2017

Project 5

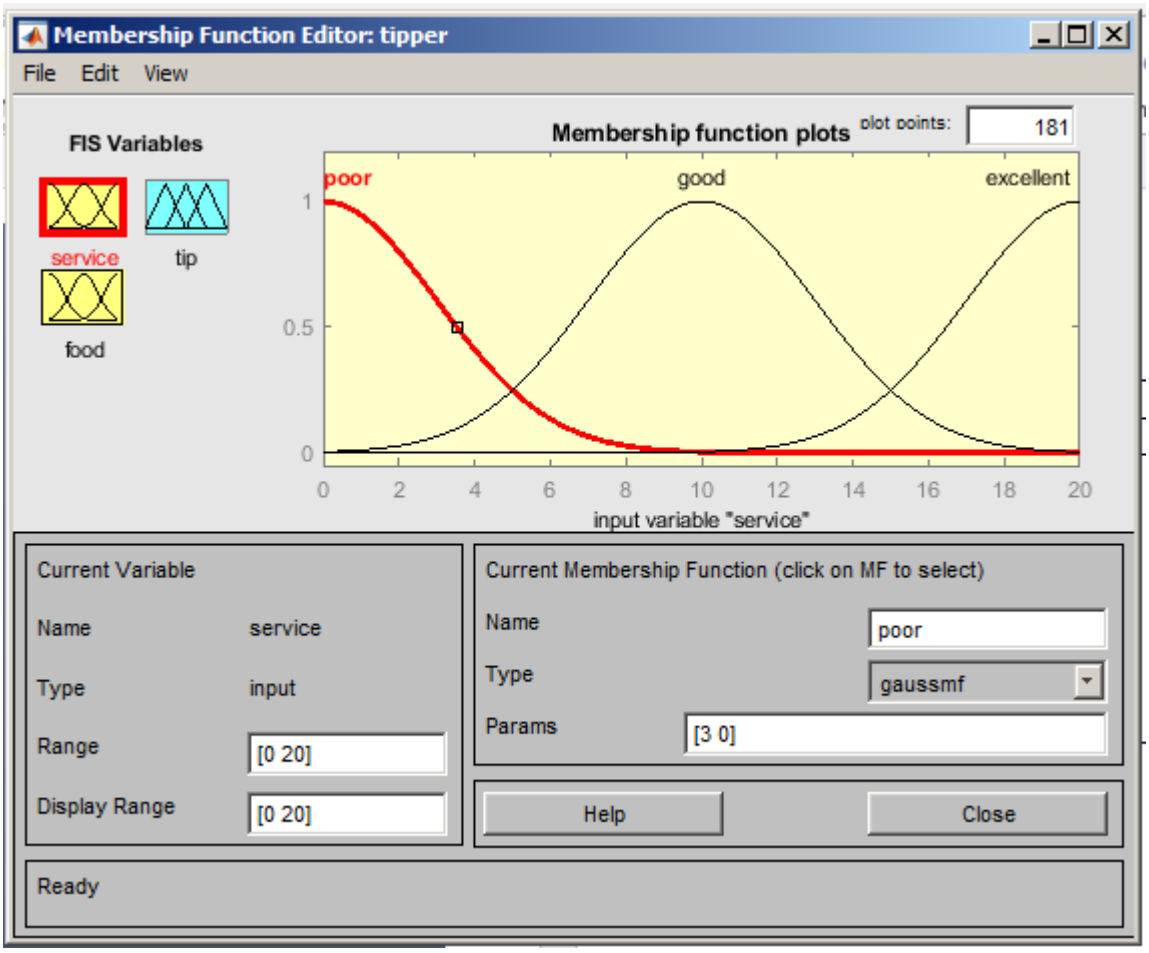
CIS 445-01: DATA MINING

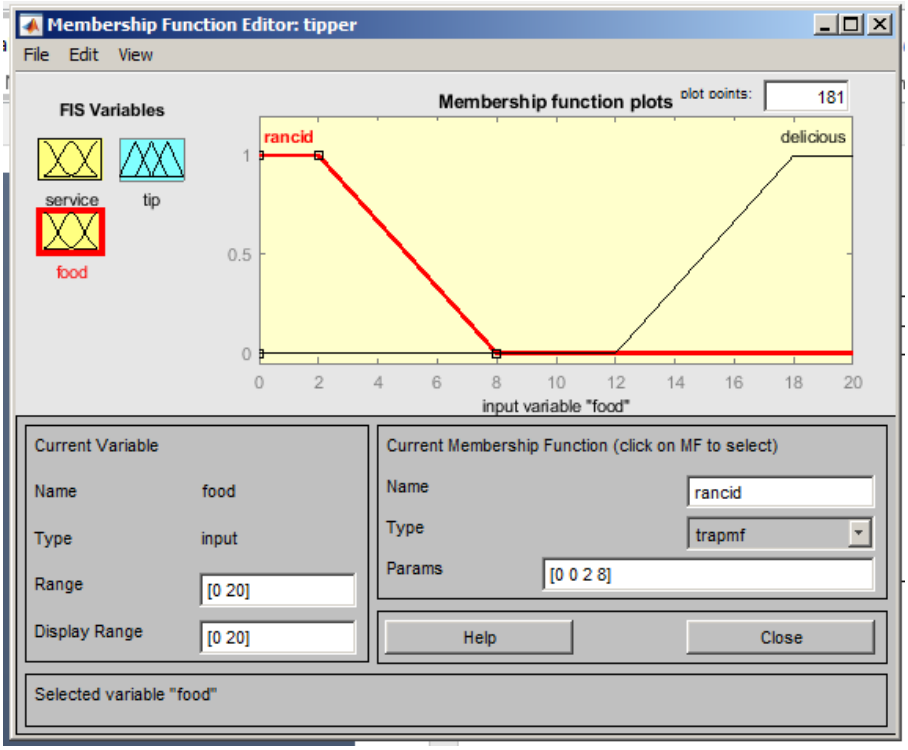
ROETEN,KIMBERLY ROSE

1.

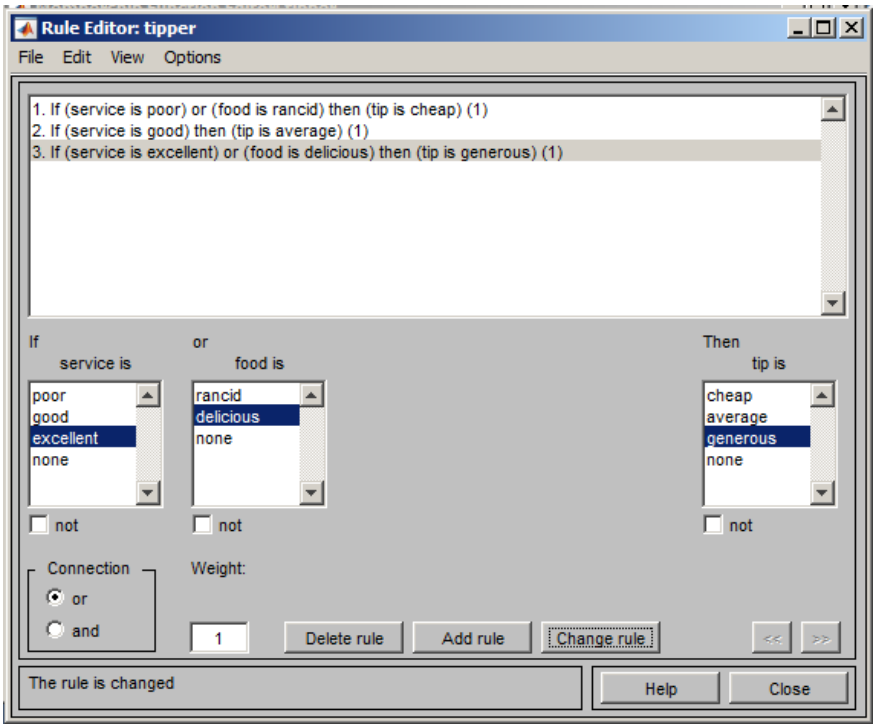
Case #			OR version		AND version	
	Service	***Food***	***Rules(s) Fired:***	***Tip***	***Rule(s) Fired:***	***Tip***
1	5	5	1&2	8.68	1&2	10
2	1	1	1	5.22	1	5.22
3	10	10	2	15	2	15
4	3	5	1&2	6.31	1&2	6.45
5	7	3	1&2	9.65	1&2	13.7
6	5	9	1&2	10	2	15
7	1	8	1	5.22	1	15
8	3	8	1&2	6.31	1&2	15

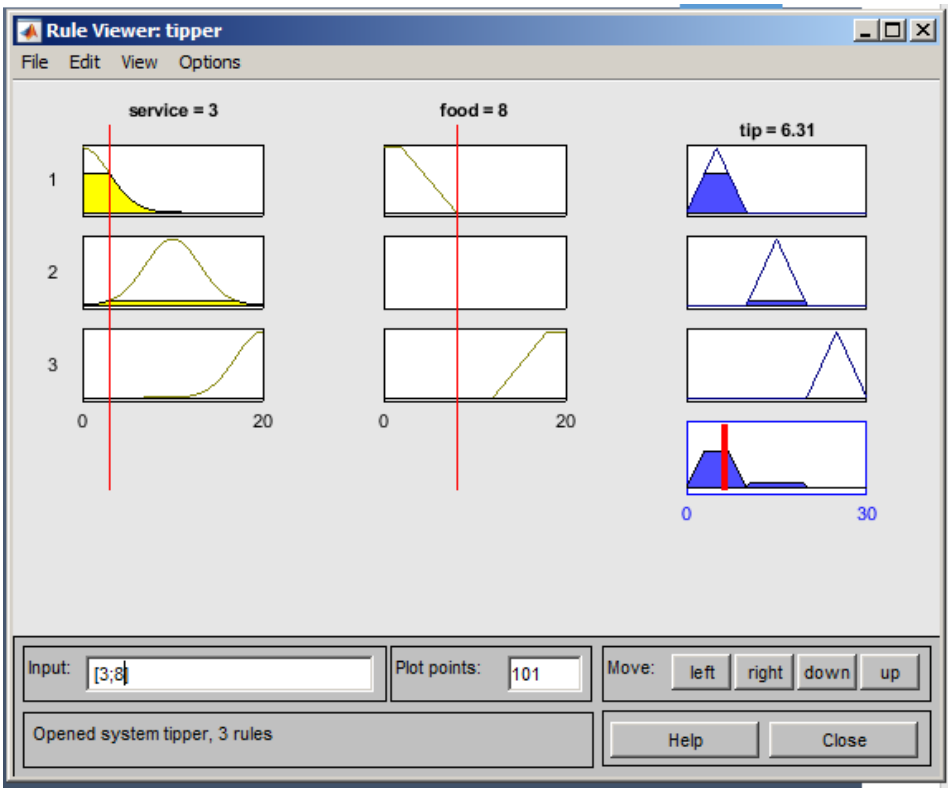
Membership Functions:

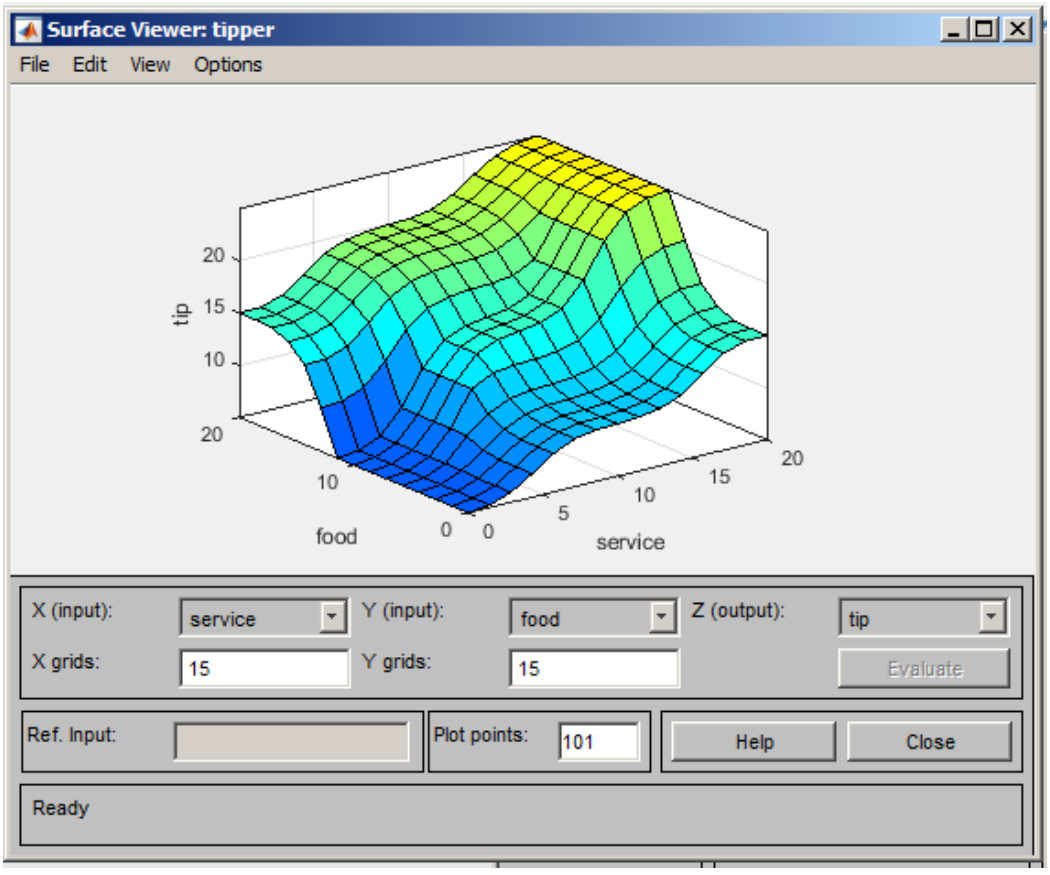




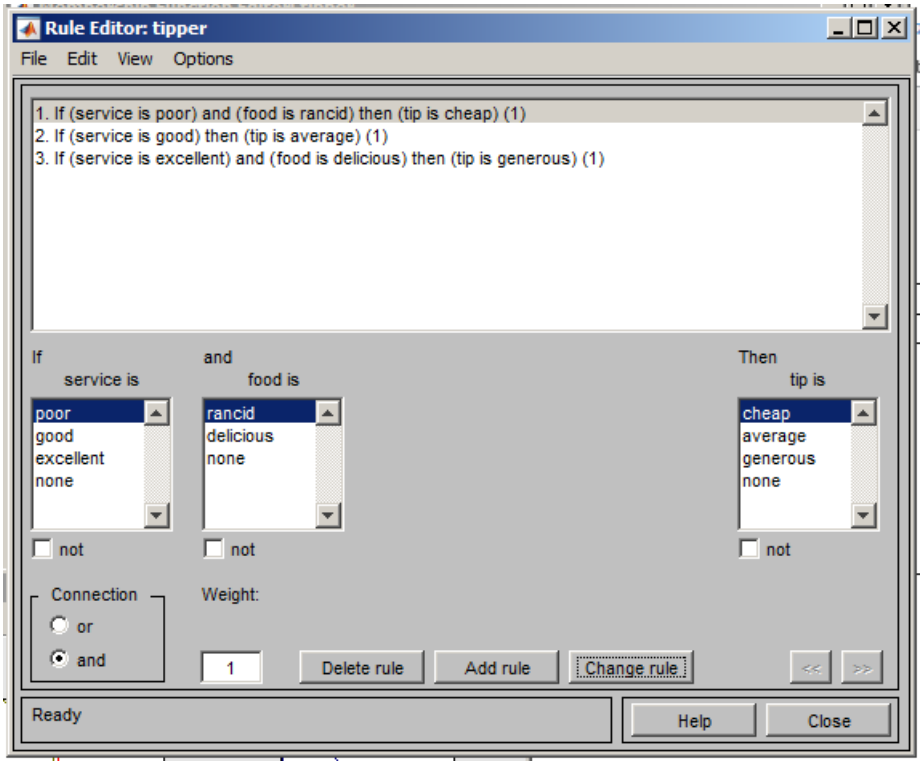
OR rules/surface:

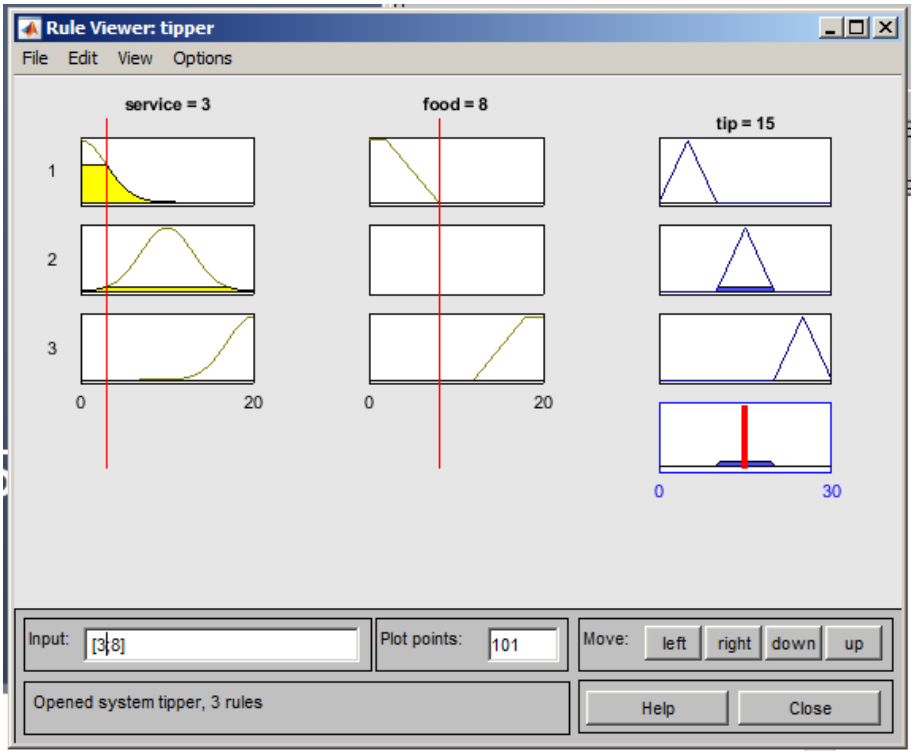


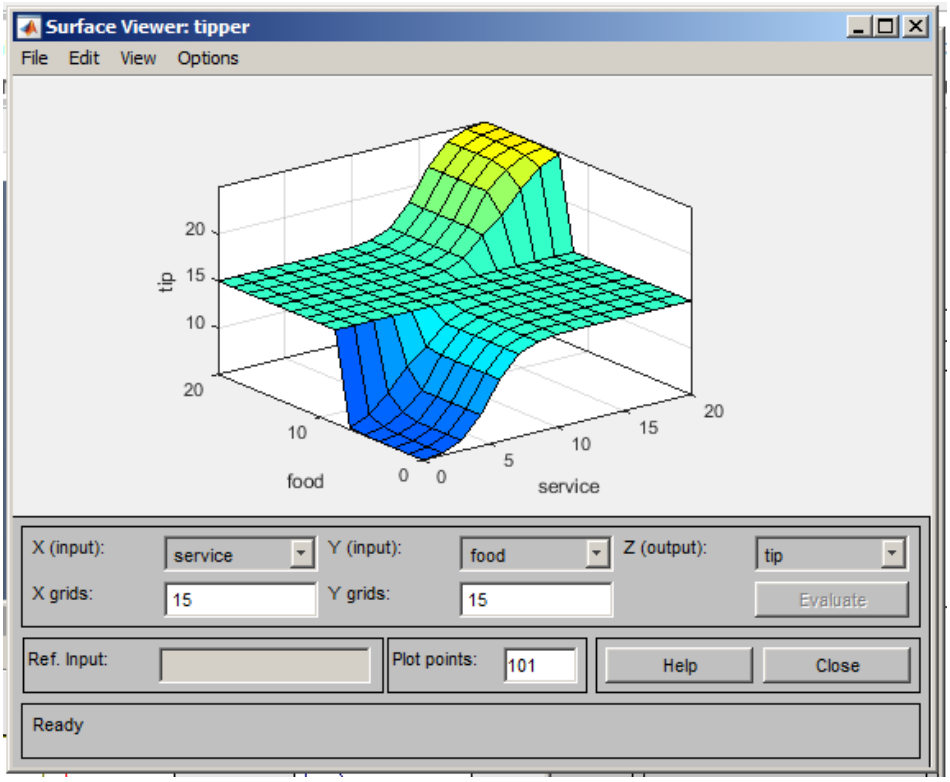

Rule Viewer: tipper
File Edit View Options
service = 3
food = 8
tip = 6.31
1
2
3
0
20
0
20
0
30
Input: [3;8]
Plot points: 101
Move: left right down up
Opened system tipper, 3 rules
Help
Close


Surface Viewer: tipper
File Edit View Options
tip
20
15
10
20
10
food
0
0
5
10
15
20
service
X (input): service
Y (input): food
Z (output): tip
X grids: 15
Y grids: 15
Evaluate
Ref. Input:
Plot points: 101
Help
Close
Ready

AND rules/surface:



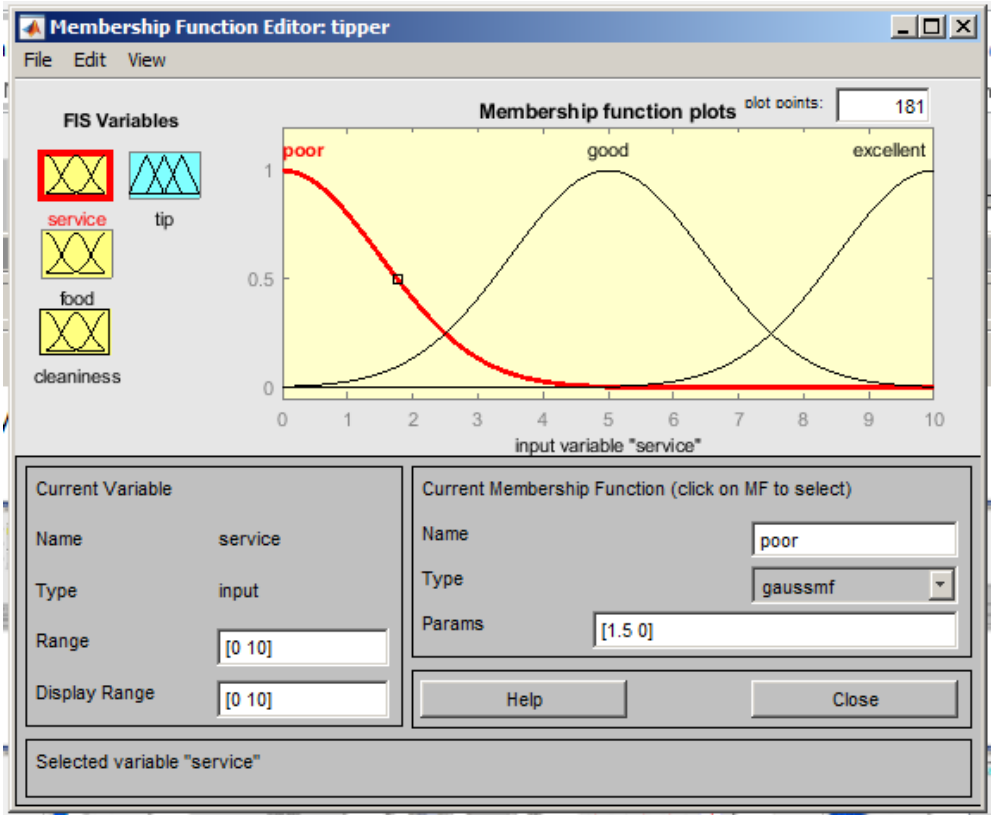


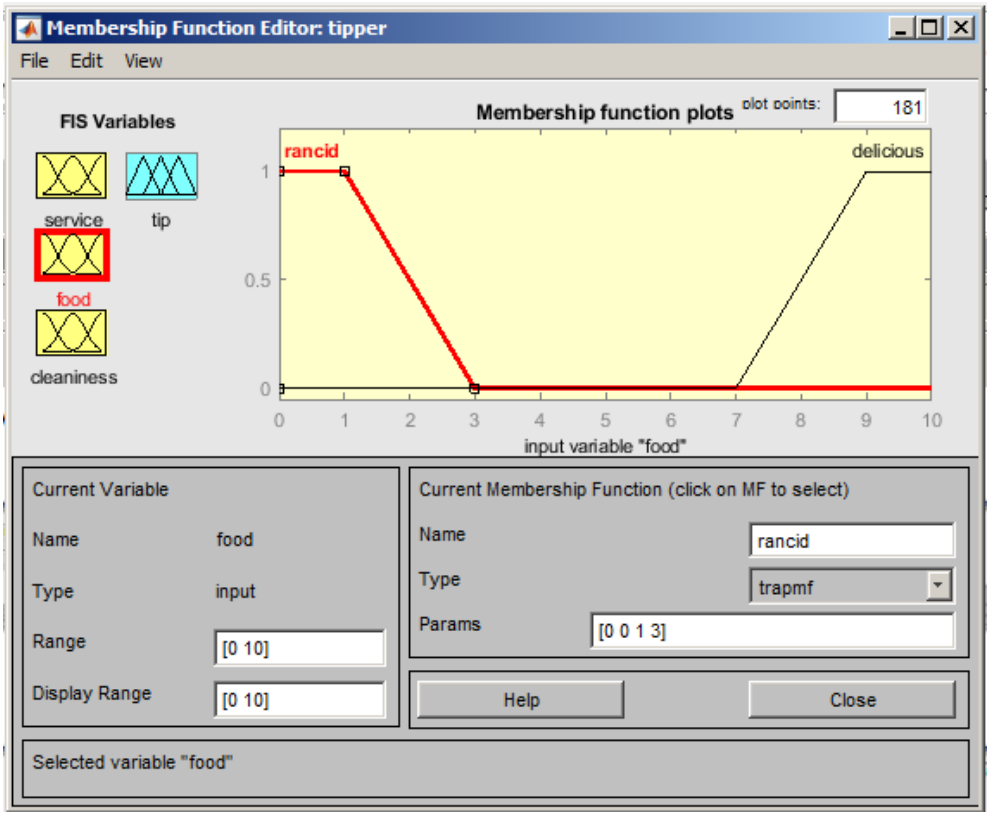


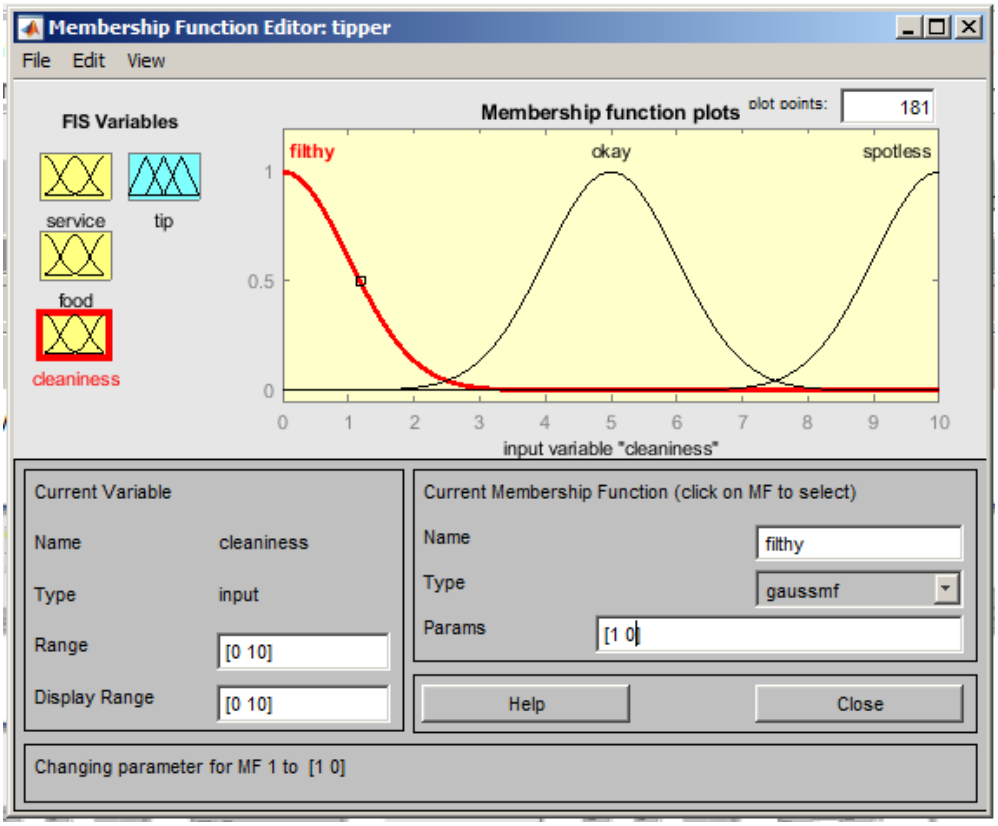
2.

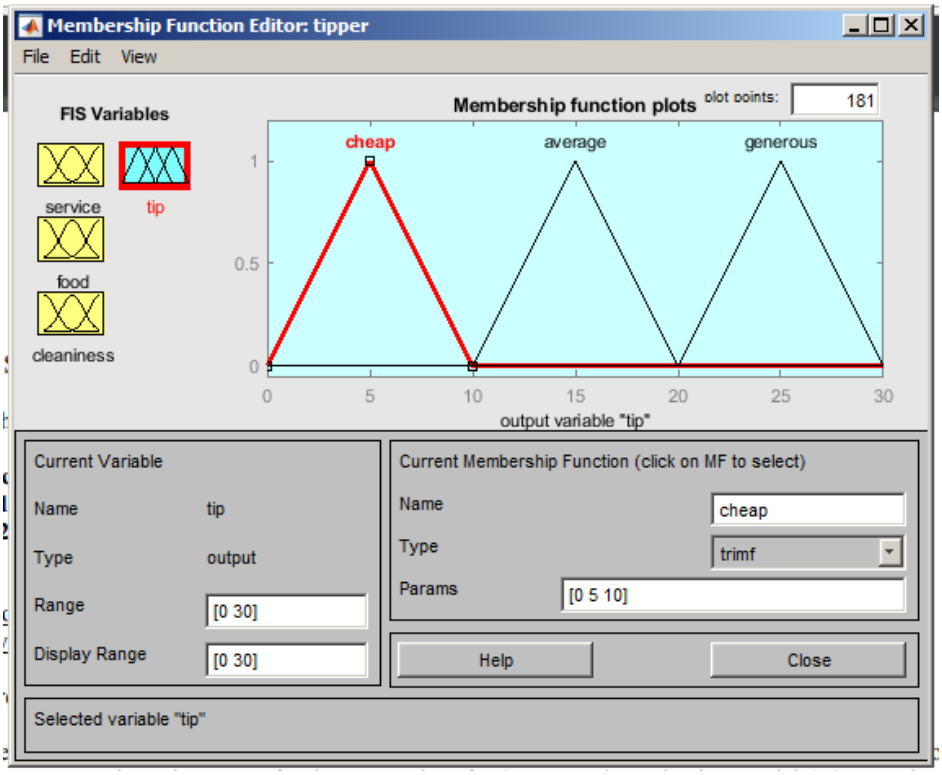
Case #				OR version		AND version	
	Service	***Food***	***Cleanliness***	***Rule(s) Fired:***	***Tip***	***Rule(s) Fired:***	***Tip***
1	5	5	5	1&2&3	15	2	15
2	1	1	1	1&2	7.02	1&2	5.56
3	10	10	10	2&3	24.2	2&3	24.9
4	8	5	3	1&2&3	15.5	2&3, 1&2	15
5	2	3	7	1&2, 2&3	14.5	1&2, 2&3	15
6	7	9	5	1&2&3	19.4	2&3	16.2
7	4	8	1	1&2&3	14.1	1&2&3	15
8	3	8	3	1&2&3	16	1&2&3	15

Membership functions:

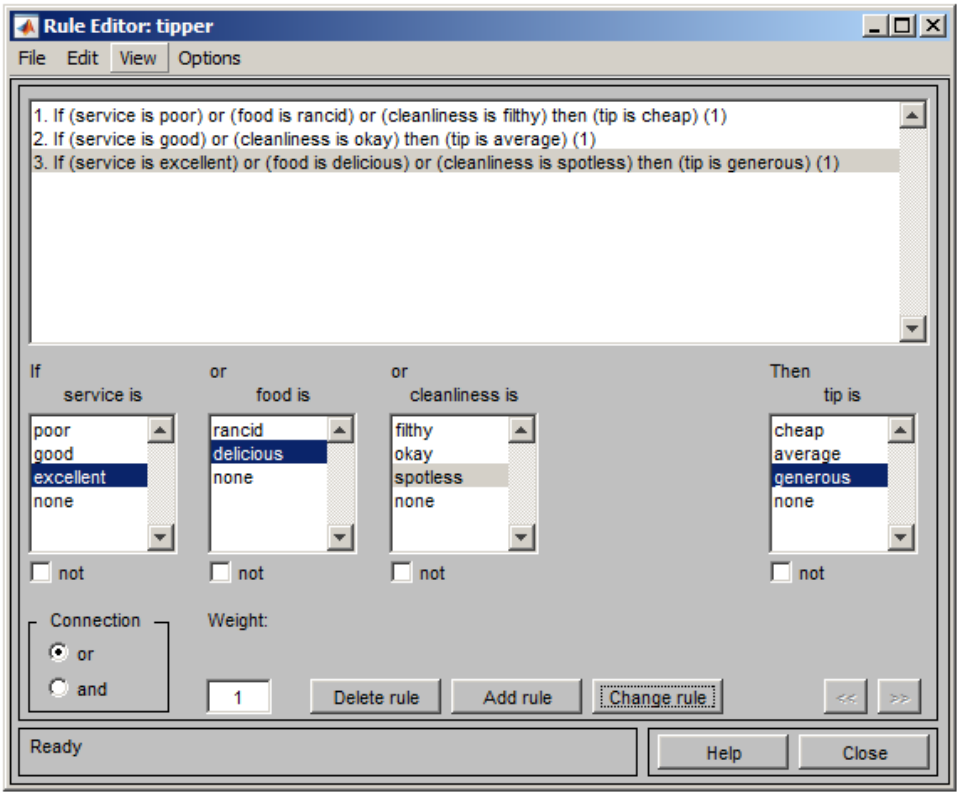

Membership Function Editor: tipper
File Edit View
FIS Variables
service
tip
food
cleaniness
Membership function plots
plot points:
181
poor
good
excellent
input variable "service"
Current Variable
Name service
Type input
Range [0 10]
Display Range [0 10]
Current Membership Function (click on MF to select)
Name poor
Type gaussmf
Params [1.5 0]
Help
Close
Selected variable "service"

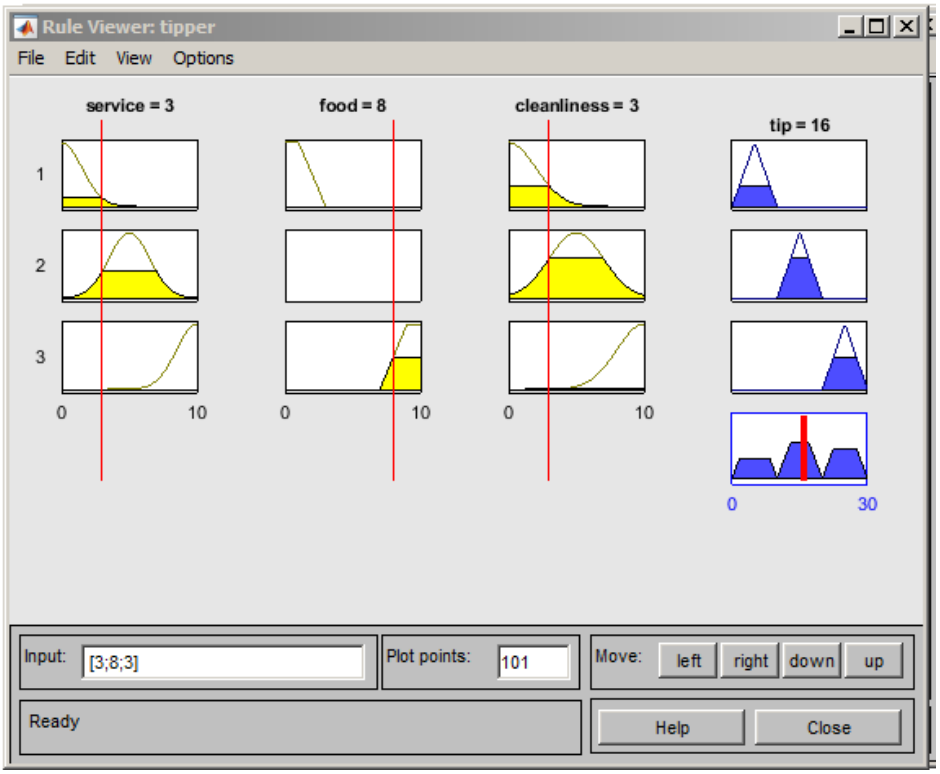

Membership Function Editor: tipper
File Edit View
FIS Variables
service
tip
food
cleaniness
Membership function plots
plot points:
181
rancid
delicious
input variable "food"
Current Variable
Name food
Type input
Range [0 10]
Display Range [0 10]
Current Membership Function (click on MF to select)
Name rancid
Type trapmf
Params [0 0 1 3]
Help
Close
Selected variable "food"

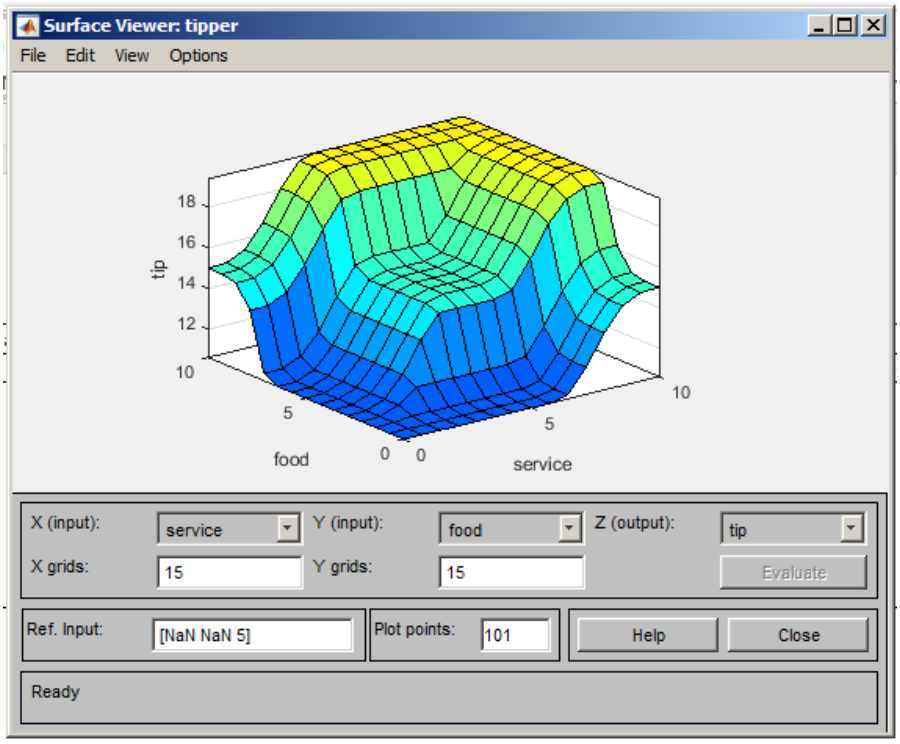

Membership Function Editor: tipper
File Edit View
FIS Variables
service
tip
food
cleaniness
Membership function plots
plot points:
181
filthy
okay
spotless
input variable "cleaniness"
Current Variable
Name cleaniness
Type input
Range [0 10]
Display Range [0 10]
Current Membership Function (click on MF to select)
Name filthy
Type gaussmf
Params [1 0]
Help
Close
Changing parameter for MF 1 to [1 0]


Membership Function Editor: tipper
File Edit View
FIS Variables
service
tip
food
cleaniness
Membership function plots
plot points:
181
cheap
average
generous
output variable "tip"
Current Variable
Name tip
Type output
Range [0 30]
Display Range [0 30]
Current Membership Function (click on MF to select)
Name cheap
Type trimf
Params [0 5 10]
Help
Close
Selected variable "tip"

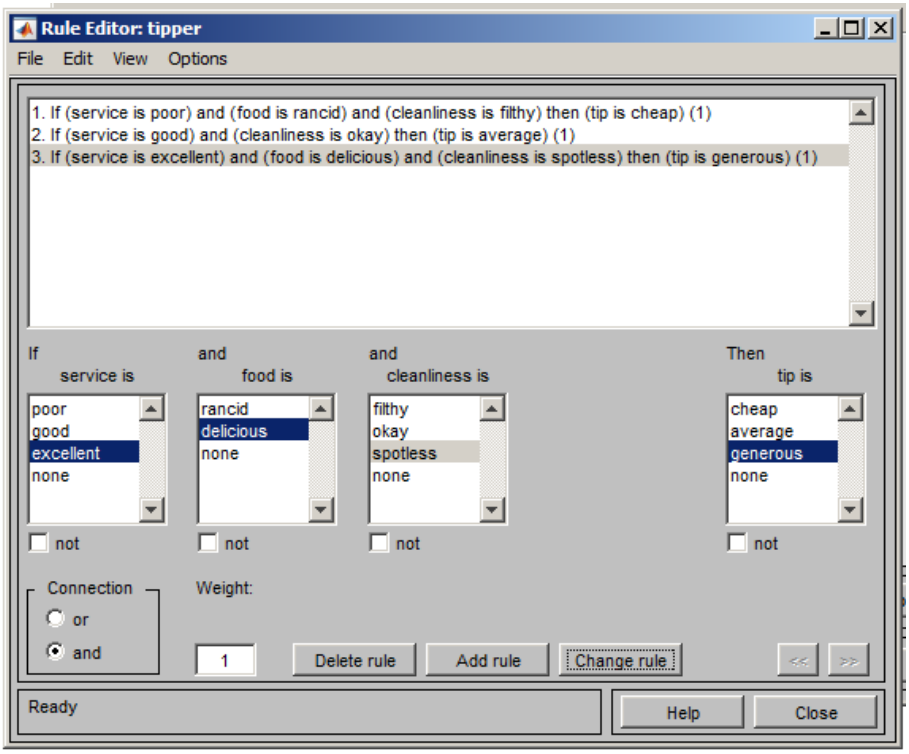
OR rules/surface:

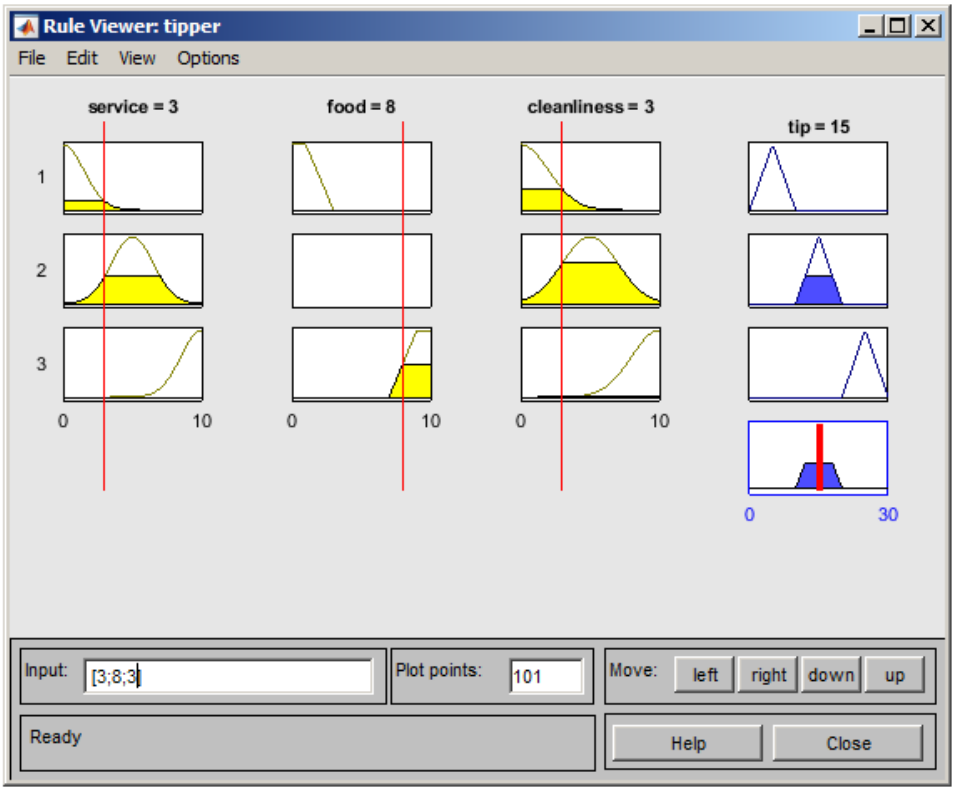


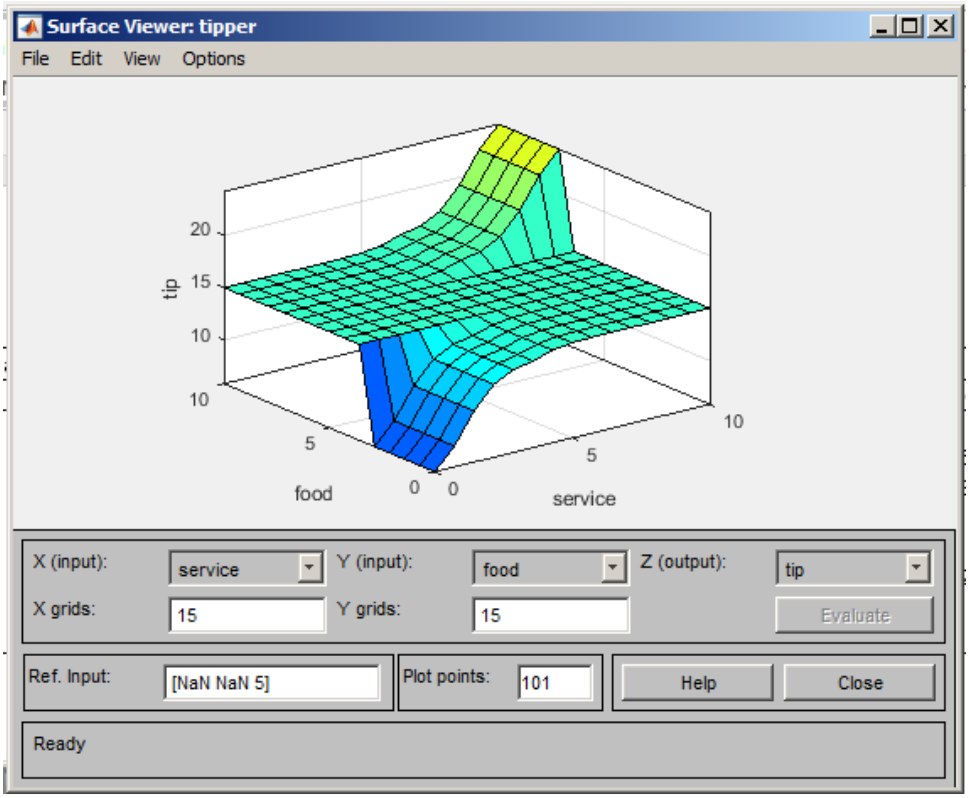




AND Rules/Surface:




Rule Viewer: tipper
File Edit View Options
service = 3
food = 8
cleanliness = 3
tip = 15
1
2
3
0
10
0
30
Input: [3;8;3]
Plot points: 101
Move: left right down up
Ready
Help
Close


Surface Viewer: tipper
File Edit View Options
tip
20
15
10
10
food
5
0
0
5
10
service
X (input): service
Y (input): food
Z (output): tip
X grids: 15
Y grids: 15
Evaluate
Ref. Input: [NaN NaN 5]
Plot points: 101
Help
Close
Ready

After comparing these two points, I think it is safe to conclude that Point 2's OR version is the way to go. In Point 1, the fuzzy rules and membership functions such as range/display range and parameters were modified but the values were kept the same for both service and food from Tutorial 4. In Point 2, the variable cleanliness was added with the same range/display range as variables food and service in Tutorial 4, however I changed the values up a little to see if it would make a difference. The only set of values that were kept constant was for variable food. Parameters and ranges/display ranges for the initial input variables service and food were kept the same. Since cleanliness is not a majorly important category for figuring out tip, I tried to be as lenient with the values as possible, and the parameters which help figure out how important a certain variable is. Also trying to modify sections of the fuzzy rules and membership functions for the variable categories was a challenge because the object was the make the surfaces as smooth and flat as possible, and for a while I was not having any luck. But it seems the surfaces are more flat when AND rules are considered. But after examining both of these models, it is indeed accurate that the better the quality of service, food, and/or cleanliness overall, the better the tip. Since there are more input variables to consider with Point 2 and an OR perspective seems to be more of a contributing factor, this model is the one that works the best, even considering the system from Tutorial 4. I personally believe the models I created produce more reasonable results because I was thinking the whole time I was trying to complete Tutorial 4 that the tips that were being generated from the data were a little too generous, unless they came from bigger parties. The MatLab ToolBox has helped me gain a better understanding on basic fuzzy logic concepts, and overall it has become easier to use the more I've gotten acquainted with the software.