Matlab Fuzzy Toolkit Example

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Introduction

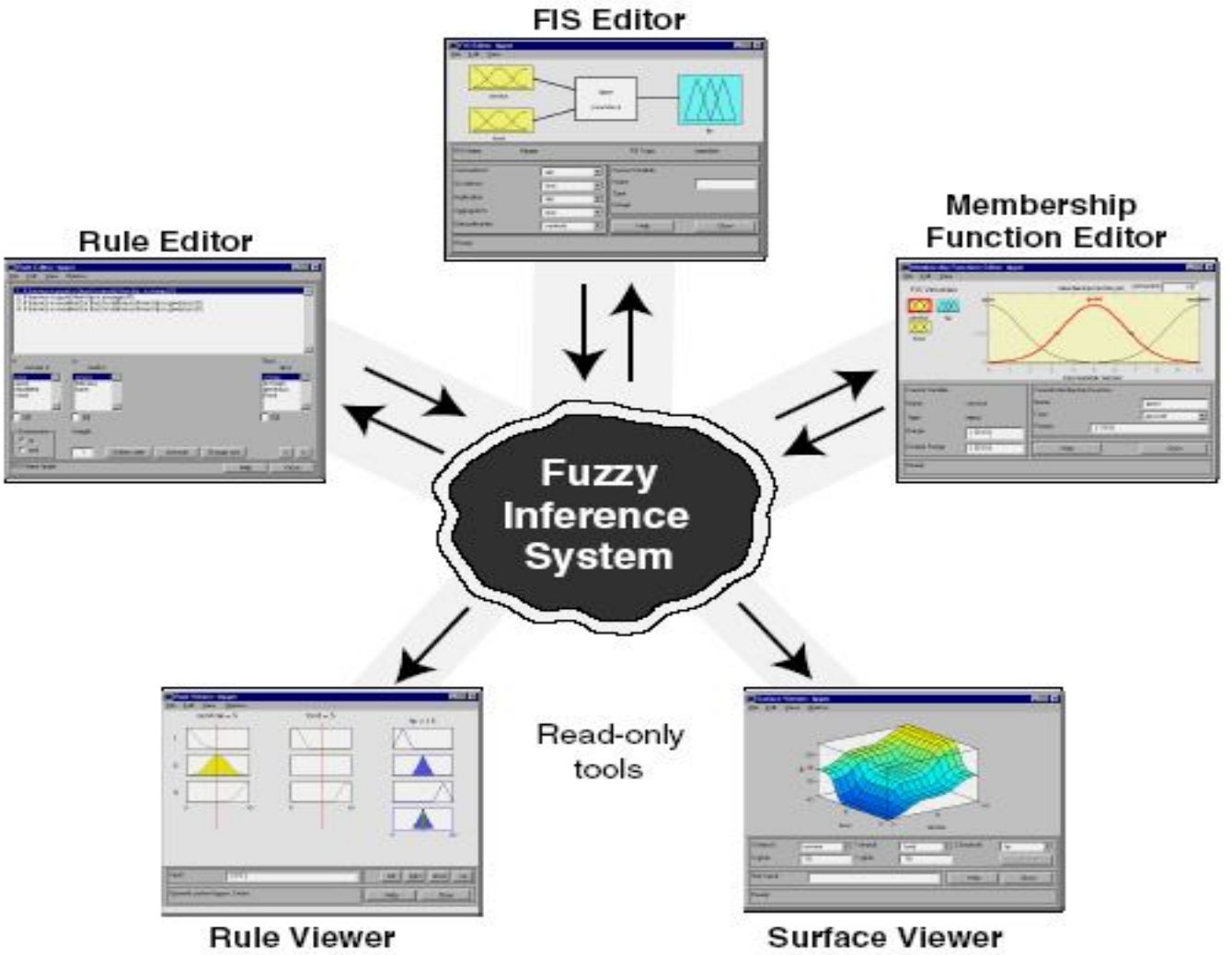
- MATLAB fuzzy logic toolbox facilitates the development of fuzzy-logic systems using:
  - graphical user interface (GUI) tools
  - command line functionality

- The tool can be used for building
  - Fuzzy Expert Systems
  - Adaptive Neuro-Fuzzy Inference Systems (ANFIS)

Graphical User Interface (GUI) Tools

- There are five primary GUI tools for building, editing, and observing fuzzy inference systems in the Fuzzy Logic Toolbox:
  - Fuzzy Inference System (FIS) Editor
  - Membership Function Editor
  - Rule Editor
  - Rule Viewer
  - Surface Viewer

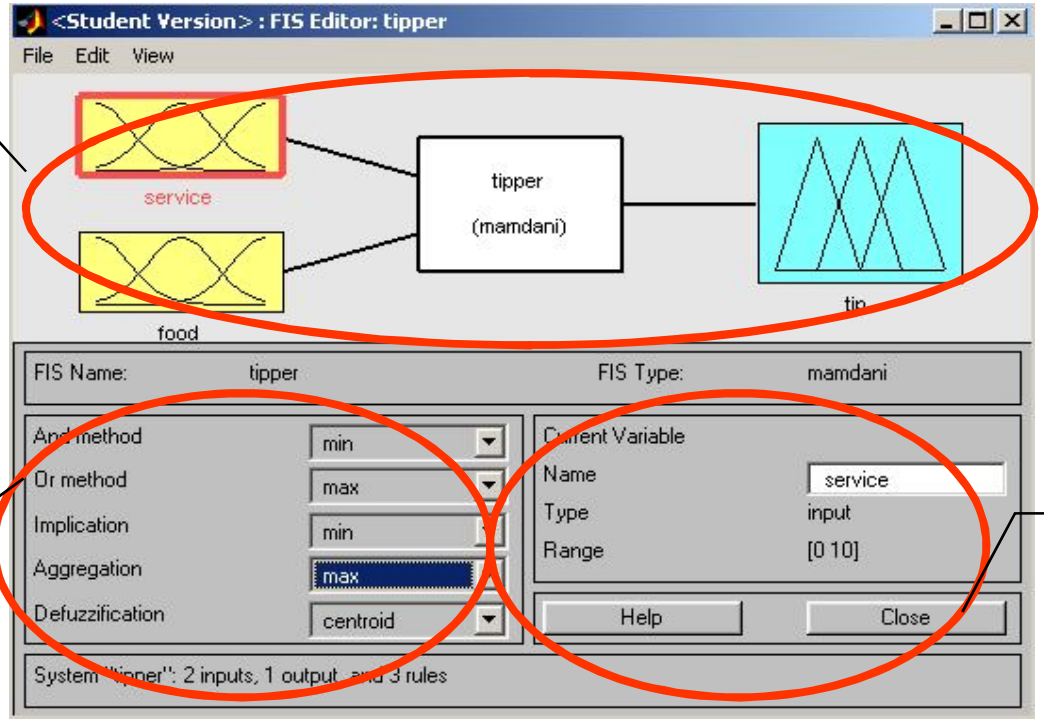
Graphical User Interface (GUI) Tools



Graphical User Interface (GUI) Tools

Fuzzy Inference System (FIS) Editor

Define number of input and output variables

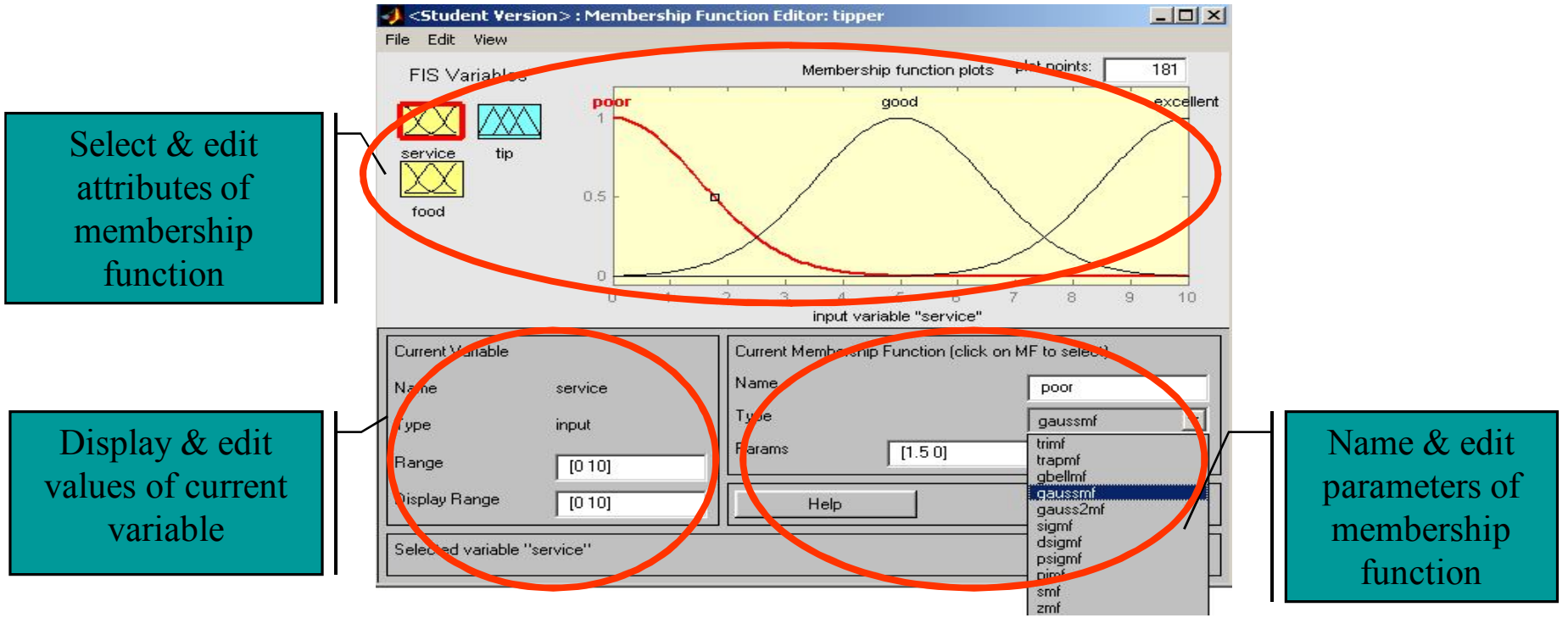


Adjust fuzzy inference functions

Name and edit names of input, output variables

Graphical User Interface (GUI) Tools

Membership Function Editor

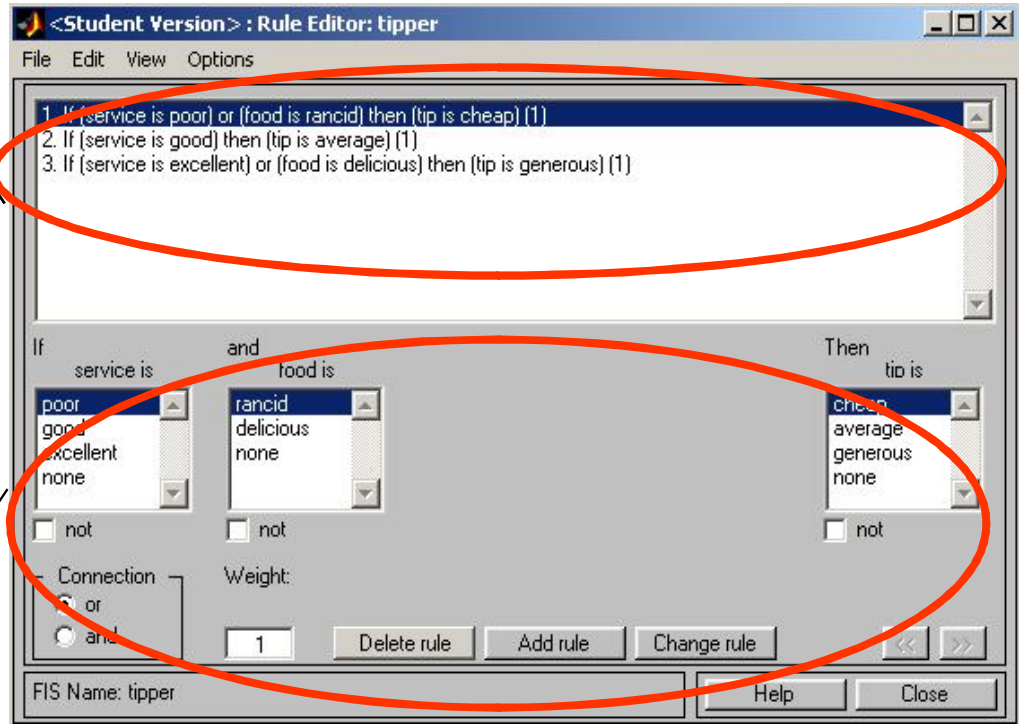


Graphical User Interface (GUI) Tools

Rule Editor

Rules – automatically updated

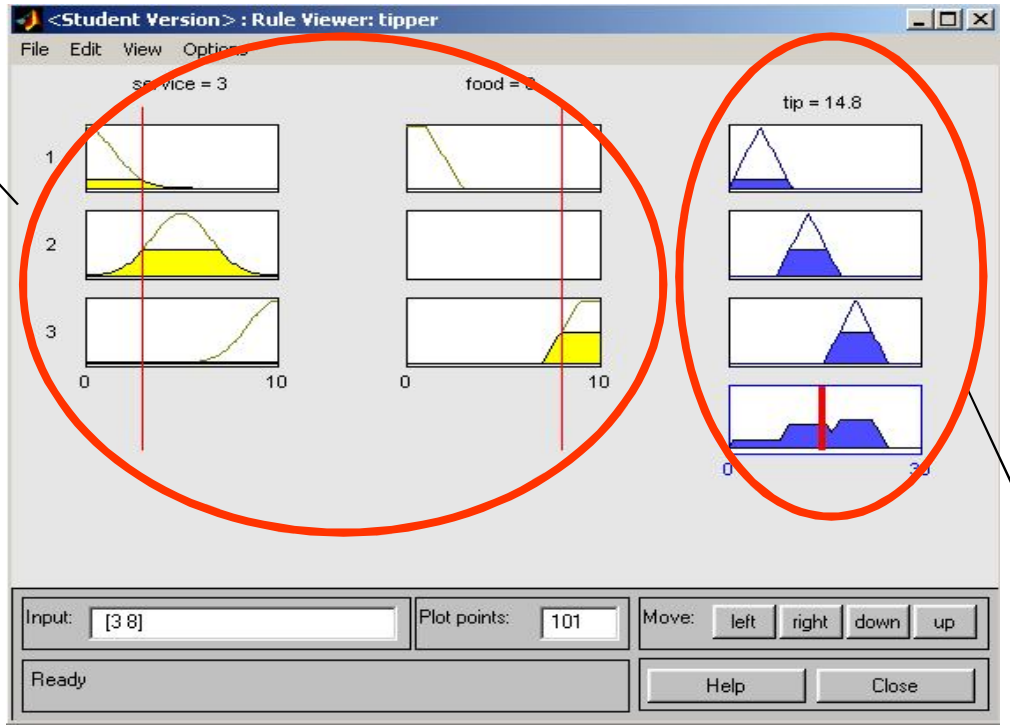
Create and edit rules



Graphical User Interface (GUI) Tools

Rule Viewer

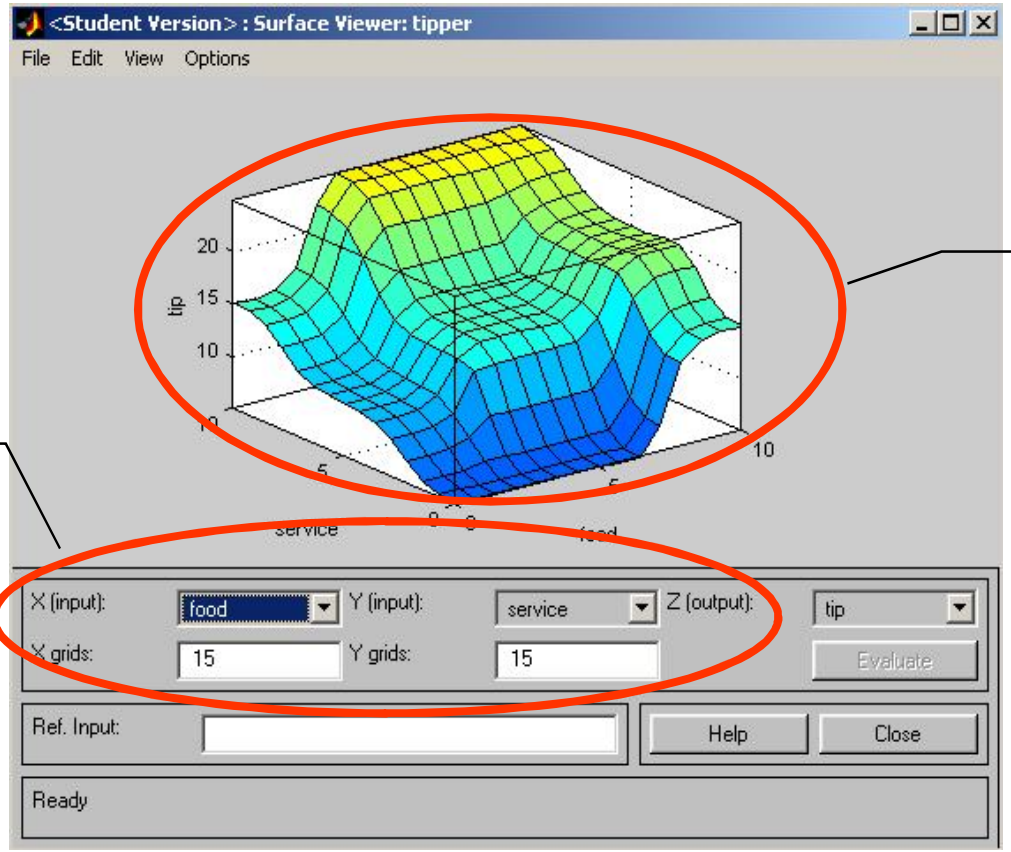
Shows how input variable is used in rules



Shows how output variable is used in rules; shows output of fuzzy system

Graphical User Interface (GUI) Tools

Surface Viewer



Specify input and output variables

Shows output surface for any system output versus any one (or two) inputs

Example: Dinner for Two

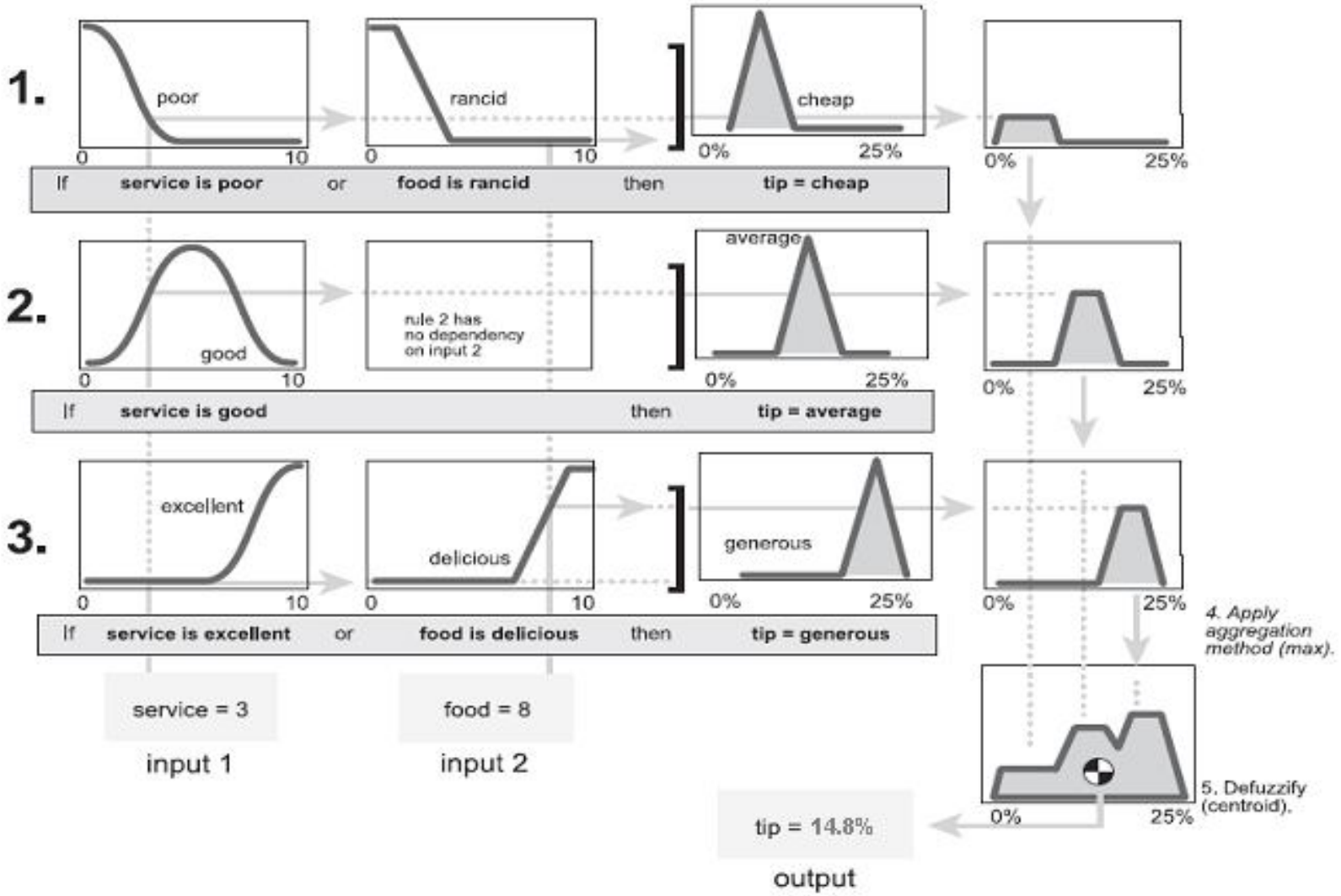
- Golden rules for tipping:

1. IF the service is poor OR the food is rancid
   THEN tip is cheap (5%).

2. IF the service is good
   THEN tip is average (15%).

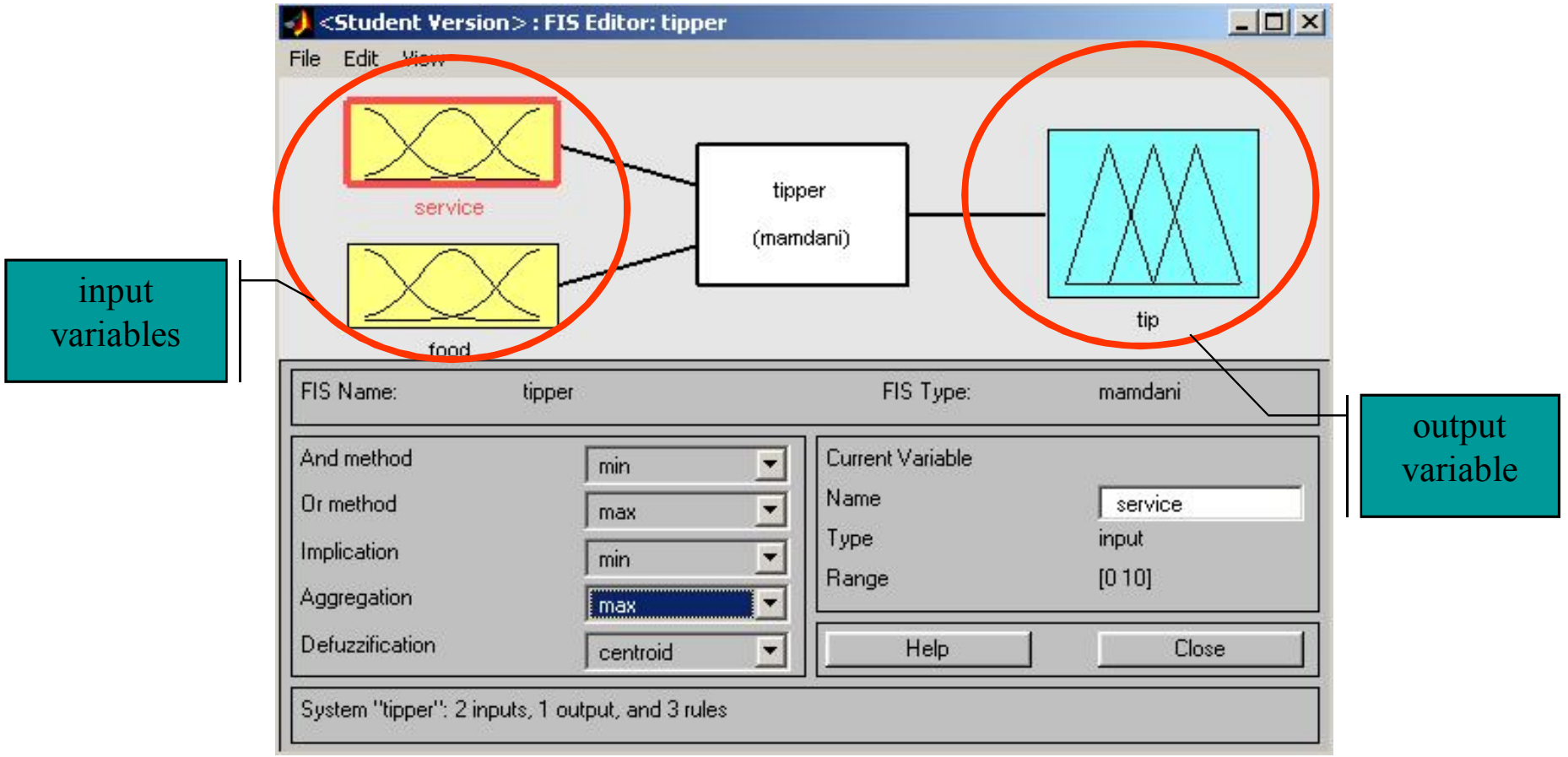
3. IF the service is excellent OR the food is delicious
   THEN tip is generous (25%).

Example: Dinner for Two



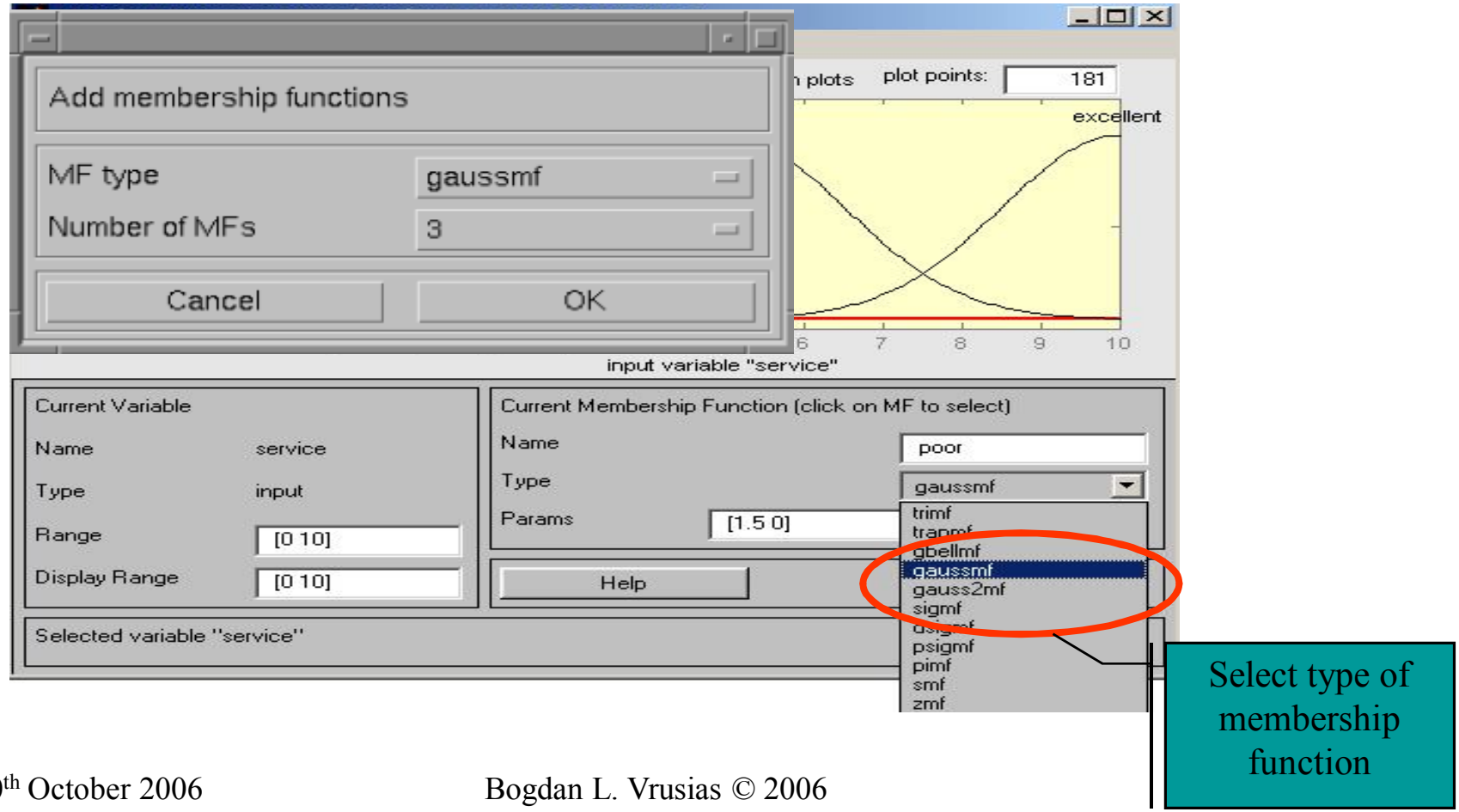
Example: Dinner for Two

Fuzzy Inference System (FIS) Editor



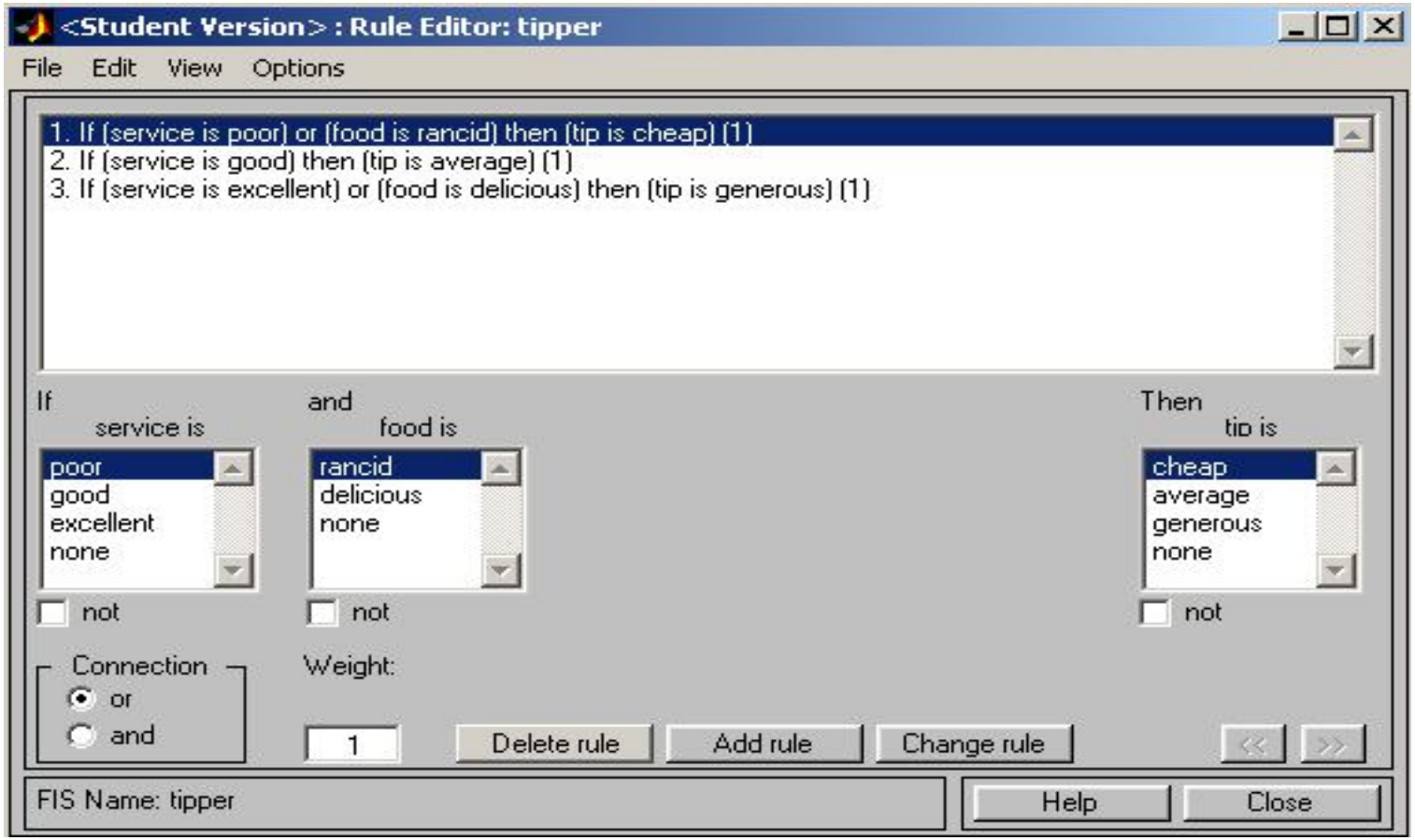
Example: Dinner for Two

Membership Function Editor



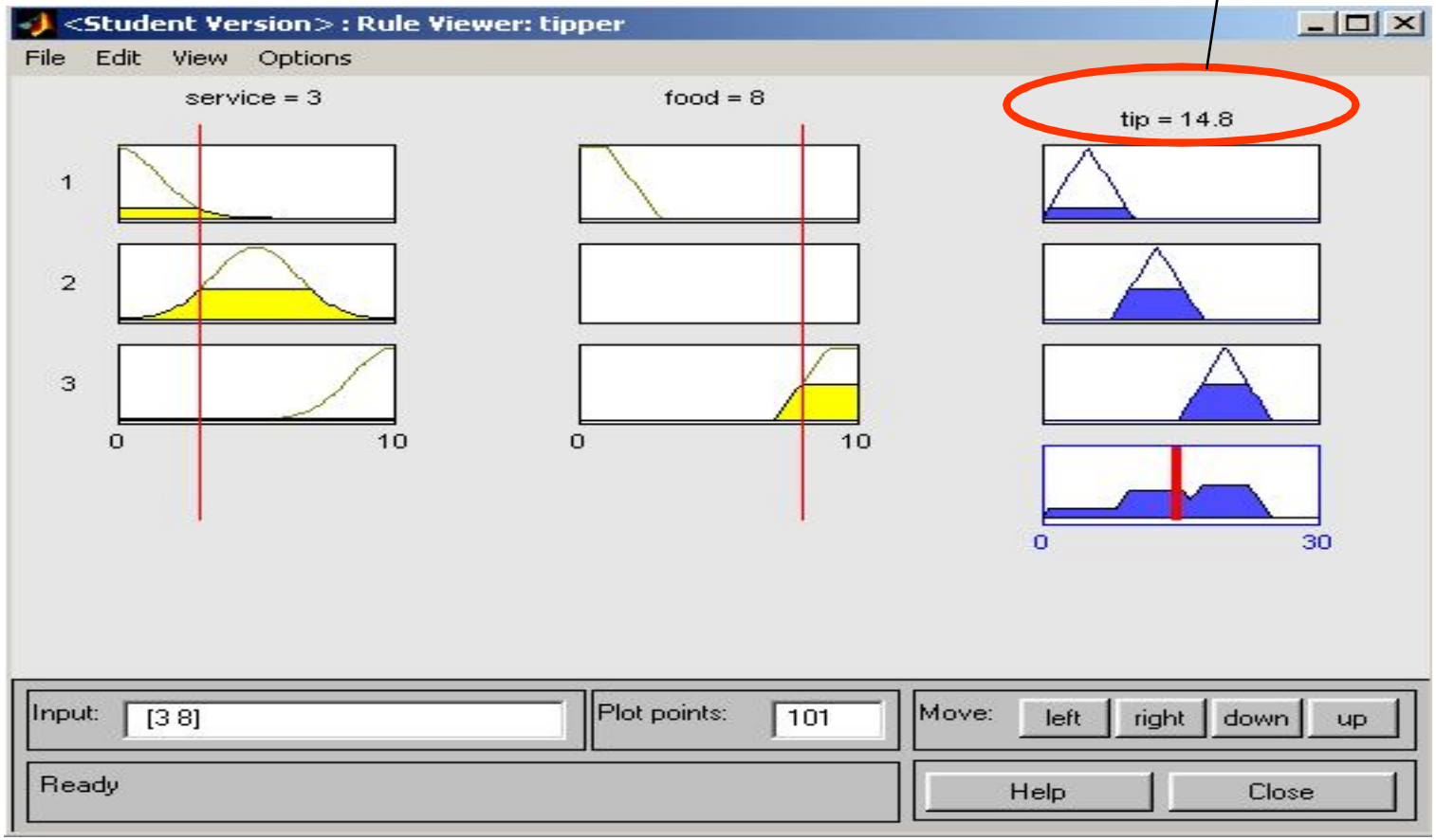
Example: Dinner for Two

Rule Editor



Example: Dinner for Two

Rule Viewer



Example: Dinner for Two

Surface Viewer