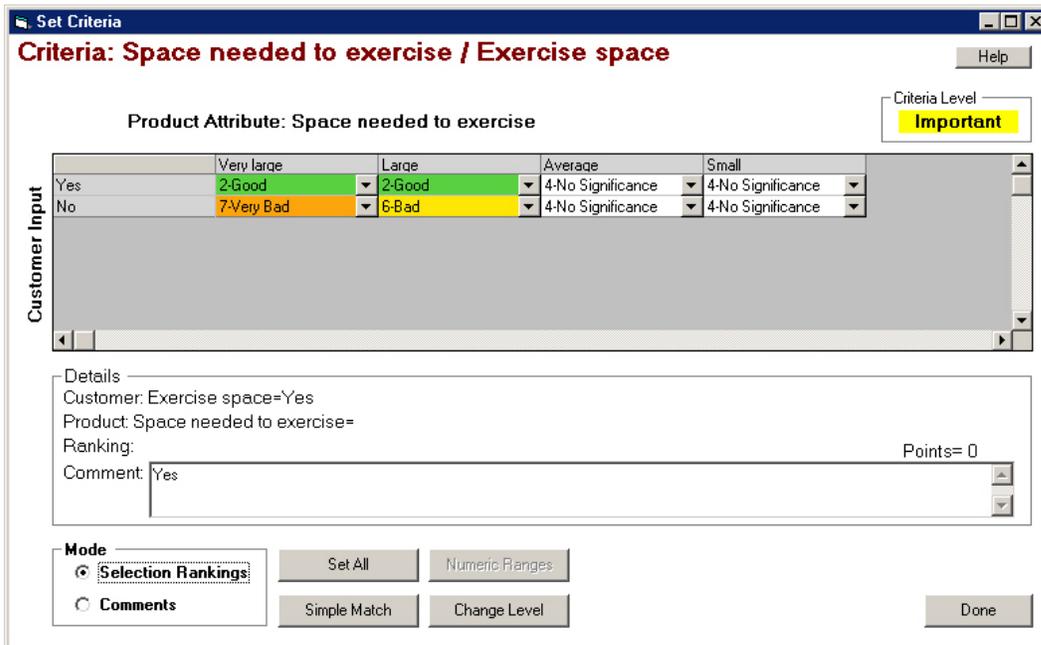
The Questions are displayed on the Questions tab in RuleBook. The Questions will ask the user to either select from among the multiple choice values for the question, or to enter a numeric value.

Name	Type	Prompt	Values
Apartment	List	The dog will be kept in:	An apartment A house with a small yard A house with a large yard
Exercise space	List	Is there a large exercise space nearby (Park or other large area where the dog can exercise)?	Yes No
Climate	List	The climate where the dog will be is:	Very cold in the winter Not exceptionally cold or hot Very hot in the summer
Children and pets	List	The dog must be good with: (Select all that apply)	Babies and small children Older children Other dogs Strangers No special requirements
Function	List	In addition to being a companion, I want a dog that is:	Watch dog (barks to warn owner) Guard dog (actually can protect owner) Hunting Dog No special requirements
Size	List	I am looking for a dog that is:	Very large Large Medium Small Very small No size preference
Grooming	List	The amount of time I am willing to spend grooming the dog is:	Over 30 min per day Some time most days Some time once a week Occasionally
Exercise	List	The amount of time I am willing to exercise the dog, in addition to normal walks, is:	Over 30 min per day Some time most days Some time once a week Occasionally

### 3. Criteria

Criteria are the heart of a Selector RuleBook system. They consider each factor in the decision independently. For that factor, they rank each combination of possible user input to the possible values that a dog breed could have. This is done with a simple spreadsheet approach. Since each factor is considered independently, the individual spreadsheets are small and easy to build. In the full system all the Criteria will be combined together to determine the overall ranking of the breed.

For example the Criteria that compares the exercise needs of the breed with the close availability of an exercise area.

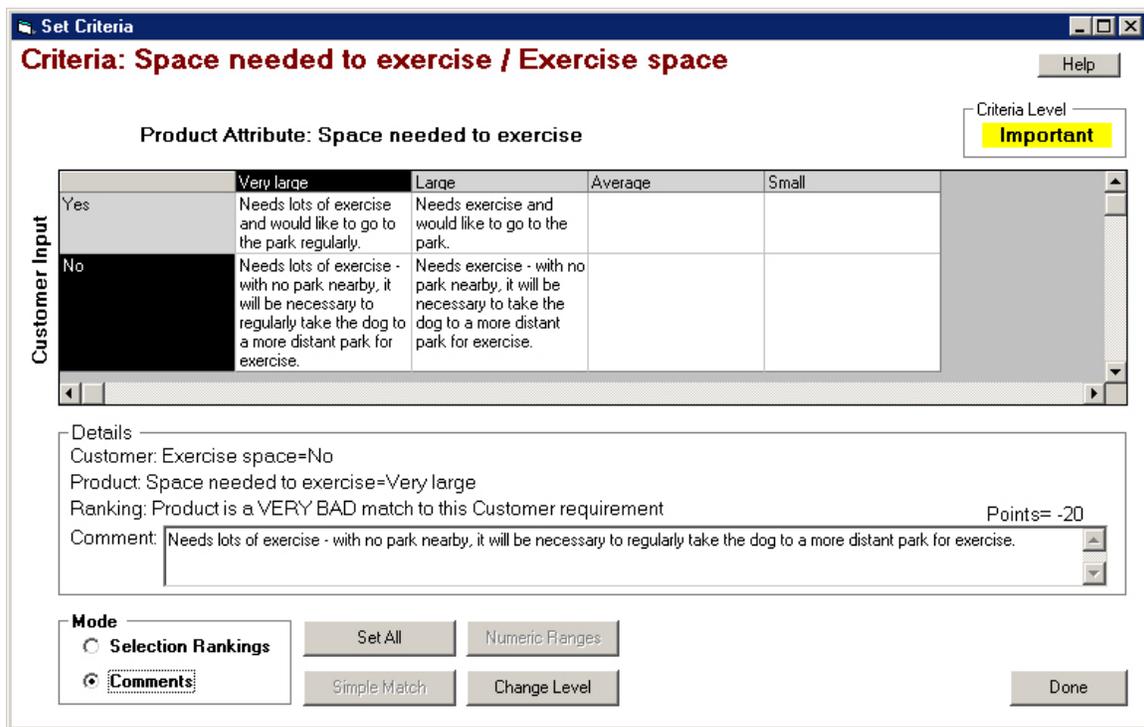


The Criteria spreadsheet includes all the possible cases for the exercise needs (columns) and the availability of a nearby exercise area.(rows). Each cell in the spreadsheet is a pull down list of values that rank if this combination indicates the breed is a "good" choice or a "poor" choice based on this factor. For example, if the breed needs a very large amount of exercise, and there is no exercise area nearby, that is "Very bad". To add this into the Criteria, just find the cell for "Very Large" exercise need (column 1) and "No available exercise space" (Row 2). Click in the cell and select the "Very Bad" value from the dropdown list.



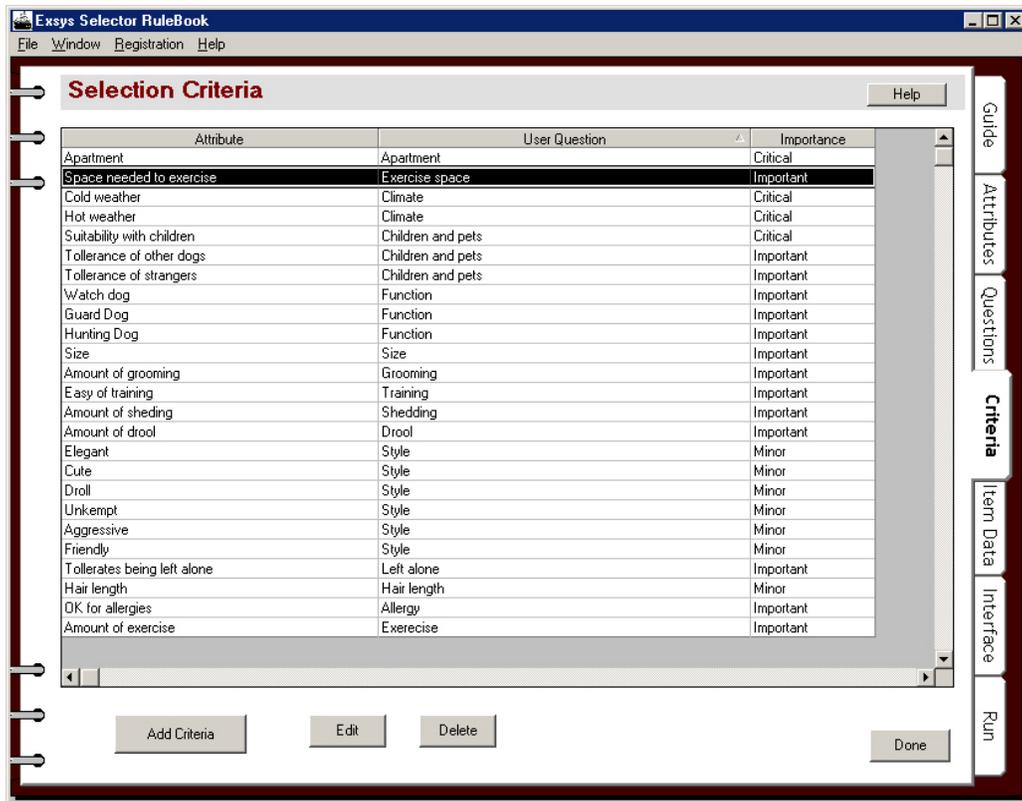
This is done for each of the possible values. Some combinations, have no significance on the outcome, such as when the breed has small exercise needs, it does not matter if there is a large exercise area nearby. These cell are given a value of "No significance"

In addition to the rankings, each cell also can have a comment. These comments are used to build a detailed report on how well each breed meets the user's requirements. To see the comments, just click the "Comment" radio button on the bottom left corner of the window.



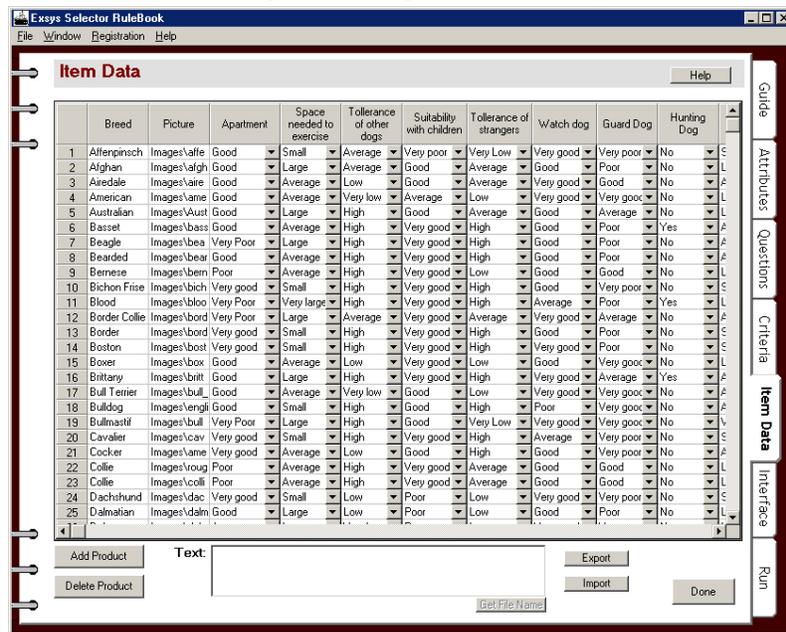
The comments apply to individual combinations of user input and breed requirements. For example, the same cell (Breed needs lots of exercise, but no space is available) has the comment "Needs lots of exercise - with no park nearby, it will be necessary to regularly take the dog to a more distant park for exercise." This comment will be added to the report on any breed that needs lots of exercise, if the user says there is no space to exercise. Remember, that while this factor is negative, there may be many other factors that are positive and the breed may be recommended despite this factor. In that case, the comment will be displayed to the end user to remind them of this problem. The ability to add comments for all the possible cases makes it possible to provide very detailed reports on each recommendation to make the user aware of all factors.

The actual Dog Selector system has many Criteria that are displayed in the Criteria tab in RuleBook. Each of the Criteria also has an importance level that weights how important that Criteria is in the overall decision.



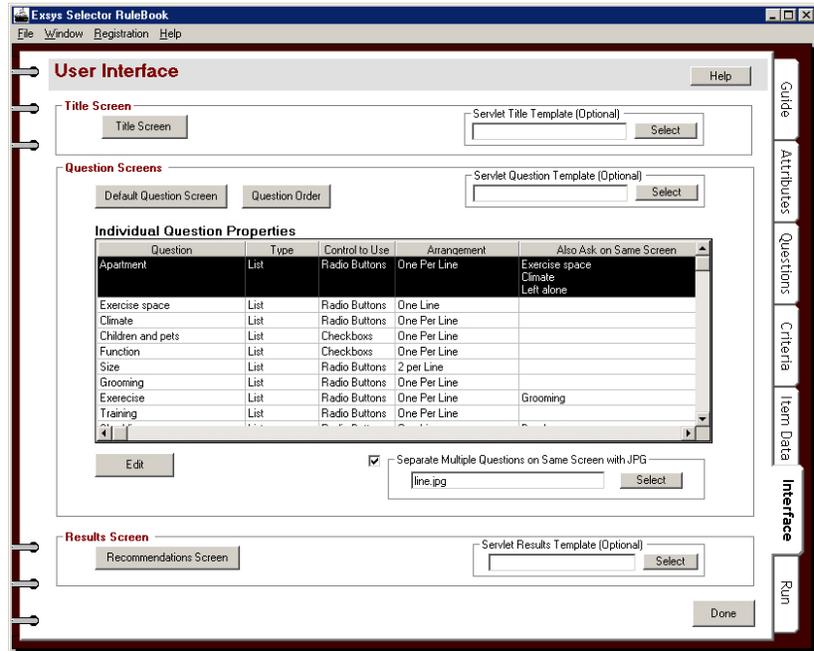
#### 4. Breed Data

The data on each breed is entered in a spreadsheet interface. Each breed has a value for each Attribute. These are entered by selecting from the dropdown list in the cells. The spreadsheet can be built from within RuleBook or can be exported to be edited in other spreadsheet programs such as Excel. Most aspects of system maintenance to add a breed or change the characteristics of a breed is simply done in the spreadsheet, without changing Criteria or Attributes. When the system runs, each breed is analyzed using all the Criteria. This, combined with the user input allows the score to be determined for the breed.



## 5. User Interface

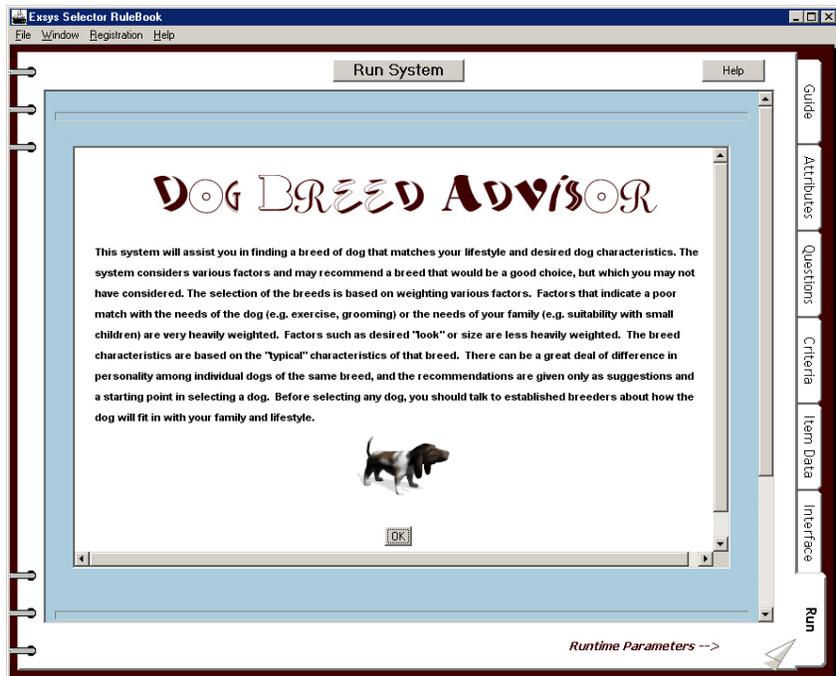
The user interface screens are built in the Interface tab of RuleBook. This screen allows text and images to be used to build the various screens that will be displayed to the end user. The title screen is presented at the start of a session. The question screens are designed using a generic template that is applied to each question to easily provide a consistent look and feel for the questions. However, it is also easy to define the control (radio button, check box, drop down, etc) that will be used for each question. Questions can also be grouped on the same screen by simply adding a list of questions to ask together.



The recommendation screen is designed by specifying the layout to use and information to display in the report on each breed.

## 6. Running the System

The final step is to run the system. This is done from the Run tab in RuleBook. When the "Run System" button is clicked, RuleBook builds a files that can be processed by the Exsys CORVID Applet Runtime program. A HTML page that calls the applet is created and displayed using Internet Explorer. The



system can then be directly run and tested. If changes are needed, they can be made by simply clicking on the appropriate tab, making the change and rerunning the system. The files produced when a system is run can be directly moved to a Web server and delivered over the Web. In addition, RuleBook produces a file that allows the system to be opened in Exsys CORVID, a powerful knowledge automation expert system tool that allows a wide range of additional features to be added to the system.