

**[DRAFT] Structural Modeling Project General Modeling Software Application [DRAFT]**  
**Strict Order – One Object Per Class [Auto]**  
11-15-2016

**Introduction:**

This document provides a quick introduction and complete overview of a simple system structuring problem. The selected structuring problem is taken from Appendix 2 of 'The Handbook of Interactive Management', section A2.2.1 of the Handbook of Interactive Management. A digital copy of the Handbook is located at:

<http://demosophia.com/wp-content/uploads/2012/09/Handbook-of-Interactive-Management.pdf>

This problem, in Appendix 2, is associated with the DOMODEL command of the GSM ISM software. In the example presented here, the Strict Order – One Object Per Class web application approach will be used to demonstrate the problem solution. The 'is heavier than' (IHT) natural language system structuring relationship is used in this case. The weight of an object is determined by a gravity force field that interacts with the mass of each object. This is viewed as a global structuring relationship with the following logical properties:

- irreflexive
- asymmetric
- transitive.

No two objects weight the same, so only one object in each weight class and one path through the system structure. There will be no clusters because there is only one element per class.

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Please Select The Appropriate Approach.

Strict Order - One Object Per Class [Manual]

Enter Inital Matrix Size

Size:  Display One [Get Detailed Information](#)

Strict Order - One Object Per Class [Auto]

Enter Inital Matrix Size

Size:  Display One [Get Detailed Information](#)

Strict Order - One Or More Objects Per Class [Manual]

Enter Inital Matrix Size

Size:  Display One Or More [Get Detailed Information](#)

Strict Order - One Or More Objects Per Class [Auto]

Enter Inital Matrix Size

Size:  Display One Or More [Get Detailed Information](#)

Cluster Objects Into Classes [Manual]

Enter Inital Matrix Size

Size:  Display Cluster [Get Detailed Information](#)

Cluster Objects Into Classes [Auto]

Enter Inital Matrix Size

Size:  Display Cluster [Get Detailed Information](#)

**Step One:**

Enter the number 7 into the size text box in the Strict Order – One Object Per Class section of the SM GSM Application.

**Step Two:**

Press the “Display One” button.

**Step Three:**

Begin to gather empirical information about the objects of interest. The empirical sampling proceeds in a structured fashion starting at the top with object one (1) and moving down through the objects of interest in a measured fashion. This is the manual algorithm approach.

Is 1 heavier than 2? No (Do not enter anything in the application interface.)

Is 2 heavier than 1? Yes

**Step Four:**

Enter the number 2 in the “Enter Column Number” text input box. Enter the number 1 in the “Enter Row Number” text input box.

**Step Five:**

Press the “Enter Data” button.

The screenshot shows the 'Structural Modeling Project' application interface. At the top is a navigation bar with 'Home', 'About', 'Documents', 'License', and 'Contact'. Below this is a legend for the matrix values: 'From Empirical Data' (0 = Known False, 1 = Known True) and 'From Empirical Data' (0 = Unknown, 1 = Inferred True). The text 'Simpson Augmented Boolean Algebra' is also present. The main section is titled 'Strict Order - One Object Per Class [Auto]' and 'Initial Matrix Size is 7'. It features a 7x7 matrix with rows and columns numbered 1 to 7. The matrix contains values 0 (yellow), 1 (red), and 1 (green). To the right of the matrix are input fields for 'Enter Column Number: 2' and 'Enter Row Number: 1', along with 'Enter Data' and 'Infer Information' buttons.

	1	2	3	4	5	6	7
1	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

**Step Six:**

Is 2 heavier than 3? Yes

**Step Seven:**

Enter the number 2 in the “Enter Column Number” text input box. Enter the number 3 in the “Enter Row Number” text input box.

**Step Eight:**

Press the “Enter Data” button.

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From Empirical Data
0 = Known False
1 = Known True
0 = Unknown
1 = Inferred True
Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

## Strict Order - One Object Per Class [Auto]

2	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0
3	1	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

Enter Column Number: 2
Enter Row Number: 3
Enter Data
Infer Information

2 1 3 4 5 6 7

### Step Nine:

Is 1 heavier than 3? No (Do not enter anything in the application interface.)

Is 3 heavier than 1? Yes

### Step Ten:

Enter the number 3 in the “Enter Column Number” text input box. Enter the number 1 in the “Enter Row Number” text input box.

### Step Eleven:

Press the “Enter Data” button.

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From Empirical Data
0 = Known False
1 = Known True
0 = Unknown
1 = Inferred True
Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

## Strict Order - One Object Per Class [Auto]

2	0	0	0	0	0	0	0
3	1	0	0	0	0	0	0
1	1	1	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

Enter Column Number: 3
Enter Row Number: 1
Enter Data
Infer Information

2 3 1 4 5 6 7

**Step Twelve:**

Is 3 heavier than 4? No (Do not enter anything in the application interface.)

Is 4 heavier than 3? Yes

**Step Thirteen:**

Enter the number 4 in the “Enter Column Number” text input box. Enter the number 3 in the “Enter Row Number” text input box.

**Step Fourteen:**

Press the “Enter Data” button.

The screenshot shows the application interface with the following elements:

- Navigation Bar:** Structural Modeling Project, Home, About, Documents, License, Contact.
- Legend:**
  - From Empirical Data: 0 = Known False (red), 1 = Known True (green).
  - 0 = Unknown (yellow), 1 = Inferred True (blue).
  - Simpson Augmented Boolean Algebra.
- Initial Matrix Size is 7**
- Title:** Strict Order - One Object Per Class [Auto]
- Matrix:** A 7x7 matrix with rows and columns indexed 1 to 7. The matrix contains values 0, 1, and 2. The values are:
 

2	0	0	0	0	0	0
4	0	0	0	0	0	0
3	1	1	0	0	0	0
1	1	0	1	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
- Input Fields:** Enter Column Number: 4, Enter Row Number: 3.
- Buttons:** Enter Data, Infer Information.

**Step Fifteen:**

Is 2 heavier than 4? Yes

**Step Sixteen:**

Enter the number in the “Enter Column Number” text input box. Enter the number 4 in the “Enter Row Number” text input box.

**Step Seventeen:**

Press the “Enter Data” button.

The screenshot shows the application interface with the following elements:

- Navigation Bar:** Structural Modeling Project, Home, About, Documents, License, Contact.
- Legend:**
  - From Empirical Data: 0 = Known False (red), 1 = Known True (green).
  - 0 = Unknown (yellow), 1 = Inferred True (blue).
  - Simpson Augmented Boolean Algebra.
- Initial Matrix Size is 7**
- Title:** Strict Order - One Object Per Class [Auto]
- Matrix:** A 7x7 matrix with rows and columns indexed 1 to 7. The matrix contains values 0, 1, and 2. The values are:
 

2	0	0	0	0	0	0
4	1	0	0	0	0	0
3	1	1	0	0	0	0
1	1	0	1	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	0
7	0	0	0	0	0	0
- Input Fields:** Enter Column Number: 2, Enter Row Number: 4.
- Buttons:** Enter Data, Infer Information.

### Step Eighteen:

Is 4 heavier than 5? Yes

### Step Nineteen:

Enter the number 2 in the “Enter Column Number” text input box. Enter the number 4 in the “Enter Row Number” text input box.

### Step Twenty:

Press the “Enter Data” button.

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From Empirical Data

0 = Known False

1 = Known True

0 = Unknown

1 = Inferred True

Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

## Strict Order - One Object Per Class [Auto]

2	0	0	0	0	0	0	0
4	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0
1	1	0	1	0	0	0	0
5	0	1	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

Enter Column Number: 4

Enter Row Number: 5

Enter Data

Infer Information

2 4 3 1 5 6 7

### Step Twenty One:

Is 5 heavier than 1? Yes

### Step Twenty Two:

Enter the number 5 in the “Enter Column Number” text input box. Enter the number 1 in the “Enter Row Number” text input box.

### Step Twenty Three:

Press the “Enter Data” button.

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From Empirical Data

0 = Known False

1 = Known True

0 = Unknown

1 = Inferred True

Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

## Strict Order - One Object Per Class [Auto]

2	0	0	0	0	0	0	0
4	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0
5	0	1	0	0	0	0	0
1	1	0	1	1	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0

Enter Column Number: 5

Enter Row Number: 1

Enter Data

Infer Information

2 4 3 5 1 6 7



#### Step Twenty Four:

Is 5 heavier than 3? Yes

#### Step Twenty Five:

Enter the number 5 in the “Enter Column Number” text input box. Enter the number 3 in the “Enter Row Number” text input box.

#### Step Twenty Six:

Press the “Enter Data” button.

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From Empirical Data

0 = Known False

1 = Known True

0 = Unknown

1 = Inferred True

Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

Strict Order - One Object Per Class [Auto]

2

0

0

0

0

0

0

0

4

1

0

0

0

0

0

0

5

0

1

0

0

0

0

0

3

1

1

1

0

0

0

0

1

1

0

1

1

0

0

0

6

0

0

0

0

0

0

0

7

0

0

0

0

0

0

0

Enter Column Number: 5

Enter Row Number: 3

Enter Data

Infer Information

2

4

5

3

1

6

7

#### Step Twenty Seven:

Is 4 heavier than 6? Yes

#### Step Twenty Eight:

Enter the number 4 in the “Enter Column Number” text input box. Enter the number 6 in the “Enter Row Number” text input box.

#### Step Twenty Nine:

Press the “Enter Data” button.

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From Empirical Data

0 = Known False

1 = Known True

0 = Unknown

1 = Inferred True

Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

Strict Order - One Object Per Class [Auto]

2

0

0

0

0

0

0

0

4

1

0

0

0

0

0

0

5

0

1

0

0

0

0

0

3

1

1

1

0

0

0

0

1

1

0

1

1

0

0

0

6

0

1

0

0

0

0

0

7

0

0

0

0

0

0

0

Enter Column Number: 4

Enter Row Number: 6

Enter Data

Infer Information

2

4

5

3

1

6

7

**Step Thirty:**

Is 3 heavier than 6? No (Do not enter anything in the application interface.)

Is 6 heavier than 3? Yes

**Step Thirty One:**

Enter the number 6 in the “Enter Column Number” text input box. Enter the number 3 in the “Enter Row Number” text input box.

**Step Thirty Two:**

Press the “Enter Data” button.

The screenshot shows the application interface with the following elements:

- Navigation Bar:** Structural Modeling Project, Home, About, Documents, License, Contact.
- Legend:**
  - From Empirical Data: 0 = Known False, 1 = Known True
  - 0 = Unknown, 1 = Inferred True
  - Simpson Augmented Boolean Algebra
- Text:** Initial Matrix Size is 7
- Matrix:** A 7x7 matrix with rows and columns indexed 1 to 7. The matrix contains values 0 (yellow), 1 (green), and 0 (red). The matrix is symmetric.
 

2	0	0	0	0	0	0
4	1	0	0	0	0	0
5	0	1	0	0	0	0
6	0	1	0	0	0	0
3	1	1	1	1	0	0
1	1	0	1	0	1	0
7	0	0	0	0	0	0
- Input Fields:** Enter Column Number: 6, Enter Row Number: 3
- Buttons:** Enter Data, Infer Information
- Footer:** 2 4 5 6 3 1 7

**Step Thirty Three:**

Is 5 heavier than 6? No (Do not enter anything in the application interface.)

Is 6 heavier than 5? Yes

**Step Thirty Four:**

Enter the number 6 in the “Enter Column Number” text input box. Enter the number 5 in the “Enter Row Number” text input box.

**Step Thirty Five:**

Press the “Enter Data” button.

The screenshot shows the application interface with the following elements:

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- Legend:**
  - From Empirical Data: 0 = Known False, 1 = Known True
  - 0 = Unknown, 1 = Inferred True
  - Simpson Augmented Boolean Algebra
- Text:** Initial Matrix Size is 7
- Matrix:** A 7x7 matrix with rows and columns indexed 1 to 7. The matrix contains values 0 (yellow), 1 (green), and 0 (red). The matrix is symmetric.
 

2	0	0	0	0	0	0
4	1	0	0	0	0	0
6	0	1	0	0	0	0
5	0	1	1	0	0	0
3	1	1	1	1	0	0
1	1	0	0	1	1	0
7	0	0	0	0	0	0
- Input Fields:** Enter Column Number: 6, Enter Row Number: 5
- Buttons:** Enter Data, Infer Information
- Footer:** 2 4 6 5 3 1 7

### Step Thirty Six:

Is 6 heavier than 7? No (Do not enter anything in the application interface.)

Is 7 heavier than 5? Yes

### Step Thirty Seven:

Enter the number 7 in the “Enter Column Number” text input box. Enter the number 5 in the “Enter Row Number” text input box.

### Step Thirty Eight:

Press the “Enter Data” button.

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From Empirical Data: 0 = Known False, 1 = Known True, 0 = Unknown, 1 = Inferred True. Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

## Strict Order - One Object Per Class [Auto]

2	0	0	0	0	0	0	0
4	1	0	0	0	0	0	0
6	0	1	0	0	0	0	0
7	0	0	0	0	0	0	0
5	0	1	1	1	0	0	0
3	1	1	1	0	1	0	0
1	1	0	0	0	1	1	0

Enter Column Number: 7 Enter Row Number: 5 Enter Data Infer Information

2 4 6 7 5 3 1

### Step Thirty Nine:

Is 7 heavier than 4? Yes

### Step Forty:

Enter the number 7 in the “Enter Column Number” text input box. Enter the number 4 in the “Enter Row Number” text input box.

### Step Forty One:

Press the “Enter Data” button.

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From Empirical Data: 0 = Known False, 1 = Known True, 0 = Unknown, 1 = Inferred True. Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

## Strict Order - One Object Per Class [Auto]

2	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
4	1	1	0	0	0	0	0
6	0	0	1	0	0	0	0
5	0	1	1	1	0	0	0
3	1	0	1	1	1	0	0
1	1	0	0	0	1	1	0

Enter Column Number: 7 Enter Row Number: 4 Enter Data Infer Information

2 7 4 6 5 3 1



### Step Forty Two:

Is 2 heavier than 7? No (Do not enter anything in the application interface.)

Is 7 heavier than 2? Yes

### Step Forty Three:

Enter the number 7 in the “Enter Column Number” text input box. Enter the number 2 in the “Enter Row Number” text input box.

### Step Forty Four:

Press the “Enter Data” button.

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From Empirical Data  $\Rightarrow$  **0** = Known False **1** = Known True  $\Leftarrow$  From Empirical Data  
**0** = Unknown **1** = Inferred True  
Simpson Augmented Boolean Algebra

Initial Matrix Size is 7

## Strict Order - One Object Per Class [Auto]

7	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0
4	1	1	0	0	0	0	0
6	0	0	1	0	0	0	0
5	1	0	1	1	0	0	0
3	0	1	1	1	1	0	0
1	0	1	0	0	1	1	0

Enter Column Number:  Enter Row Number:

Process Complete.