



Exercise # 2

National Cohesive Wildland Fire Management Strategy
Science Analysis Report: Application to the Southeast Region
January, 2014

Agenda

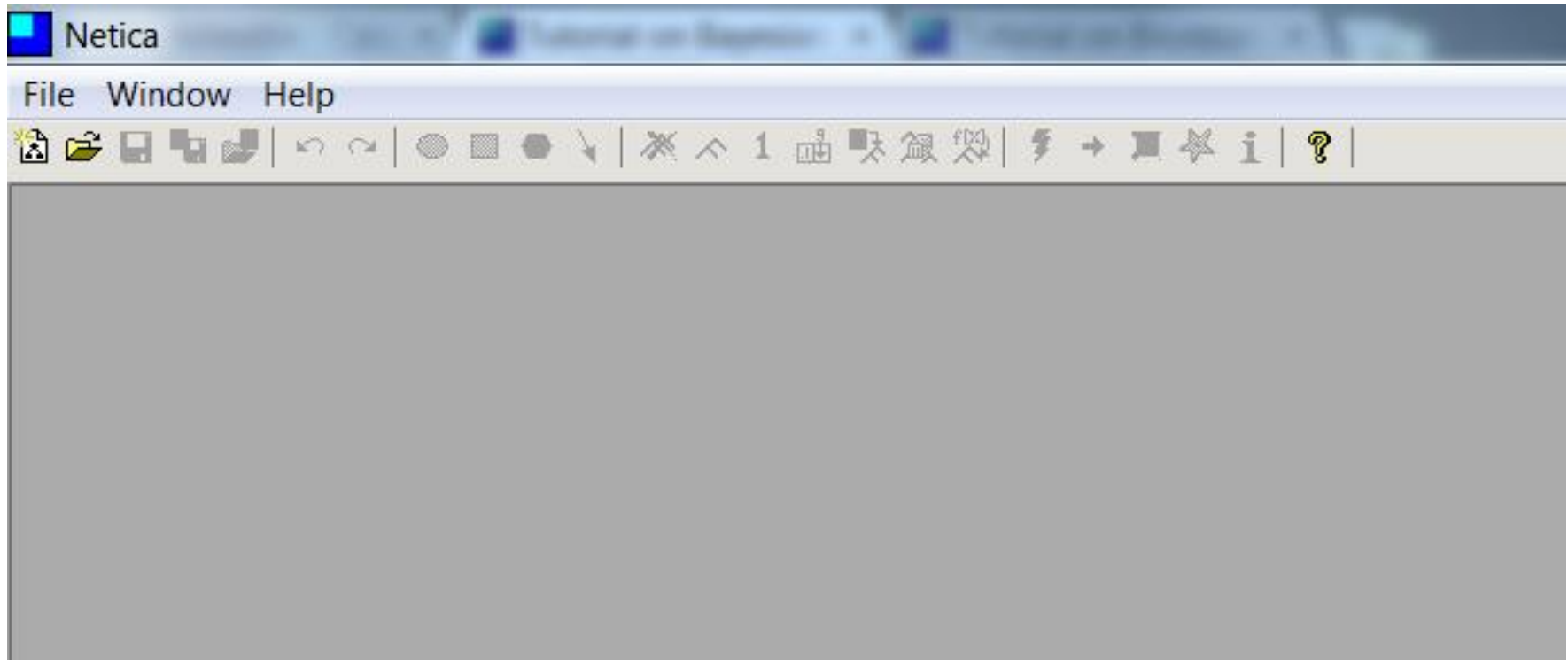
- Yesterday:
 - The National Science Analysis
 - Preparing Data for Analysis
 - Application of Products
 - Basics of Belief Nets
- Today:
 - Exercise #1: Pivot Tables
 - Exercise #2: Naïve Networks
 - Exercise #3: Bayes Networks
 - Wrap-up



Introduction

- The Netica Interface
- Interacting with a network
- A naïve network used in the Cohesive Strategy Science Analysis
- Tasks and Process for Exercise #2

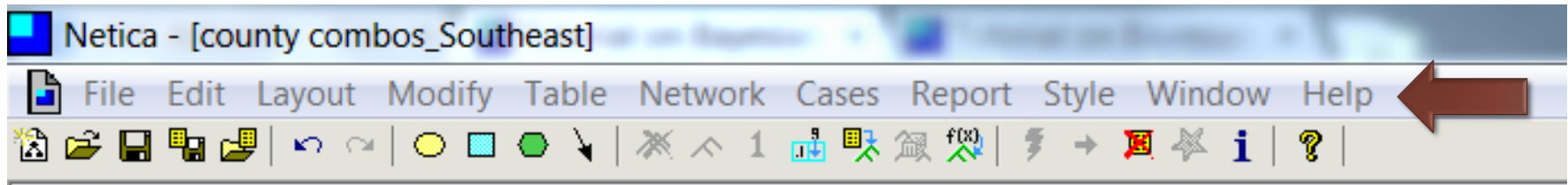
THE NETICA INTERFACE

Main window



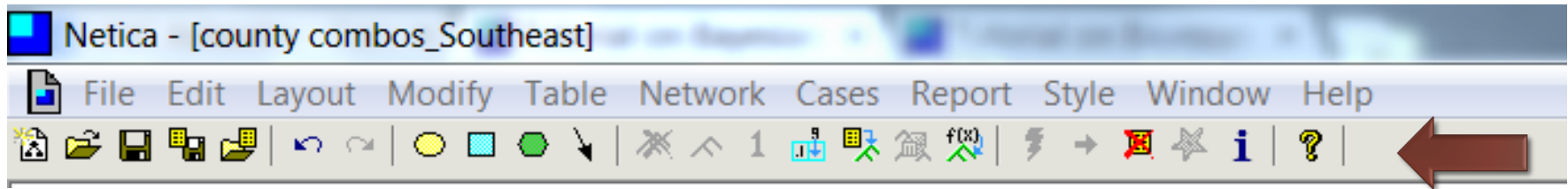
- This is the first screen you will see
- Buttons that are grayed out are disabled
- Click the  icon to create a new network
- Click the  icon to open a Netica file

Menu Bar



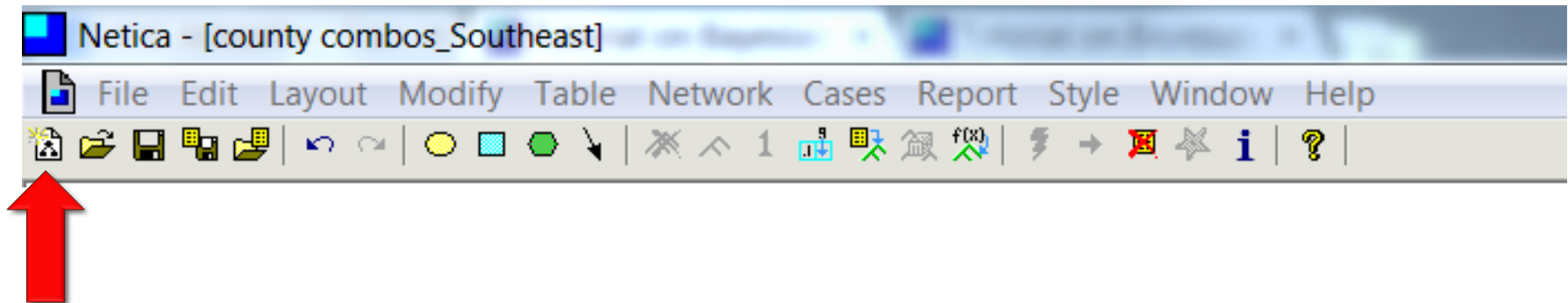
- The menu bar provides many ways to build new networks, change layout, modify networks and tables, build new cases, create reports and stylize networks.
- The Help command may be the most useful to beginners
- We'll cover some of the most basic commands in the Menu Bar in these two exercises

Tool Bar



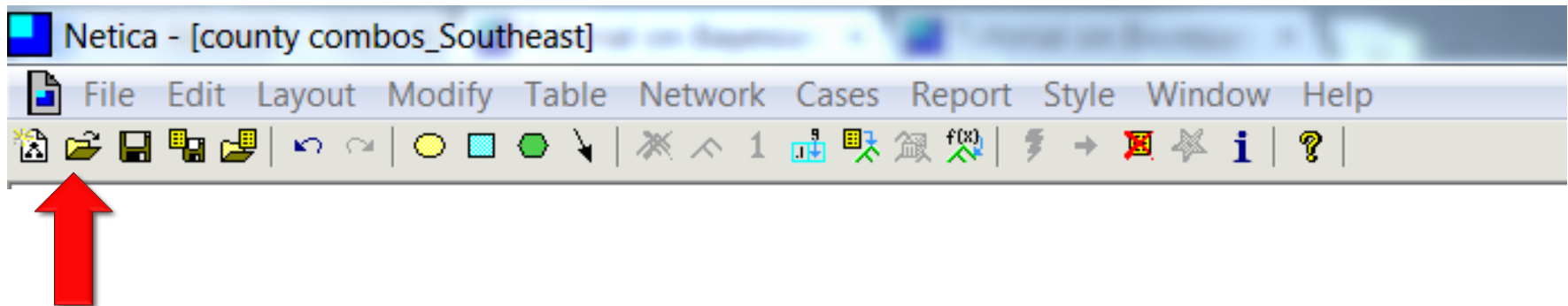
- The tool bar provides shortcuts to the most used commands in the Menu Bar
- The Tool Bar is completely customizable to a users preference
- Some of the most common commands used are:
 - Create a new network
 - Open a Netica file
 - Save
 - Insert node
 - Insert link
 - Remove findings

Tool Bar



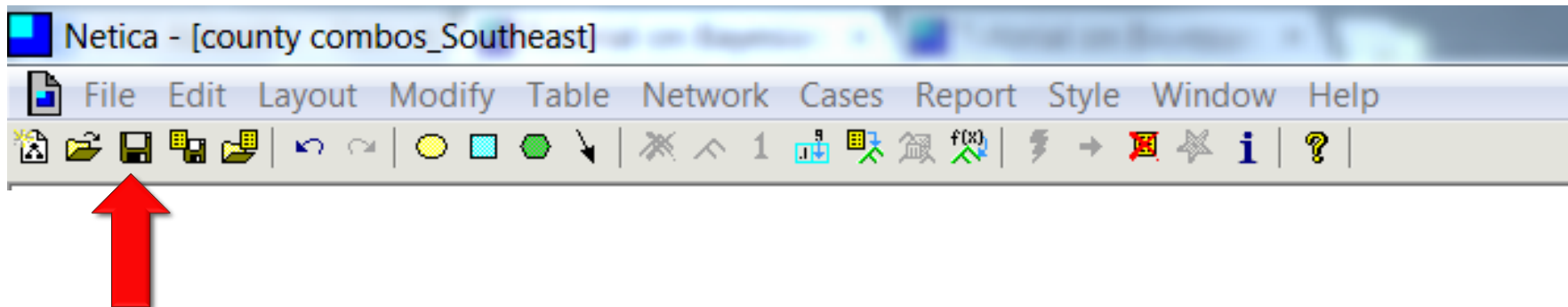
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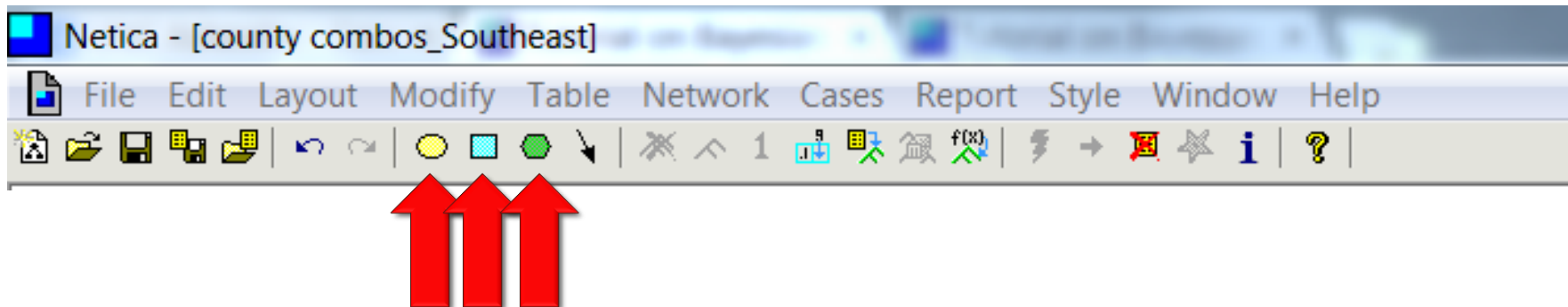
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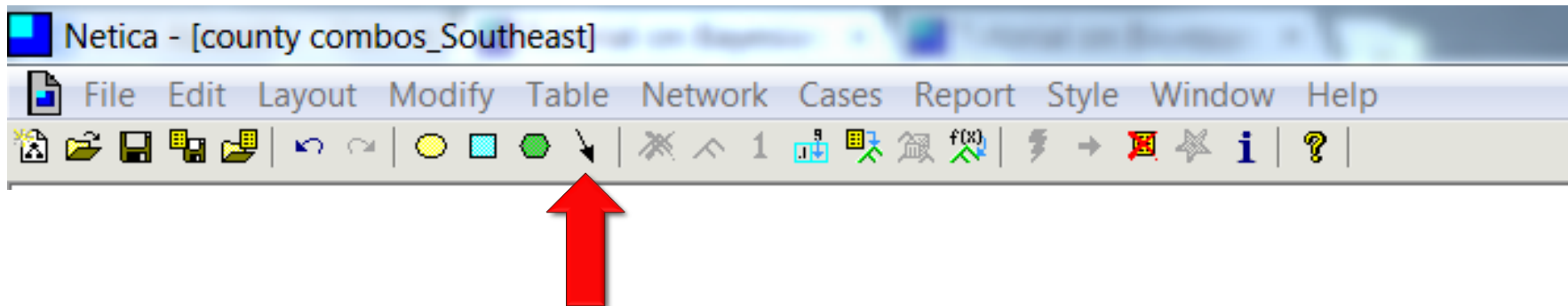
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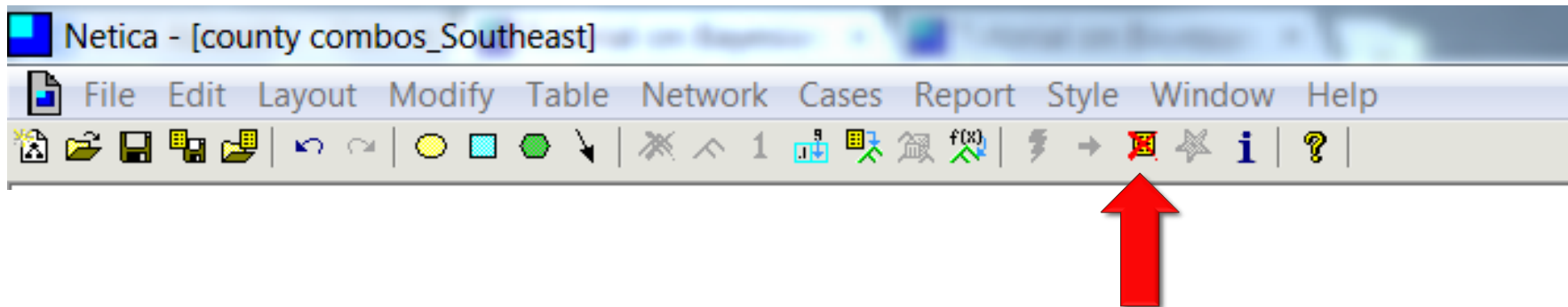
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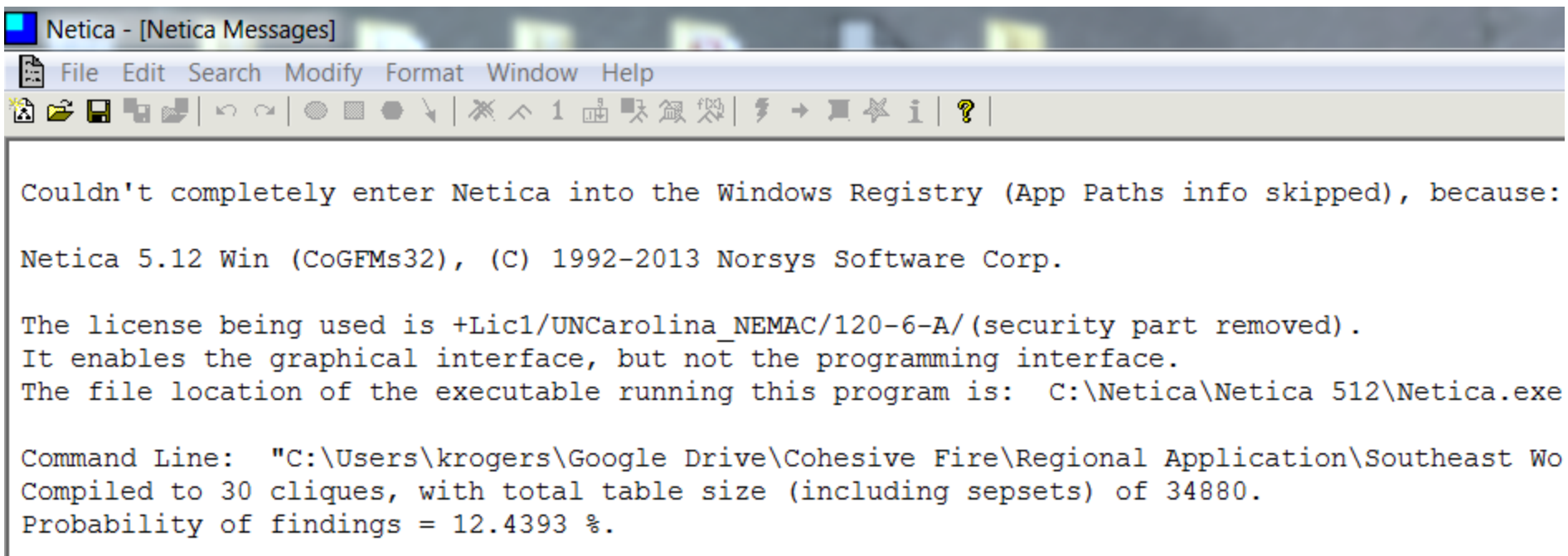
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 - Insert node
 - Insert link
 - **Remove findings**

Message Window



Netica - [Netica Messages]

File Edit Search Modify Format Window Help

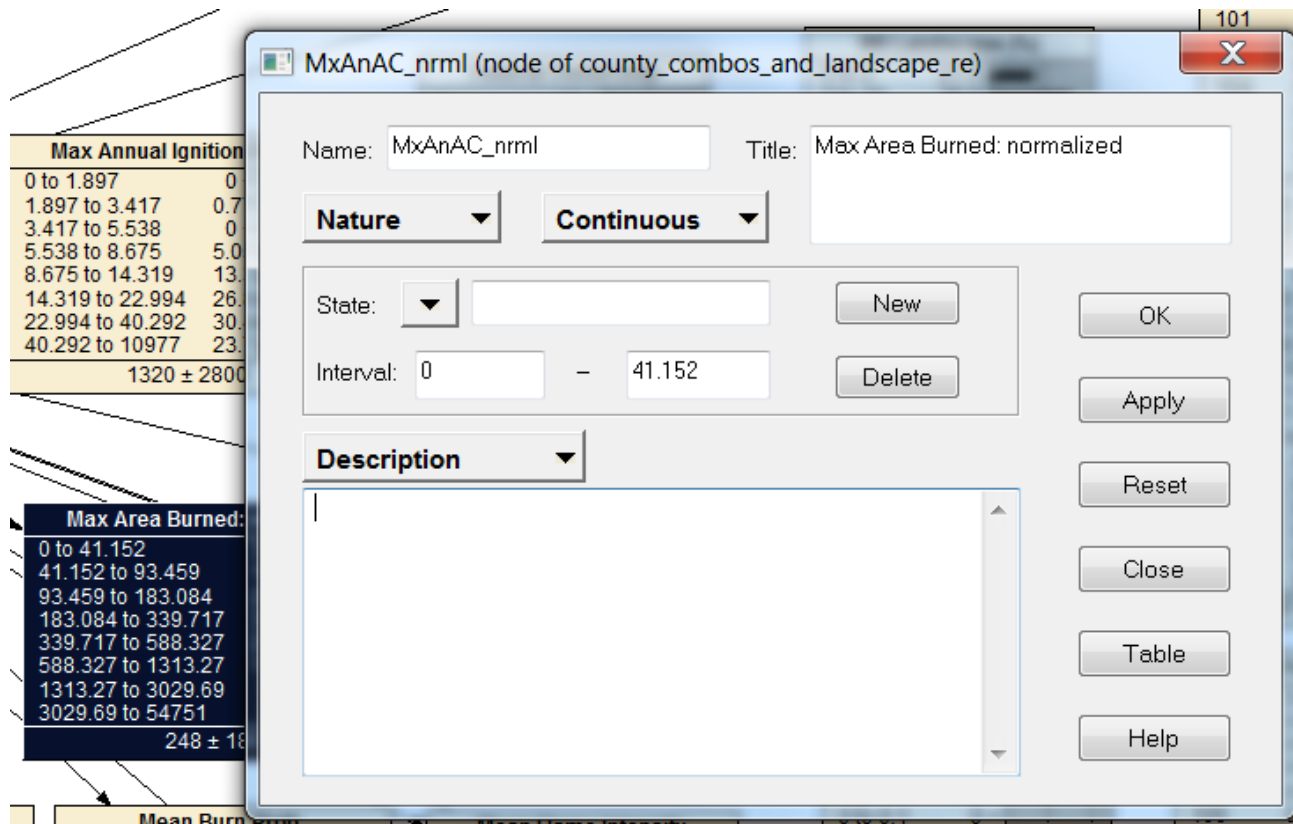
Couldn't completely enter Netica into the Windows Registry (App Paths info skipped), because:
 Netica 5.12 Win (CoGFMs32), (C) 1992-2013 Norsys Software Corp.

The license being used is +Lic1/UNCarolina_NEMAC/120-6-A/(security part removed).
 It enables the graphical interface, but not the programming interface.
 The file location of the executable running this program is: C:\Netica\Netica 512\Netica.exe

Command Line: "C:\Users\krogers\Google Drive\Cohesive Fire\Regional Application\Southeast Wo
 Compiled to 30 cliques, with total table size (including sepsets) of 34880.
 Probability of findings = 12.4393 %.

- The message window (Window>Messages) will automatically open when opening Netica
- Errors and any other activity is posted in the message window
- Reports are found in the message window



Node Dialog Box



- Opens when you double-click on a node in the title area
- Can modify the title, the type of node, the states shown in a node and various other helpful commands

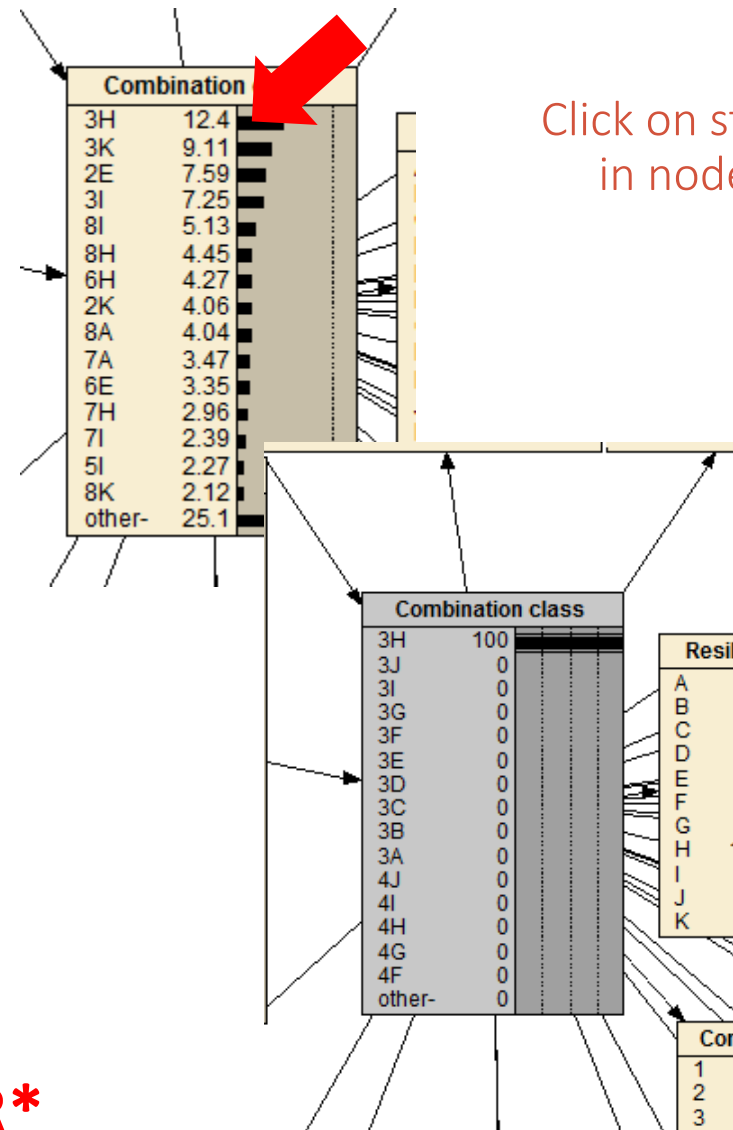
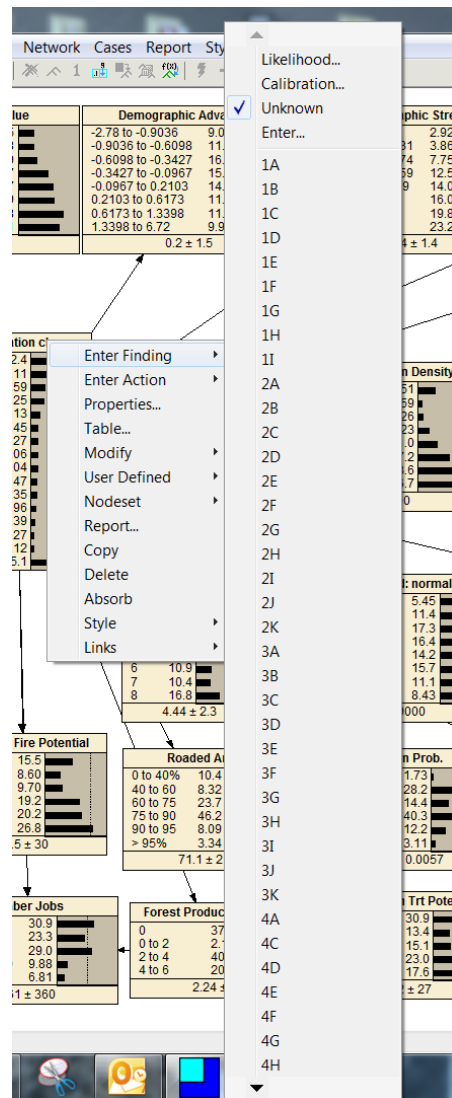
INTERACTING WITH A NETWORK

Interacting with a network

- Types of nodes
- Adding links
- Moving nodes
- Selecting nodes and links
- Reshaping a link
- Deleting nodes
- Entering findings (selecting states) 
- Removing findings 
- Integrating your own data
- Compiling data
- Exporting data for use in GIS

Entering findings

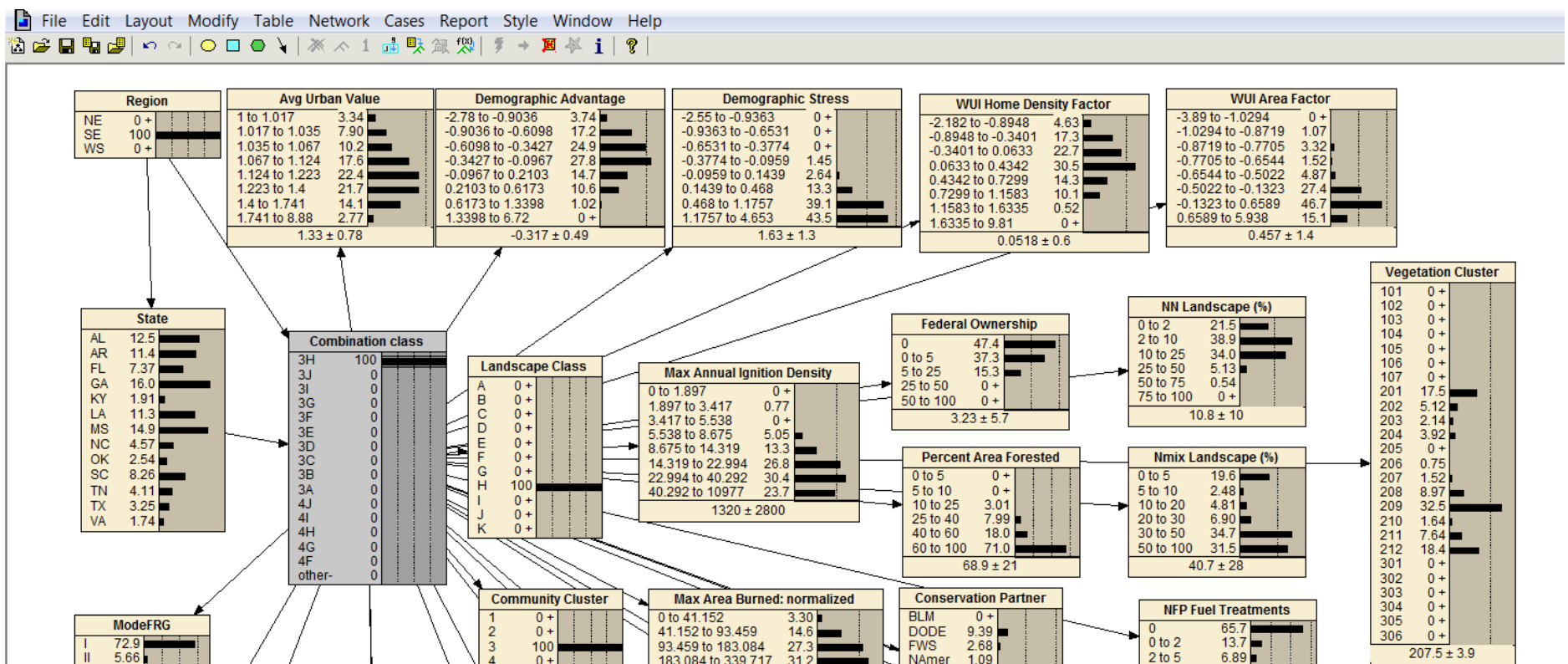
Right click
on node



Click on state
in node

OR

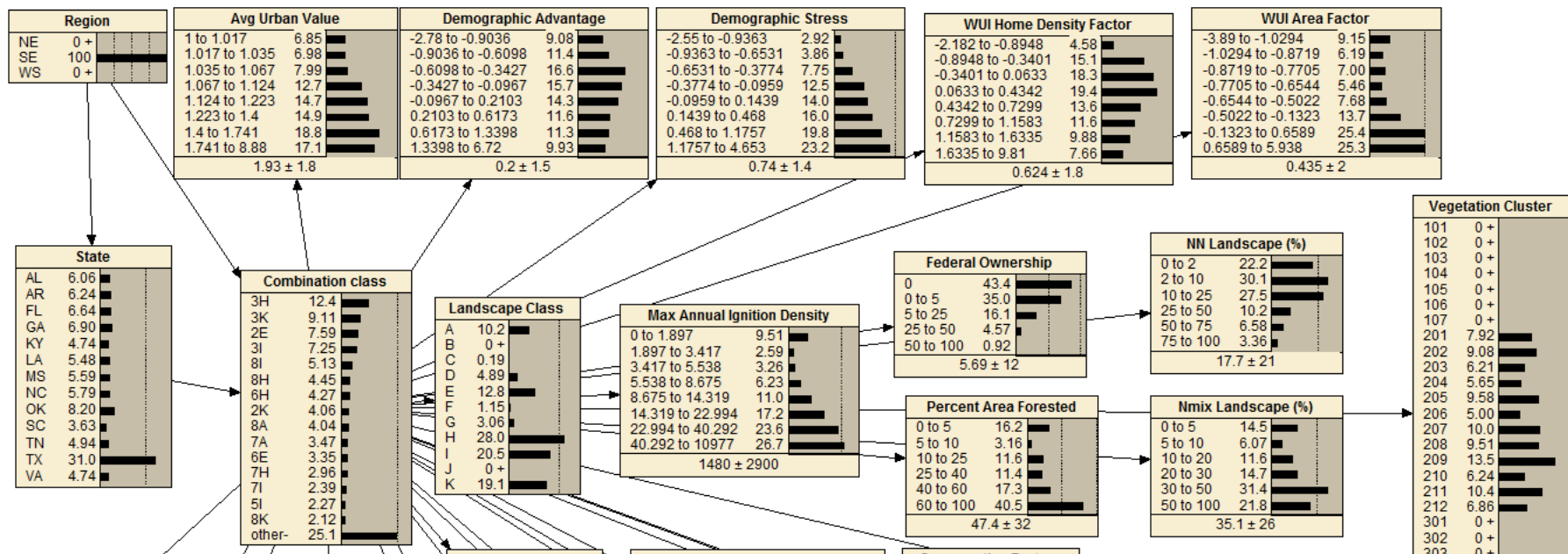
Removing findings



Removing findings



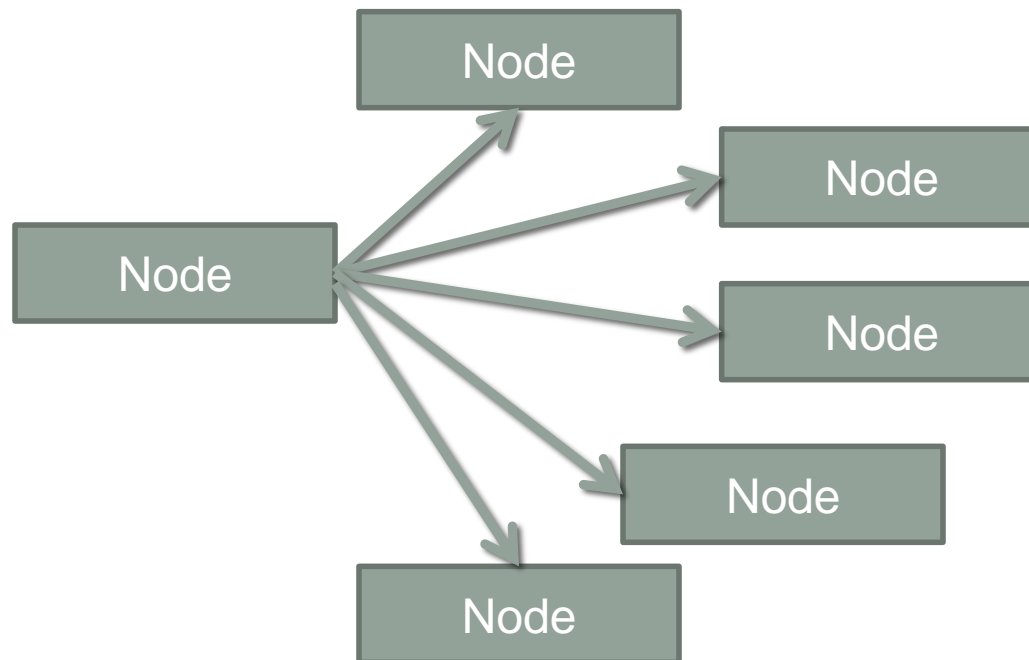
File Edit Layout Modify Table Network Cases Report Style Window Help

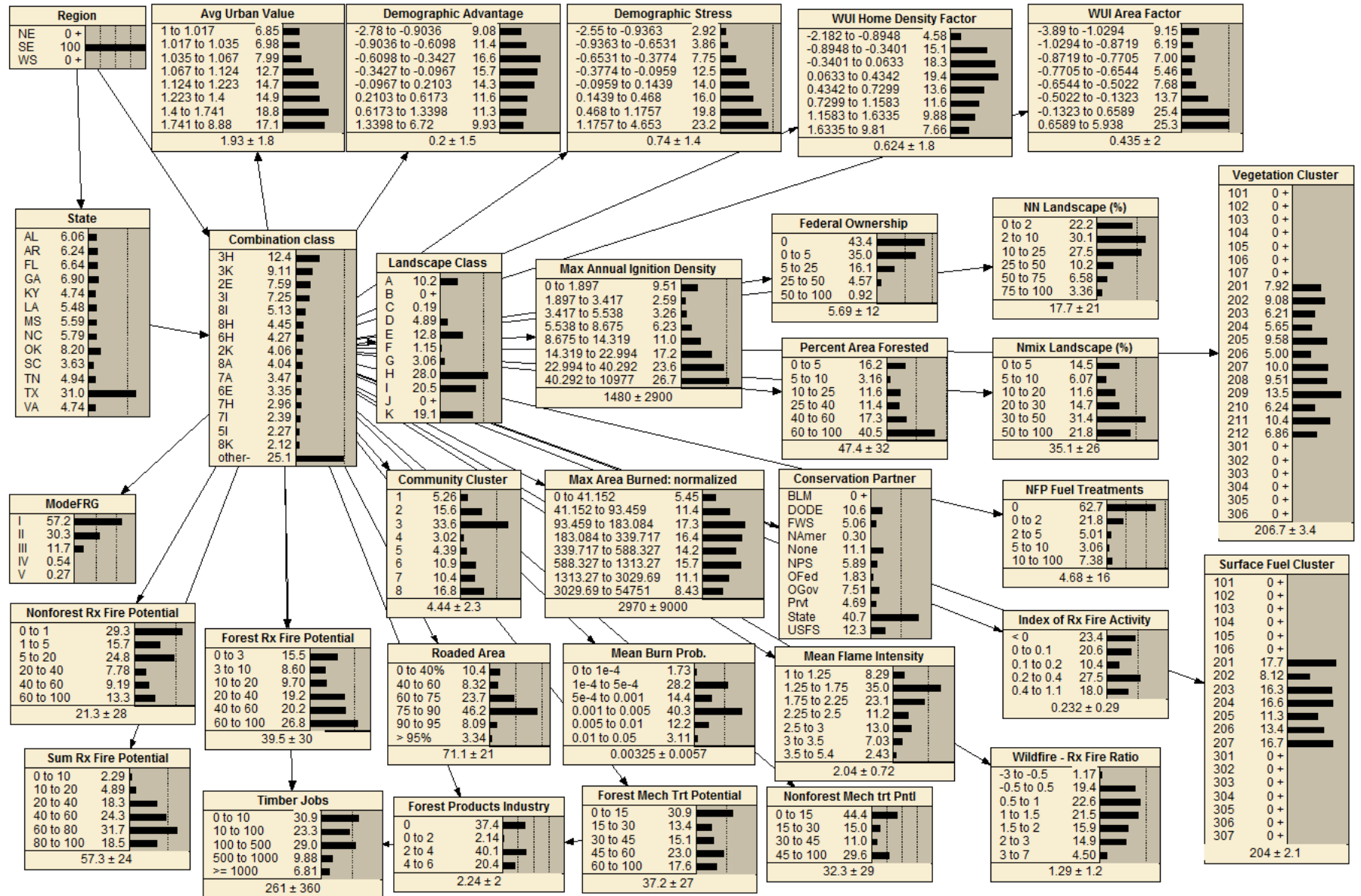


A NAÏVE NETWORK

Cohesive Fire Naïve Network

- A type of structure for a network
- Assumes that all nodes (or data variables) are independent and that the presence or absence of a node is unrelated to the presence or absence of another node
- There is no cause and effect relationship among all nodes





EXERCISE #2

Tasks and Process

1 Science Analysis: Application to the Southeast Region

Explore Data with Belief Networks (Netica)

Exercise # 2

INTRODUCTION

This exercise will introduce you to a software package called Netica, which is a leading tool for creating and exploring belief networks. You will have the opportunity to interact with a "naive" network, or a network that has one "parent" and multiple "children". This network has many of the primary datasets used in the National Science Analysis, which are expressed as different nodes within the network. The goal of this exercise is to expose you to some simple commands within Netica and to show you how to interact with the data on a basic level.

TASK(S)

Your task for this exercise is to work with a partner and complete the activities outlined below. Most activities have a related question, which you should answer and write down in the space provided.

If you have any questions about the software or run into any issues, several facilitators will be walking around the room to answer your questions.

ACTIVITY/PROCESS

Activity #1

1. Open Netica
2. Open the Netica file called "County Combos...Southeast" (File> Open...navigate to desktop)
3. Take a close look at the different nodes and how they are connected to the "Combination Class" node. Notice the distribution of data for each of the nodes and which Combination Classes are most prominent for the Southeast.
4. In the "Combination Class" node, click on "3H". You will see that the distributions of other nodes in the network change.
5. Now, remove your findings. To do that, you can either: a) click on "3H" again in the "Combination Class" node; or b) click on the "red x" button at the top called "Remove Case (Findings)".



6. In the "Combination Class" node, click on "3K", examine the distribution of data and then remove your findings.
7. In the "Combination Class" node, click on "2E", examine the distribution of data and then remove your findings.
8. **Question: Of these three combination classes, which has 91% of the counties with "0-5" Percent Area Forested?** _____

2 Science Analysis: Application to the Southeast Region

Explore Data with Belief Networks (Netica)

Exercise # 2

Activity #2

1. In the "Community Cluster" node, click on "3". You will notice that each combination class that includes community cluster "3" appears at the top of the box. Also, notice the distribution of community cluster "3" throughout the southern states in the "State" node.
2. Be careful, because this is a naive network and each node contributes independently to the network, you cannot (with confidence) read the distributions of the other "child" nodes. That is, there is no cause and effect relationship between "Community Cluster" and any other node besides "Combination Class".

Activity #3

1. Make sure all findings are removed from the network (click on the "red x" button at the top called "Remove Case (Findings)").
2. Now, double click on the "Conservation Partner" node title (the thin box at the top of the node). You will notice several fields such as Name (the name of the data in the master dataset), Title (the title of the node) and Description (a short description of the data). Additionally, you should see several buttons on the right-hand side of the box.
3. Click on "Table". This is the Conditional Probability Table. This is where you see the data behind the node and any other node that is connected to it (in this case, it is "Combination Class"). Here you see the percentage of counties within each Primary Conservation Partner across each Combination Class.
4. **Question: Which Primary Conservation Partner has the greatest percentage of counties in Combination Class 1A?** _____

Activity #4

1. Make sure all findings are removed from the network (click on the "red x" button at the top called "Remove Case (Findings)").
2. In the "Combination Class" node, click on "3H".
3. Now, in the top navigation bar, select "Report" > "Beliefs".
4. The output is a text file that provides the probability distributions of each of the nodes for "Combination Class" 3H. This can be helpful in the exploration of the data.
5. **Question: What is the percentage of counties in Combination Class 3H that have 75-90% Roaded Area (you may need to scroll up or down to find the answer)?** _____

THINGS YOU WILL NEED

You will need the following items:

- Personal laptop
- Netica file saved on desktop ("County combos...Southeast")

RESOURCES

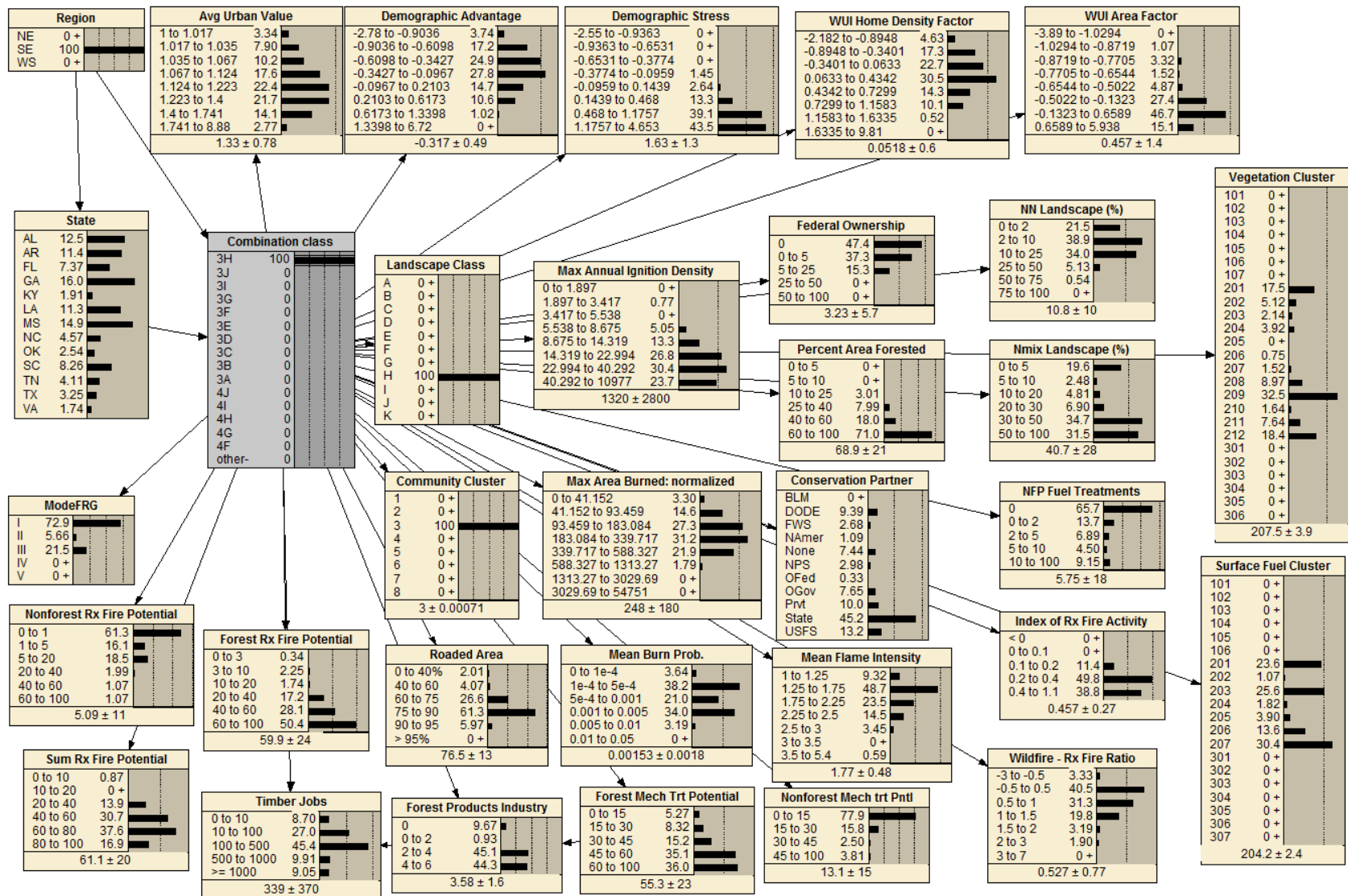
Norsys Netica "Help" section: <http://www.norsys.com/WebHelp/NETICA.htm>

Tasks and Process

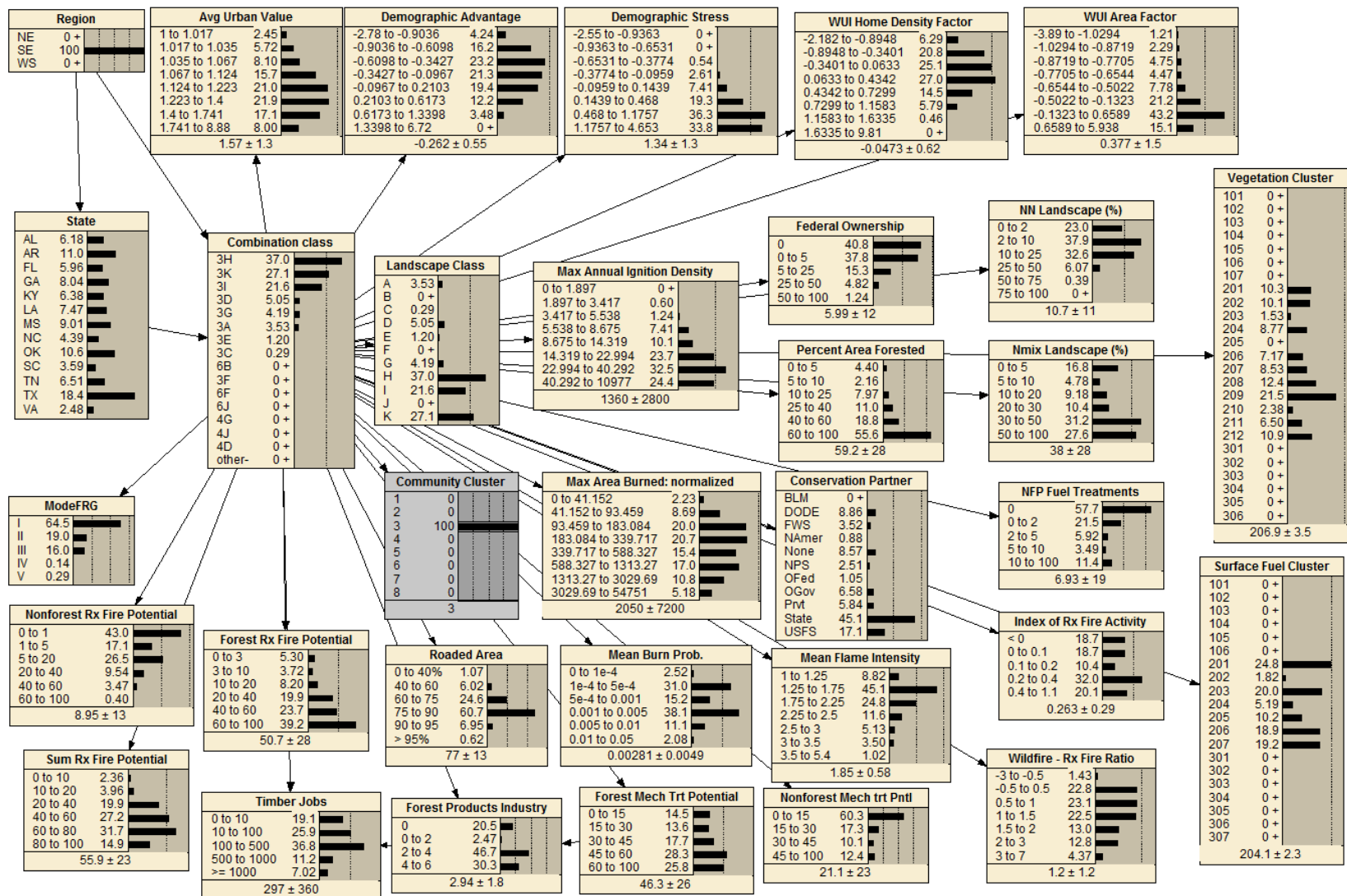
- Everyone will pair up in groups of two
- You will need:
 - NETICA installed on your laptop
 - “county combos_Southeast” file
 - Copy of “Combination Class Southeast” document
- Go through the FOUR activities outlined in the Exercise Handout
- If you have questions, please raise your hand and someone will assist you...

LET'S GET STARTED

Activity #1



Activity #2



Activity #3

```
G 9.4287e-09
H 1
I 9.4287e-09
J 9.4287e-09
K 9.4287e-09
```

Roaded Area

```
0 to 40% 0.020102
40 to 60 0.040741
60 to 75 0.26626
75 to 90 0.61322
90 to 95 0.059684
> 95% 9.4287e-09
```

State

```
CT 1.2267e-10
DC 1.2267e-10
DE 1.2267e-10
IA 1.2267e-10
IL 1.2267e-10
IN 1.2267e-10
MA 1.2267e-10
MD 1.2267e-10
ME 1.2267e-10
MI 1.2267e-10
MN 1.2267e-10
MO 1.2267e-10
NH 1.2267e-10
NJ 1.2267e-10
NY 1.2267e-10
OH 1.2267e-10
PA 1.2267e-10
RI 1.2267e-10
VT 1.2267e-10
WI 1.2267e-10
WV 1.2267e-10
AL 0.12544
AK 0.11444
```


Activity #4 and 5

