Model Inspection & Error Messages

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Based on materials written by Gillig & McCarl and improved upon by many previous lab instructors

Special thanks to Mario Andres Fernandez
Outline

1 Model Inspection

2 LIMROW / LIMCOL Option
   - LIMROW
   - LIMCOL

3 Common Errors
   - Errors in Models
   - Error Messages in GAMS
YES, errors are common!

- When one has a large and complicated data set containing many calculations, one may lose touch with the exact model being solved in GAMS.
- Errors can be involved with data calculation, model structure, and/or typos.
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- When one has a large and complicated data set containing many calculations, one may lose touch with the exact model being solved in GAMS.
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- For small models
  - Display
  - Examine output
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- For small models
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  - Examine output
- For larger models
  - Limrow / Limcol
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- Errors can be involved with data calculation, model structure, and/or typos.
- For small models
  - Display
  - Examine output
- For larger models
  - Limrow / Limcol
- For very big models
  - Gamscheck (Developed by Dr. Burce McCarl)
A Transportation Problem

Minimize:
\[ \min \sum_{i=1}^{3} \sum_{j=1}^{3} c_{ij} X_{ij} \]
Subject to:
\[ X_{11} + X_{12} + X_{13} \leq S_1 \]
\[ X_{21} + X_{22} + X_{23} \leq S_2 \]
\[ X_{11} + X_{12} \geq D_1 \]
\[ X_{11} + X_{21} \geq D_2 \]
\[ X_{13} + X_{23} \geq D_3 \]
\[ X_{11}, X_{12}, X_{13}, X_{21}, X_{22}, X_{23} \geq 0 \]
A Transportation Problem

Minimize \( c_{11}X_{11} + c_{12}X_{12} + c_{13}X_{13} + c_{21}X_{21} + c_{22}X_{22} + c_{23}X_{23} \)

Subject to

\[
\begin{align*}
X_{11} + X_{12} + X_{13} & \leq S_1 \\
X_{21} + X_{22} + X_{23} & \leq S_2 \\
X_{11} + X_{21} & \geq D_1 \\
X_{12} + X_{22} & \geq D_2 \\
X_{13} + X_{23} & \geq D_3 \\
X_{11}, X_{12}, X_{13}, X_{21}, X_{22}, X_{23} & \geq 0
\end{align*}
\]

Maximize \( \sum \sum c_{ij}X_{ij} \)

Subject to

\[
\begin{align*}
\sum_j X_{ij} & \leq S_i \quad \forall i \\
\sum_i X_{ij} & \geq D_j \quad \forall j \\
X_{ij} & \geq 0 \quad \forall i, j
\end{align*}
\]
A Transportation Problem

\[ \begin{align*}
\text{min} & \quad c_{11}X_{11} + c_{12}X_{12} + c_{13}X_{13} + c_{21}X_{21} + c_{22}X_{22} + c_{23}X_{23} \\
\text{s.t.} & \quad X_{11} + X_{12} + X_{13} \leq S_1 \\
& \quad X_{21} + X_{22} + X_{23} \leq S_2 \\
& \quad X_{11} + X_{21} \geq D_1 \\
& \quad X_{12} + X_{22} \geq D_2 \\
& \quad X_{13} + X_{23} \geq D_3 \\
& \quad X_{11}, X_{12}, X_{13}, X_{21}, X_{22}, X_{23} \geq 0
\end{align*} \]

- Minimization of total cost across all possible shipment routes
- Limited outgoing shipments from each S point \(i\)
- Minimum demand constraint at each D point \(j\)
LIMROW/LIMCOL

- LIMROW refers to “limits of equations”, while LIMCOL refers to “limits of variables” in the *.LST file after the model runs.
- When GAMS runs by default, it displays the first three variables and equations in each block.

```gams
Costsum..
  TotalCost
  =E=  SUM((Source, Destination),
     TranCost(Source, Destination)*Transport(Source, Destination));
SupplyBal(Source)..  
  SUM(Destination, Transport(Source, Destination))
  =L=  Supply(Source) ;
Demandbal(Destination) ..
  SUM(Source, Transport(Source, Destination))
  =G=  Need(Destination) ;
Model  Transport /ALL/ ;
OPTION  LIMROW = 100;
OPTION  LIMCOL = 100;
Solve  Transport USING LP MINIMIZING TotalCost ;
```
LIMROW/LIMCOL

- LIMROW refers to “limits of equations”, while LIMCOL refers to “limits of variables” in the *.LST file after the model runs.
- When GAMS runs by default, it displays the first three variables and equations in each block.

```plaintext
Costsum..  
  TotalCost  
  =E= SUM((Source, Destinaton), 
         TranCost(Source, Destinaton)*Transport(Source, Destinaton));
SupplyBal(Source)..  
  =L= Supply(Source) ;
Demandbal(Destinaton) ..  
  =G= Need(Destinaton) ;
Model Transport /ALL/ ;
  OPTION LIMROW = 100;
  OPTION LIMCOL = 100;
Solve  Transport USING LP MINIMIZING TotalCost ;
```

- LIMROW / LIMCOL are placed between Model and Solve statements.
LIMROW/LIMCOL

- LIMROW refers to “limits of equations”, while LIMCOL refers to “limits of variables” in the *.LST file after the model runs.
- When GAMS runs by default, it displays the first three variables and equations in each block.

```gams
LIMROW/LIMCOL are placed between Model and Solve statements.
To eliminate variable and equation displays, set

- **OPTION LIMROW = 0;**
- **OPTION LIMCOL = 0;**
```

```gams
Set Source, Destination /Source1, Source2/;
Parameter Cost (/Source1, Source2, Destination /
TranCost(Source, Destination)*Transport(Source, Destination));
Set SupplyBal(Source) /Source1, Source2/;
Set DemandBal(Destination) /Destination1, Destination2/;
Equations Costsum.. TotalCost
   =E=   SUM((Source, Destination), TranCost(Source, Destination)*Transport(Source, Destination));
SupplyBal(Source)..
   SUM(Destination, Transport(Source, Destination))
   =L=   Supply(Source);
DemandBal(Destination)..
   SUM(Source, Transport(Source, Destination))
   =G=   Need(Destination);
Model Transport /ALL/;
OPTION LIMROW = 100;
OPTION LIMCOL = 100;
Solve Transport USING LP MINIMIZING TotalCost;
```
List the objective equation in the *.LST file

```plaintext
--- Costsum =E=  Total transport cost -- objective function

Costsum..  TotalCost - 250*Transport(Seattle,New York)

   - 178*Transport(Seattle,Chicago) - 187*Transport(Seattle,Topeka)
   - 250*Transport(San Diego,New York) - 187*Transport(San Diego,Chicago)
   - 151*Transport(San Diego,Topeka) =E= 0 ; (LHS = 0)
```
List the supply constraint equations in the *.LST file

```plaintext
---- Supplybal  =L=  Supply limit at source plants

Supplybal(Seattle).  Transport(Seattle,New York) + Transport(Seattle,Chicago)
   + Transport(Seattle,Topeka) =L= 350 ; (LHS = 0)

Supplybal(San Diego).  Transport(San Diego,New York) + Transport(San Diego,Chicago)
   + Transport(San Diego,Topeka) =L= 600 ; (LHS = 0)
```
LIMROW Report

<table>
<thead>
<tr>
<th></th>
<th>Seattle to New York</th>
<th>Seattle to Chicago</th>
<th>Seattle to Topeka</th>
<th>San Diego to New York</th>
<th>San Diego to Chicago</th>
<th>San Diego to Topeka</th>
<th>Delivered Cost</th>
<th>Supply</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>250</td>
<td>178</td>
<td>187</td>
<td>250</td>
<td>187</td>
<td>151</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivered Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seattle</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Diego</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicago</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topeka</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>275</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- List the demand constraint equations in the *.LST file

```plaintext
---- Demandbal = Demand at destinations

Demandbal(New York).. Transport(Seattle,New York) + Transport(San Diego,New York) =G= 325 ; (LHS = 0, INFES = 325 ***)

Demandbal(Chicago).. Transport(Seattle,Chicago) + Transport(San Diego,Chicago) =G= 300 ; (LHS = 0, INFES = 300 ***)

Demandbal(Topeka).. Transport(Seattle,Topeka) + Transport(San Diego,Topeka) =G= 275 ; (LHS = 0, INFES = 275 ***)
```
List the supply side variables in the *.LST file

```
--- Transport shipment quantities in cases

Transport(Seattle, New York)
(LO, L, UP = 0, 0, +INF)
-250 Costsum
  1 Supplybal(Seattle)
  1 Demandbal(New York)

Transport(Seattle, Chicago)
(LO, L, UP = 0, 0, +INF)
-178 Costsum
  1 Supplybal(Seattle)
  1 Demandbal(Chicago)

Transport(Seattle, Topeka)
(LO, L, UP = 0, 0, +INF)
-107 Costsum
  1 Supplybal(Seattle)
  1 Demandbal(Topeka)
```
List the demand side variables in the *.LST file

```plaintext
---- Transport Shipment quantities in cases

Transport(San Diego, New York)
  (.LO, .L, .UP = 0, 0, +INF)
  -250 Costsum
  1 Supplybal(San Diego)
  1 Demandbal(New York)

Transport(San Diego, Chicago)
  (.LO, .L, .UP = 0, 0, +INF)
  -187 Costsum
  1 Supplybal(San Diego)
  1 Demandbal(Chicago)

Transport(San Diego, Topeka)
  (.LO, .L, .UP = 0, 0, +INF)
  -151 Costsum
  1 Supplybal(San Diego)
  1 Demandbal(Topeka)
```
For large models, the LIMROW / LIMCOL option can generate very substantial output files.

An alternative way of displaying models called GAMSCHK will be discussed later.
What to do when ERRORS strike and GAMS stops running?

```plaintext
1  SETS
2      Source       Canning plants
3          / Seattle     Canning plant in Seattle
4                      "San Diego"  Canning plant in San Diego
5
6  Destination     Markets
7          / "New York" Demand in New York

**** 409 Unrecognizable item - skip to find a new statement
****  looking for a ';' or a key word to get started again
```
Errors Occur

- What to do when ERRORS strike and GAMS stops running?

- GAMS inserts coded error messages inside the echo print in the *.LST file.
Errors Occur

- What to do when ERRORS strike and GAMS stops running?

- GAMS inserts coded error messages inside the echo print in the *.LST file.

- All errors are marked with four asterisks **** at the beginning of a line.
Errors Occur

What to do when ERRORS strike and GAMS stops running?

- GAMS inserts coded error messages inside the echo print in the *.LST file.
- All errors are marked with four asterisks **** at the beginning of a line.
- One can use the highlighted button to find where errors occur and fix them.
Double click on Red Color Lines in the process window causes the cursor to jump to the location in *.gms file where error occurs.
Locate Errors

- Double click on **Red Color Lines** in the process window causes the cursor to jump to the location in *.gms* file where error occurs.
Locate Errors

- Double click on **Red Color Lines** in the process window causes the cursor to jump to the location in *.gms* file where error occurs.
Locate Errors

- Double click on Black Color Lines in the process window, then a cursor will jump to a *.LST file where the error is listed.
Locate Errors

- Double click on Black Color Lines in the process window, then a cursor will jump to a *.LST file where the error is listed.
- Double click on Black Color Lines in the process window, then a cursor will jump to a *.LST file where the error is listed.
"First show, First fix" rule

<table>
<thead>
<tr>
<th>Error</th>
<th>File Path</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error 2</td>
<td>C:\TASANA\641CLASS\PROGRAM\TRANSPORT</td>
<td>Identifier expected</td>
</tr>
<tr>
<td>Error 257</td>
<td>C:\TASANA\641CLASS\PROGRAM\TRANSPORT</td>
<td>Solve statement not checked because of previous</td>
</tr>
<tr>
<td>Error 257</td>
<td>C:\TASANA\641CLASS\PROGRAM\TRANSPORT</td>
<td>Solve statement not checked because of previous</td>
</tr>
<tr>
<td>Error 141</td>
<td>C:\TASANA\641CLASS\PROGRAM\TRANSPORT</td>
<td>Symbol neither initialized nor assigned</td>
</tr>
<tr>
<td>Error 141</td>
<td>C:\TASANA\641CLASS\PROGRAM\TRANSPORT</td>
<td>Symbol neither initialized nor assigned</td>
</tr>
</tbody>
</table>
“First show, First fix” rule

- Always concentrate on fixing the first or first few errors and ignore the others since many subsequent errors may result from a previous error.

--- Starting compilation
--- TRANSPORT.GMS(12) 1 Mb 1 Error
*** Error 2 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT
   Identifier expected
--- TRANSPORT.GMS(65) 1 Mb 2 Errors
*** Error 257 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT
   Solve statement not checked because of previous
--- TRANSPORT.GMS(67) 1 Mb 3 Errors
*** Error 257 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT
   Solve statement not checked because of previous
--- TRANSPORT.GMS(67) 1 Mb 6 Errors
*** Error 141 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT
   Symbol neither initialized nor assigned
       A wild shot: You may have spurious commas in
text of a declaration. Check symbol reference
*** Error 141 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT
   Symbol neither initialized nor assigned
Handle Sets in Equations

- In every equation, all subscripts (SETS) must be handled in every term. They either must be summed over, or must appear in the equation definition.

Example

```
Costsum..
TotalCost
  := SUM((Source, Destination),
  TranCost(Source, Destination) * Transport(Source, Destination));
SupplyBal(Source).. 
  SUM(Destination, Transport(Source, Destination))
  := Supply(Source);
DemandBal(Destination)..
  SUM(Source, Transport(Source, Destination))
  := Need(Destination);
```

- Not obeying this rule will cause errors.
Common Error Messages

- Set is under control already.

--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 125 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Set is under control already

57    SupplyBal(Source) ..
58    SUM(Source, Transport(Source, Destination))
****    $125 $149
**** 125 Set is under control already
**** 149 Uncontrolled set entered as constant
59    =L= Supply(Source) ;
Common Error Messages

- Set is under control already.

--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 125 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Set is under control already

57    SupplyBal(Source) ..
58    SUM(Source, Transport(Source,Destination))
    $125 $149
**** 125 Set is under control already
**** 149 Uncontrolled set entered as constant
59    =L=  Supply(Source) ;
Common Error Messages

- Set is under control already.

```plaintext
--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 125 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Set is under control already

57 SupplyBal(Source) ..
58 SUM(Source, Transport(Source,Destination))
**** SUM $125 $149
**** 125 Set is under control already
**** 149 Uncontrolled set entered as constant
59 =L= Supply(Source) ;
```

- The set “Source” is handled both in equation declaration `SupplyBal(Source) ..` and summation `SUM`.
Common Error Messages

- Set is under control already.

--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 125 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS

Set is under control already

```
57    SupplyBal(Source) ..
58    SUM(Source, Transport(Source,Destinaton))
****    $125    $149
**** 125    Set is under control already
**** 149    Uncontrolled set entered as constant
59    =L=    Supply(Source) ;
```

- The set “Source” is handled both in equation declaration SupplyBal(Source) and summation SUM.
- The set “Destination” is left uncontrolled.
Common Error Messages

- Set is under control already.

--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 125 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS

Set is under control already

57 SupplyBal(Source) ..
58 SUM(Source, Transport(Source, Destination))
**** $125
**** 149 Uncontrolled set entered as constant
59 =L= Supply(Source) ;

- The set “Source” is handled both in equation declaration SupplyBal(Source) .. and summation SUM.
- The set “Destination” is left uncontrolled.
- How do you fix it?
Common Error Messages

- Uncontrolled set entered as constant

--- Starting compilation
--- ERROR.GMS(52) 1 Mb 2 Errors
*** Error 149 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
   Uncontrolled set entered as constant

49  Costsum..
50    TotalCost
51    =E=    $UM((Destination),
52        TranCost(Source, Destination)*Transport(Source, Destination))

****        $149        $149
**** 149 Uncontrolled set entered as constant
Common Error Messages

- Uncontrolled set entered as constant

--- Starting compilation
--- ERROR.GMS(52) 1 Mb 2 Errors
*** Error 149 in C:\TASANA\641CLASS_GAMS SECTION_SPRING2003\PROGRAM\ERROR.GMS

Uncontrolled set entered as constant

49 Costsum..
50 TotalCost
51 =E= SUM((Destination),
52 
53 TranCost(Source, Destination)*Transport(Source, Destination))

**** $149 $149

**** 149 Uncontrolled set entered as constant
Common Error Messages

- Uncontrolled set entered as constant

```plaintext
--- Starting compilation
--- ERROR.GMS(52) 1 Mb 2 Errors
*** Error 149 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Uncontrolled set entered as constant
```

```plaintext
49  Costsum..
50  TotalCost
51   =E= SUM((Destination),
52         TranCost(Source,Destinaton)*Transport(Source,Destinaton))
**** $149 $149
**** 149 Uncontrolled set entered as constant
```

- The set “Source” is not operated in equation declaration Costsum.. or summation SUM.
Common Error Messages

- Uncontrolled set entered as constant

```plaintext
--- Starting compilation
--- ERROR.GMS(52) 1 Mb 2 Errors
*** Error 149 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Uncontrolled set entered as constant
```

```plaintext
49 Costsum..  
50 TotalCost  
51 =E= SUM((Destination),  
52 TranCost(Source, Destination)*Transport(Source, Destination))  
**** $149  
**** 149 Uncontrolled set entered as constant
```

- The set "Source" is not operated in equation declaration Costsum.. or summation SUM.

- How do you fix it?
Common Error Messages

- Floating entry ignored

--- Starting compilation
--- TRNSPORT.GMS(39) 1 Mb 1 Error
*** Error 225 in C: \TASANA\641CLASS\PROGRAM\TRNSPORT.GMS
Floating entry ignored

35 TABLE Distance(Source, Destination) Distance in thousands of miles
36
37 "New York"  Chicago  Topeka
38
39 Seattle  2.5  1.7  1.8
**** $225
**** 225 Floating entry ignored
40 "San Diego"  2.5  1.8  1.4 
**** $225
**** 225 Floating entry ignored
Common Error Messages

- Floating entry ignored

```plaintext
--- Starting compilation
--- TRNSPORT.GMS(39) 1 Mb 1 Error
*** Error 225 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT.GMS

Floating entry ignored

35    TABLE Distance(Source,Destination) Distance in thousands of miles
36
37        "New York"    Chicago    Topeka
38
39    Seattle    2.5    1.7    1.8
****     $225
**** 225 Floating entry ignored
40        "San Diego"  2.5    1.8    1.4 ;
****     $225
**** 225 Floating entry ignored
```
Common Error Messages

- **Floating entry ignored**

```
--- Starting compilation
--- TRANSPORT.GMS(39) 1 Mb 1 Error
*** Error 225 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT.GMS
Floating entry ignored
```

<table>
<thead>
<tr>
<th>Source</th>
<th>Destination</th>
<th>Distance (Thousands of Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;New York&quot;</td>
<td>Chicago</td>
<td>1.8</td>
</tr>
<tr>
<td>Seattle</td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Topeka</td>
<td>1.8</td>
</tr>
<tr>
<td>&quot;San Diego&quot;</td>
<td></td>
<td>1.4</td>
</tr>
</tbody>
</table>

We have made an error in typing of a table. The data in the circle is not aligned under a column set name, so GAMS does not know which data column a number goes with.
Common Error Messages

- Dimension inconsistency

--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 171 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
  Domain violation for set
*** Error 148 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
  Dimension different - The symbol is referenced with more/less
  indices as declared

**POSITIVE VARIABLE**

  Transport(Source, Destinaton) Shipment quantities in cases;

```plaintext
49  Costsum..
50    TotalCost
51    =E=    SUM((Source, Destinaton),
52       TranCost(Source, Destinaton)*Transport(Source, Destinaton))
53 SupplyBal(Source)..
54    SUM(Destinaton, Transport(Destinaton))
****          $171,148
**** 148 Dimension different - The symbol is referenced with more/less
****             indices as declared
**** 171 Domain violation for set
```
## Common Error Messages

### Dimension inconsistency

---
---
--- ERROR.GMS(54) 1 Mb 2 Errors

*** Error 171 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS

Domain violation for set

*** Error 148 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS

- The symbol is referenced with more/less indices as declared

**POSITIVE VARIABLE**

Transport(Source, Destination) Shipment quantities in cases;

---

49  Costsum..
50    TotalCost
51      =E= SUM((Source, Destination),
52       TranCost(Source, Destination)*Transport(Source, Destination))
53 SupplyBal(Source)..
54    SUM(Destination, Transport(Destination))

**** $171,148

**** 148 Dimension different - The symbol is referenced with more/less indices as declared

**** 171 Domain violation for set
Common Error Messages

- Dimension inconsistency

--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 171 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
  Domain violation for set
*** Error 148 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
  Dimension different - The symbol is referenced with more/less
  indices as declared

**POSITIVE VARIABLE**

Transport(Source, Destination) Shipment quantities in cases;

49  Costsum..
50    TotalCost
51    =E=    SUM((Source, Destination),
52          TranCost(Source, Destination)*Transport(Source, Destination))
53  SupplyBal(Source)..
54  SUM(Destination, Transport(Destination))
****                      $171,148
**** 148 Dimension different - The symbol is referenced with more/less
****          indices as declared
**** 171 Domain violation for set
Common Error Messages

- **Dimension inconsistency**

--- Starting compilation
--- ERROR.GMS(54) 1 Mb 2 Errors
*** Error 171 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
  Domain violation for set
*** Error 148 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
  Dimension different - The symbol is referenced with more/less
  indices as declared

**POSITIVE VARIABLE**

Transport(Source, Destination) Shipment quantities in cases;

49  Costsum..
50    TotalCost
51    =E=    SUM((Source, Destination),
52    TranCost(Source, Destination)*Transport(Source, Destination))
53    SupplyBal(Source).
54    SUM(Destination, Transport(Destination))
****  $171,148
****  148 Dimension different - The symbol is referenced with more/less
****  indices as declared
****  171 Domain violation for set
Common Error Messages

- Duplicate names defined multiple times

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(44) 1 Mb 1 Error
*** Error 195 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Symbol redefined with a different type
```

```plaintext
33  PARAMETER
34      TranCost(Source, Destination)  Transport cost in c
35      Trancost(Source, Destination)
36      = Loadcost + PrMileCst * Distance(Source, Destin
37
38  VARIABLE
39      TotalCost                           Total transportation
40      POSITIVE VARIABLE
41      Transport(Source, Destination)     Shipment quantities
42
43  EQUATIONS
44      Trancost                           Total transport cost
****  $195
****  195  Symbol redefined with a different type
```
Common Error Messages

- Duplicate names defined multiple times

--- Starting compilation
--- TRNSPORT_ERR.GMS(44) 1 Mb 1 Error
*** Error 195 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Symbol redefined with a different type

33  PARAMETER
34     TranCost(Source,Destinaton)  Transport cost in $ per unit
35     Trancost(Source,Destinaton)
36     = Loadcost + PrMileCst * Distance(Source,Destinaton)
37
38  VARIABLE
39     TotalCost                   Total transport ation cost
40     POSITIVE VARIABLE
41     Transport(Source,Destinaton) Shipment quantity
42
43  EQUATIONS
44     Trancost                    Total transport cost
**** $195
**** 195 Symbol redefined with a different type
Common Error Messages

- Duplicate names defined multiple times

--- Starting compilation
--- TRNSPORT_ERR.GMS(44) 1 Mb 1 Error
*** Error 195 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Symbol redefined with a different type

PARAMETER
  TranCost(Source, Destination) Transport cost in cost
  TranCost(Source, Destination)
  = Loadcost + PrMileCst * Distance(Source, Desti
VARIABLE
  TotalCost Total transportation
  TotalCost
POSITIVE VARIABLE
  Transport(Source, Destination) Shipment quantity
EQUATIONS
  TranCost Total transport cost
  TranCost
**** $195
**** 195 Symbol redefined with a different type
Common Error Messages

- Omitted set elements

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(15) 1 Mb 1 Error
*** Error 170 in C:\TASAN\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Domain violation for element

1   SETS
2       Source     Canning plants
3          / Seattle     Canning plant in Seattle
4          /
5
6       Destination   Markets
7          / "New York" Demand in New York
8          Chicago Demand in Chicago
9          Topeka Demand in Topeka   / ;
10
12  PARAMETERS
13       Supply(Source) Supply at each source plant in cases
14          /Seattle   350
15          "San Diego" 600/
****       $170
****  170 Domain violation for element
```
Common Error Messages

- Omitted set elements

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(15) 1 Mb 1 Error
*** Error 170 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Domain violation for element
```

```plaintext
1 SETS
2   Source          Canning plants
3       / Seattle    Canning plant in Seattle
4       /
5
6   Destination   Markets
7       / "New York" Demand in New York
8       Chicago   Demand in Chicago
9       Topeka    Demand in Topeka
10
11
12 PARAMETERS
13   Supply(Source) Supply at each source plant in cases
14       /Seattle 350
15       "San Diego" 600/
**** $170
**** 170 Domain violation for element
```
Common Error Messages

- Omitted set elements

--- Starting compilation
--- TRNSPORT_ERR.GMS(15) 1 Mb 1 Error
*** Error 170 in C:\TASAMA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS

Domain violation for element

```plaintext
SETS
  Source / Canning plants
  / Seattle Canning plant in Seattle
  /

  Destination Markets
  / "New York" Demand in New York
  Chicago Demand in Chicago
  Topeka Demand in Topeka / ;

PARAMETERS

Supply(Source) Supply at each source plant in cases
  / Seattle 350
  "San Diego" 600/

*** 170 Domain violation for element
```
Common Error Messages

■ Mismatched parentheses - too many

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 408 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
   Too many ),] or }
```

```plaintext
48  Costsum..
49    TotalCost
50    =E= SUM((Source, Destinaton),
51        Trancost(Source, Destinaton)*Transport(Source, Destinaton));
***    $408
*** 408    Too many ),] or }
```

■ We can use the button to check for abundant parenthesis.
Common Error Messages

- Mismatched parentheses - too many

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 408 in C:\TASANA\64CLASS\PROGRAM\TRNSPORT_ERR.GMS
Too many },] or }
```

```plaintext
48 Costsum.
49 TotalCost
50 =E= SUM((Source, Destination),
51 Trancost(Source, Destination)*Transport(Source, Destination));
*** $408
*** 408 Too many },] or }
```

- We can use the button to check for abundant parenthesis.
Common Error Messages

- Mismatched parentheses - too many

--- Starting compilation
--- TRNSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 408 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
  Too many ],] or }

48    Costsum..
49    TotalCost
50    =E=  SUM((Source, Destinaton),
51        Trancost(Source, Destinaton)*Transport(Source, Destinaton)))
*** 408
*** 408 Too many ],] or }

- We can use the button to check for abundant parenthesis.
Common Error Messages

- Mismatched parentheses - too many

```
--- Starting compilation
--- TRNSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 408 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Too many ),] or }
```

```
48   Costsum..
49    TotalCost
50    =E=  SUM((Source, Destination),
51       Trancost(Source, Destination)*Transport(Source, Destination)));
***
*** 408 Too many ),] or }
```

We can use the button to check for abundant parenthesis.
Common Error Messages

- Mismatched parentheses - missed

```plaintext
--- Starting compilation
--- TRANSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 8 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT_ERR.GMS
')' expected

48   Costsum..
49    TotalCost
50     =E=  SUM((Source, Destination),
51         Trancost(Source, Destination)*Transport(Source, Destination);
****           $8
****    8 ')' expected
```

- We still can use the button to check for missing parenthesis.
Common Error Messages

- Mismatched parentheses - missed

```
--- Starting compilation
--- TRANSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 6 in C:TASANA\641CLASS\PROGRAM\TRANSPORT_ERR.GMS
  ')' expected
```

```
48    Costsum ..
49      TotalCost
50      =E= SUM((Source,Destinaton),
51            Trancost(Source,Destinaton)*Transport(Source,Destinaton);
**** 8 ')' expected
```

- We still can use the button to check for missing parenthesis.
Common Error Messages

- Mismatched parentheses - missed

--- Starting compilation
--- TRANSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 8 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT_ERR.GMS

48 Costum..
49 TotalCost
50 =E= SUM((Source, Destination),
51 Transcost(Source, Destination)*Transport(Source, Destination);

**** 8 ')' expected

- We still can use the button to check for missing parenthesis.
Common Error Messages

- Mismatched parentheses - missed

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(51) 1 Mb 1 Error
*** Error 5 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
')', expected
```

```plaintext
48    Costsum..
49    TotalCost
50    =E= SUM((Source, Destination),
51    TranCost(Source, Destination))*Transport(Source, Destination);
**** 8 ', expected
```

- We still can use the button to check for missing parenthesis.
Common Error Messages

- Mismatched parentheses - missed

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(68) 1 Mb 2 Errors
*** Error 56 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Endogenous operands for * not allowed in linear models

38   VARIABLE
39       TotalCost             Total transportation costs in dol
40   POSITIVE VARIABLE
41       Transport(Source,Destinaton) Shipment quantities in cases;
48       CostSum..
49       TotalCost*SUM((Source,Destinaton),Transport(Source,Destinaton))
52         =E=  0;
73   SOLVE Transport USING LP MINIMIZING TotalCost ;
**** $56,256
**** 56 Endogenous operands for * not allowed in linear models
**** 256 Error(s) in analyzing solve statement. More detail appears
**** Below the solve statement above
**** The following LP errors were detected in model Tranport:
**** 56 in equation CostSum .. VAR operands for *
```
Common Error Messages

- Mismatched parentheses - missed

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(68) 1 Mb 2 Errors
*** Error 56 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Endogenous operands for * not allowed in linear models

38 VARIABLE
39    TotalCost
40    POSITIVE VARIABLE
41    Transport(Source,Destinaton) Shipment quantities in cases;
48    CostSum..
49    TotalCost*SUM((Source,Destinaton),Transport(Source,Destinaton))
52    =E=  0 ;
73    SOLVE Transport USING LP MINIMIZING TotalCost ;
**** $56,256
**** 56 Endogenous operands for * not allowed in linear models
**** 256 Error(s) in analyzing solve statement. More detail appears
**** Below the solve statement above
**** The following LP errors were detected in model Transport:
**** 56 in equation CostSum .. VAR operands for *
```
Common Error Messages

- Mismatched parentheses - missed

```plaintext
--- Starting compilation
--- TRANSPORT_ERR.GMS(68) 1 Mb 2 Errors
*** Error 56 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT_ERR.GMS
Endogenous operands for * not allowed in linear models

38 VARIABLE
39 TotalCost Total transportation costs in dol
40 POSITIVE VARIABLE
41 Transport(Source,Destiniton) Shipment quantities in cases;
48 CostSum.:
49 ** TotalCost = SUM((Source,Destiniton) Transport(Source,Destiniton))
52 =E= 0 ;
73 SOLVE Tranport USING LP MINIMIZING TotalCost;
**** $56,256
**** 56 Endogenous operands for * not allowed in linear models
**** 256 Error(s) in analyzing solve statement. More detail appears
**** Below the solve statement above
**** The following LP errors were detected in model Tranport:
**** 56 in equation CostSum .. VAR operands for *
```
Common Error Messages

- Mismatched parentheses - missed

--- Starting compilation
--- TRANSPORT_ERR.GMS(68) 1 Mb 2 Errors
*** Error 56 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT_ERR.GMS

\[\text{Endogenous operands for } \ast \text{ not allowed in linear models}\]

```plaintext
38 VARIABLE
39    TotalCost  Total transportation costs in dol
40 POSITIVE VARIABLE
41   Transport(Source, Destination) Shipment quantities in cases;
48   CostSum..  
49   TotalCost = \text{SUM}((Source, Destination) \quad \text{Transport}(Source, Destination))
52   \quad \text{= 0};
73   SOLVE Transport USING LP MINIMIZING TotalCost ;

**** 56 Endogenous operands for \ast \text{ not allowed in linear models}
**** 256 Error(s) in analyzing solve statement. More detail appears
**** Below the solve statement above
**** The following LP errors were detected in model Transport:
**** 56 in equation CostSum .. VAR operands for \ast
```

Pei Huang | Texas A&M University | AGEC 641 Lab Session, Fall 2013
Common Error Messages

- Using undefined data

```plaintext
### Starting compilation
### TRNSPORT_ERR.GMS (65) 1 Mb 2 Errors

*** Error 66 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
The symbol shown has not been defined or assigned
A wild shot: You may have spurious commas in the explanatory
text of a declaration. Check symbol reference list.

*** Error 256 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS

```

```
33   PARAMETER
34       TranCost(Source,Destinaton)  Transport cost in dollars per case ;

48   Costsum.
49       TotalCost
50       =E=  SUM((Source,Destinaton),
51           TranCost(Source,Destinaton)*Transport(Source,Destinaton));
52
65   SOLVE Tranport USING LP MINIMIZING TotalCost ;

```

```plaintext
**** 66 The symbol shown has not been defined or assigned
**** A wild shot: You may have spurious commas in the explanatory
**** text of a declaration. Check symbol reference list.
**** 256 Error(s) in analyzing solve statement. More detail appears
**** Below the solve statement above
**** The following LP errors were detected in model Tranport:
**** 66 TranCost has no data
```
Common Error Messages

- Using undefined data

--- Starting compilation
--- TRNSPORT_ERR.GMS(65) 1 Mb 2 Errors
*** Error 256 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS

The symbol shown has not been defined or assigned
A wild shot: You may have spurious commas in the explanatory
text of a declaration. Check symbol reference list.

---

33 \PARAMETER
34 \TRANCost(Source,Destinaton) Transport cost in dollars per case ;
48 Costsum..
49 \TOTALCost
50 =B= \SUM((Source,Destinaton),
51 \TRANCost(Source,Destinaton)*\TRANsp(\Source,\Destinaton));
52
65 \SOLVE\ TRANsport USING LP MINIMIZING \TOTALCost ;
***** \$66,256
***** 66 The symbol shown has not been defined or assigned
***** A wild shot: You may have spurious commas in the explanatory
***** text of a declaration. Check symbol reference list.
***** 256 Error(s) in analyzing solve statement. More detail appears
***** Below the solve statement above
***** The following LP errors were detected in model TRANsport:
***** 66 TRANCost has no data
Common Errors

- Using undefined data

--- Starting compilation
--- TRNSPORT_ERR.GMS(65) 1 Mb 2 Errors
*** Error 256 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS

The symbol shown has not been defined or assigned
A wild shot: You may have spurious commas in the explanatory
  text of a declaration. Check symbol reference list.

*** Error 256 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS

33  PARAMETER
34    TranCost(Source,Destination)  Transport cost in dollars per case;
48  Costsum..
49    TotalCost
50    =E=  SUM((Source,Destination),
51    TranCost(Source,Destination)  *Transport(Source,Destination));
52
65  SOLVE Transport USING LP MINIMIZING TotalCost ;

****  $66,256
****  66 The symbol shown has not been defined or assigned
****  A wild shot: You may have spurious commas in the explanatory
****  text of a declaration. Check symbol reference list.
****  256 Error(s) in analyzing solve statement. More detail appears
****  Below the solve statement above
****  The following LP errors were detected in model Transport:
****  66 TranCost has no data
Common Error Messages

- No variable, parameter, or equation definition

--- Starting compilation
--- TRNSPORT_ERR.GMS(47) 1 Mb 1 Error
*** Error 140 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Unknown symbol

```
43   EQUATIONS
44       SupplyBal(Source)       Supply limit at source plants
45       DemandBal(Destination)  Demand at destinations;
46
47       CostSum..
****     $140
**** 140 Unknown symbol
48       TotalCost
49       =E= SUM((Source,Destination),
50       Trancost(Source,Destination)*Transport(Source,Destination));
```
Common Error Messages

- No variable, parameter, or equation definition

```
--- Starting compilation
--- TRNSPORT_ERR.GMS(47) 1 Mb 1 Error
*** Error 140 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS

Unknown symbol
```

```
43   EQUATIONS
44       SupplyBal(Source) Supply limit at source plants
45       DemandBal(Destination) Demand at destinations ;
46
47   CostSum..
****      $140
**** 140 Unknown symbol
48       TotalCost
49       =E=   SUM((Source,Destination),
50       Trancost(Source,Destination)*Transport(Source,Destination));
```
Common Error Messages

- No variable, parameter, or equation definition

```plaintext
--- Starting compilation
--- TRANSPORT_ERR.GMS(47) 1 Mb 1 Error
*** Error 140 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT_ERR.GMS
Unknown symbol

43   EQUATIONS
44       SupplyBal(Source)           Supply limit at source plants
45       DemandBal(Destination)      Demand at destinations ;
46
47       CostSum..
****  $140
**** 140  Unknown symbol
48       TotalCost
49       =E=  SUM((Source,Destination),
50       Trancost(Source,Destination)*Transport(Source,Destination));
```
Common Error Messages

- Insufficient semi-colon

```plaintext
--- Starting compilation
--- TRNSPORT_ERR.GMS(48) 1 Mb 1 Error
*** Error 96 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS
Blank needed between identifier and text
(or illegal character in identifier)
(or check for missing ';' on previous line)
```

```plaintext
43 EQUATIONS
44 CostSum Total transport cost -- objective
45 SupplyBal(Source) Supply limit at source plants
46 DemandBal(Destinaton) Demand at destinations
47
48 CostSum..
**** $96
**** 96 Blank needed between identifier and text
**** (or illegal character in identifier)
**** (or check for missing ';' on previous line)
```
Common Error Messages

- Insufficient semi-colon

--- Starting compilation
--- TRNSPORT_ERR.GMS(48) 1 Mb 1 Error
*** Error 96 in C:\TASANA\641CLASS\PROGRAM\TRNSPORT_ERR.GMS

Blank needed between identifier and text
(-or- illegal character in identifier)
(-or- check for missing ';' on previous line)

43 EQUATIONS
44  CostSum  Total transport cost -- objecti
45  SupplyBal(Source)  Supply limit at source plants
46  DemandBal(Destinatiom)  Demand at destinations
47
48  CostSum..
**** $96
**** 96 Blank needed between identifier and text
**** (-or- illegal character in identifier)
**** (-or- check for missing ';' on previous line)
Common Error Messages

- Insufficient semi-colon

```plaintext
--- Starting compilation
--- TRANSPORT_ERR.GMS(48) 1 Mb 1 Error
*** Error: 96 in C:\TASANA\641CLASS\PROGRAM\TRANSPORT_ERR.GMS
Blank needed between identifier and text
(-or- illegal character in identifier)
(-or- check for missing ';' on previous line)
```

```
43 EQUATIONS
44    CostSum: Total transport cost -- objective
45    SupplyBal(Source): Supply limit at source plants
46    DemandBal(Destinaton): Demand at destinations
48    CostSum: $96
**** 96 Blank needed between identifier and text
**** (-or- illegal character in identifier)
**** (-or- check for missing ';' on previous line)
```
Common Error Messages

- Domain violation for element → inconsistent elements in a set

```
--- Starting compilation
--- ERROR.GMS(21) 1 Mb 1 Error
*** Error 170 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
   Domain violation for element
```

```
13 SETS
14   Source   canning plants   /Seattle, "San Diego" /
15   Destination markets   /"New York", Chicago, Topeka /
16
17 PARAMETERS
18   Supply(Source) Supply at each source plant in cases
19       /Seattle 350, "San Diego" 600 /
20   Need(Destination) Amount needed at each market destination in cases
21       /"New York" 325, Chicago 300, Topeka 275 /
**** $170
**** 170 Domain violation for element
```
Common Error Messages

- Domain violation for element → inconsistent elements in a set

--- Starting compilation
--- ERROR.GMS(21) 1 Mb 1 Error
*** Error 170 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
   Domain violation for element

```gams
13    SETS
14       Source   canning plants /Seattle, "San Diego" /
15       Destination markets /"New Yor", Chicago, Topeka /
16
17    PARAMETERS
18       Supply(Source)   Supply at each source plant in cases
19                   /seattle 350, "san diego" 600 /
20       Need(Destination) Amount needed at each market destination in cases
21                   /"new york" 325, chicago 300, topeka 275 /
****
**** 170 Domain violation for element
```
Common Error Messages

- Domain violation for element → inconsistent elements in a set

--- Starting compilation
--- ERROR.GMS(21) 1 Mb 1 Error
*** Error 170 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Domain violation for element

---
13 SETS
14 Source      canning plants /Seattle, "San Diego" /
15 Destinaton  markets      /"New Yor" Chicago, Topeka /

17 PARAMETERS
18 Supply(Source) Supply at each source plant in cases
19             /seattle  350, "san diego" 600 /
20 Need(Destinaton) Amount needed at each market destination in cases
21             /"new york" 325, chicago 300, topeka 275 /

**** $170
**** 170 Domain violation for element
Common Error Messages

- Missing `=' or `..' operator

--- Starting compilation
--- ERROR.GMS(50) 1 Mb 1 Error
*** Error 036 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
`=' or `..' or `:=` or `$=' operator expected
rest of statement ignored

45 EQUATIONS
46 CostSum total transport cost -- objective funct
47 SupplyBal(Source) supply limit at source plants
48 DemandBal(Destination) demand at destinations;
49 Costsum
50 TotalCost
51 $36
52 `=' or `..' or `:=` or `$=' operator expected
53 rest of statement ignored
54 =E= SUM((Source,Destination),
55 TranCost(Source,Destination)*Transport(Source,Destination))
Common Error Messages

- Missing ‘=’ or ‘..’ operator

--- Starting compilation
--- ERROR.GMS(50) 1 Mb 1 Error
*** Error 036 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS

`'=` or `..' or `::=` or `'=='` operator expected
rest of statement ignored

45  EQUATIONS
46       CostSum                      total transport cost -- objective funct
47       SupplyBal(Source)           supply limit at source plants
48       DemandBal(Destination)      demand at destinations;
49       Costsum
50       TotalCost
51       $36
52       *=` or `..' or `::=` or `'=='` operator expected
53       rest of statement ignored
54     =E= SUM((Source,Destination),
55     TranCost(Source,Destination)*Transport(Source,Destination))
Common Error Messages

- Missing ‘=’ or ‘..’ operator

--- Starting compilation
--- ERROR.GMS(50) 1 Mb 1 Error
*** Error 036 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
'=' or '...' or ':=' or '$='$ operator expected
rest of statement ignored

45    EQUATIONS
46        CostSum                         total transport cost -- objective funct
47        SupplyBal(Source)             supply limit at source plants
48        DemandBal(Destination)        demand at destinations;
49        Costsum
50    TotalCost
51    $36
52    =E=  SUM((Source,Destination),
53                  TranCost(Source,Destination)*Transport(Source,Destination))

**** 36  ‘=’ or ‘...' or ':=‘ or '$='$ operator expected
**** rest of statement ignored
Common Error Messages

- **Unknown symbol**

---

Starting compilation
--- ERROR.GMS(62) 1 Mb 3 Errors
*** Error 140 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Unknown symbol

```
59 Model Transport /ALL/ ;
60 OPTION LIMROW = 100;
61 OPTION LIMCOL = 100;
62 Solve Transport USING LP MINIMIZING TotalCost ;
**** $140,241 $257
**** 140 Unknown symbol
**** 241 Model has not been defined
**** 257 Solve statement not checked because of previous errors
```
Common Error Messages

- Unknown symbol

--- Starting compilation
--- ERROR.GMS(62) 1 Mb 3 Errors
*** Error 140 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Unknown symbol

59     Model  Transpor /ALL/ ;
60     OPTION LIMROW = 100;
61     OPTION LIMCOL = 100;
62     Solve  Transpor  USING LP MINIMIZING TotalCost ;
****        $140,241          $257
**** 140   Unknown symbol
**** 241   Model has not been defined
**** 257   Solve statement not checked because of previous errors
??
Common Error Messages

- Unknown symbol

--- Starting compilation
--- ERROR.GMS(62) 1 Mb 3 Errors
*** Error 140 in C:\TASANA\641CLASS_GAMS_SECTION_SPRING2003\PROGRAM\ERROR.GMS
Unknown symbol

59   Model  **Tranport** /ALL/ ;
60   OPTION LIMROW = 100;
61   OPTION LIMCOL = 100;
62   Solve **Transport** USING LP MINIMIZING TotalCost ;
****   $140,241 $257
****  140 Unknown symbol
****  241 Model has not been defined
****  257 Solve statement not checked because of previous errors
Heads On 2

- Take the model in Hands On 1 and write it in general formulation as taught in Lecture 2.

\[
\begin{align*}
\text{min} & \quad \sum_{\text{ingredient}} \text{cost}_{\text{ingredient}} \cdot \text{quan}_{\text{ingredient}} \\
\text{s.t.} & \quad \sum_{\text{ingredient}} \text{content}_{\text{nutrient,ingredient}} \cdot \text{quan}_{\text{ingredient}} \geq \text{Minimum}_{\text{nutrient}} \quad \forall \text{nutrient} \\
& \quad \sum_{\text{ingredient}} \text{quan}_{\text{ingredient}} = 1 \\
& \quad \text{quan}_{\text{ingredient}} \geq 0 \quad \forall \text{ingredient}
\end{align*}
\]

1. Expand to use sets and parameters. The equations should be calculated using only parameters, tables, and sets.
2. Display the model with options "LIMROW=10".
3. Use "Option" and "Display" commands to display the optimal solutions, shadow prices, and reduced costs.
4. Comment on shadow prices and reduced cost.
Requirements

- Create HandsOn2.gms with “* your name” on the first line of the code.
- Turn in an electronic copy of *.gms file for Part 1 to 3 via email.
- Turn in a hard copy of *.lst file (from Solution Report to the end).
- You can work as a group with no more than three people.