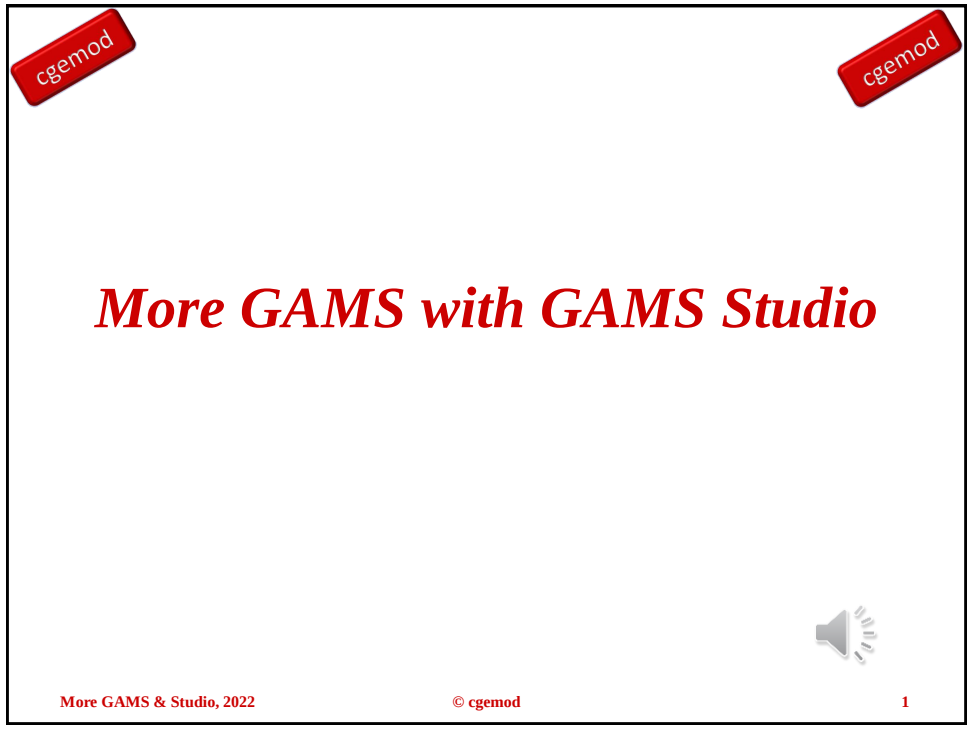
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More GAMS with GAMS Studio
More GAMS & Studio, 2022
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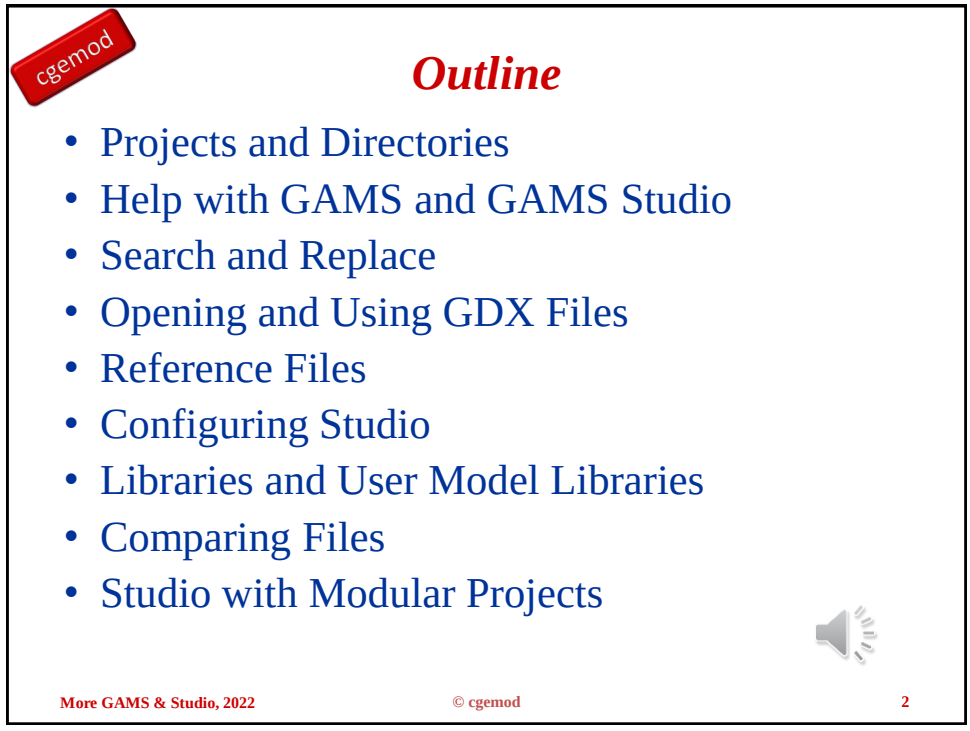
1


cgemod
Outline
• Projects and Directories
• Help with GAMS and GAMS Studio
• Search and Replace
• Opening and Using GDX Files
• Reference Files
• Configuring Studio
• Libraries and User Model Libraries
• Comparing Files
• Studio with Modular Projects
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2

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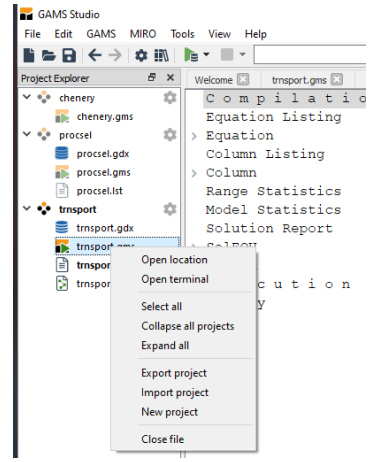
Projects and Directories

- Open Studio and make sure no projects are listed in the Project Explorer
- Select File>Open in a New Project (or Ctrl+Shift+O)
- Open the file transport.gms from the workspace directory
- Select Open in a New Project
- Open the file chenery.gms from the workspace directory
- Select Open in a New Project
- Open the file procsel.gms from the workspace directory



Many projects can be called from within a single directory!

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GAMS Help

4

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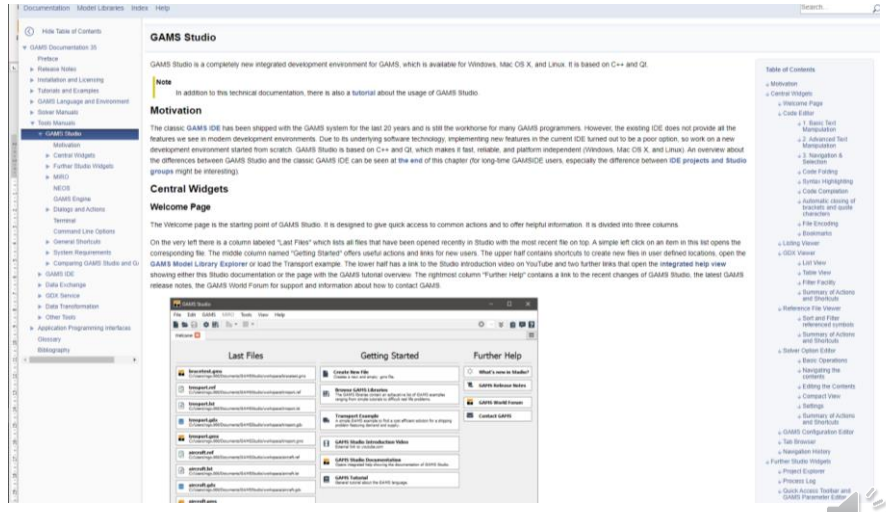
Help with GAMS and GAMS Studio

Select: `Help > GAMS Documentation`, or `F1`, or `View > Help`



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Help with GAMS and GAMS Studio

Keyboard Shortcuts

2. Advanced Text Manipulation

Action	Shortcut	macOS	Description
Remove Line	**Shift** - **Del**		Removes the current line
Duplicate Line	**Ctrl** - **D**	**Command** - **D**	Duplicates the current line
Lowercase	**Alt** - **Shift** - **L**	**Option** - **Shift** - **L**	Toggle selection to lower case
Uppercase	**Alt** - **Shift** - **U**	**Option** - **Shift** - **U**	Toggle selection to upper case
Tab	**Tab**	**Tab**	Add spaces till next tab size
Untab	**Shift** - **Tab**	**Shift** - **Tab**	Remove spaces till previous tab size
Indent	**Ctrl** - **I**	**Command** - **I**	Indent complete line
Outdent	**Ctrl** - **Shift** - **I**	**Command** - **Shift** - **I**	Outdent complete line
Find	**Ctrl** - **F**	**Command** - **F**	Open Search & Replace window, filling search field with selected text if there is any.
Find Next	**F3**	**F3**	Jump to next search result if
Find Previous	**Shift** - **F3**	**Shift** - **F3**	Jump to previous search result

3. Navigation & Selection

Action	Shortcut	macOS	Description
Zoom In	**Ctrl** - **+** or **Ctrl** - **=** or **Ctrl** - **Wheel Up**	**Command** - **+** or **Command** - **=** or **Command** - **Wheel Up**	Zoom in
Zoom Out	**Ctrl** - **-** or **Ctrl** - **Wheel Down**	**Command** - **-** or **Command** - **Wheel Down**	Zoom out
Reset Zoom	**Ctrl** - **0**	**Command** - **0**	Reset zoom
Match Parentheses	**Ctrl** - **B**	**Command** - **B**	Jump to matching parenthesis

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Search & Replace

7

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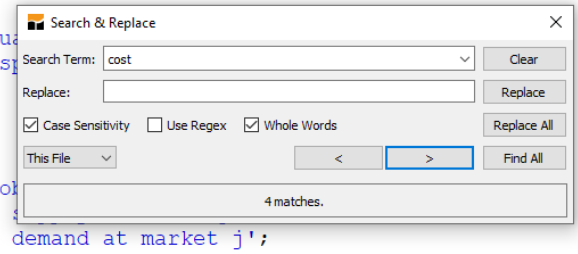
Search and Replace

```
41
42  Parameter c(i,j) 'transport cost in thousands of dollars per case';
43  c(i,j) = f*d(i,j)/1000;
44
45  Variable
46     x(i,j)  'shipment qua
47     z       'total transp
48
49  Positive Variable x;
50
51  Equation
52     cost       'define ob
53     supply(i)  'observe s
54     demand(j)  'satisfy demand at market j';
55
56  cost..       z =e= sum((i,j), c(i,j)*x(i,j));
57
58  supply(i).. sum(j, x(i,j)) =l= a(i);
```



8

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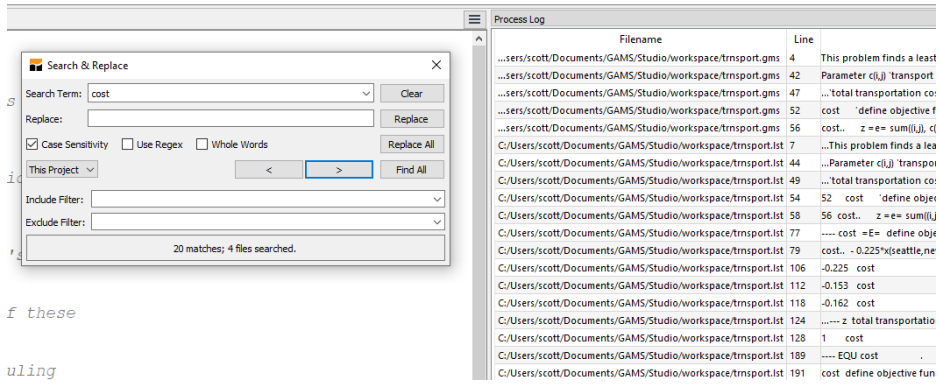
Search and Replace



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GDX Files

10

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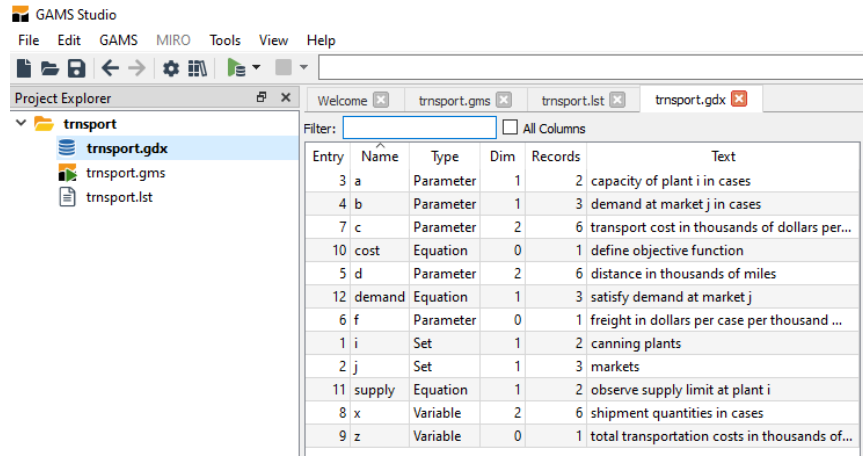
Opening and Using GDX Files



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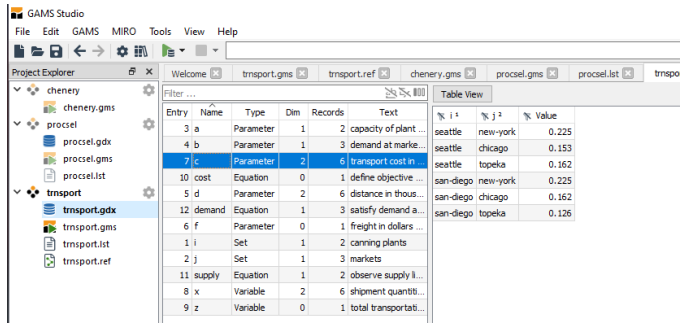
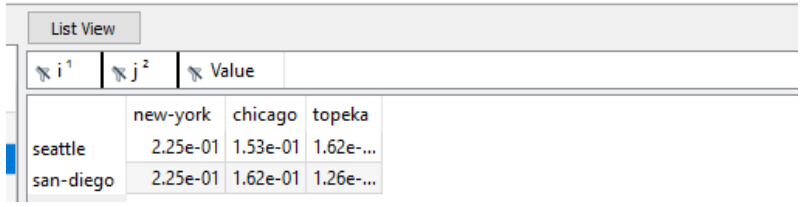
Opening and Using GDX Files





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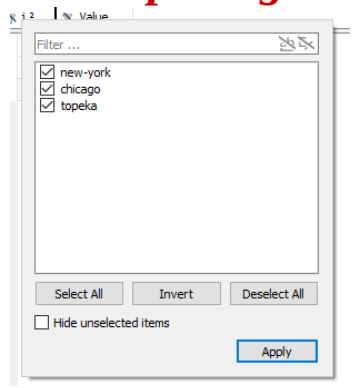
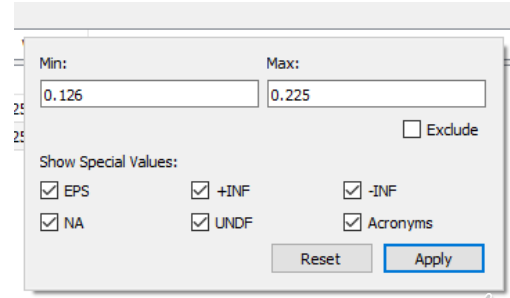
Opening and Using GDX Files





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Opening and Using GDX Files

Entry	Name	Type	Dim	Records	Text
6	aio	Parameter	2	6	input coefficients
13	alp	Parameter	1	3	slope of export revenue function
57	cli	Parameter	0	1	cost of living index
53	cva	Parameter	0	1	total value added at current prices
23	dbar	Parameter	0	1	trade deficit
8	ddat	Parameter	3	20	demand parameters
18	del	Parameter	1	4	distribution parameter in production functions
44	dem	Equation	1	4	demand equations
42	dg	Equation	1	3	definition of imports
43	dh	Equation	1	3	definition of exports
51	dk	Equation	1	4	definition of capital coefficient
50	dl	Equation	1	4	definition of labor coefficient
39	dty	Equation	0	1	total demand: definition
52	dv	Equation	1	4	value added
49	dvv	Equation	1	4	definition of vv
30	e	Variable	1	3	quantity of exports
19	efy	Parameter	1	4	efficiency parameter in production functions
56	emp	Parameter	0	1	total employment
48	fpr	Equation	0	1	factor price ratio definition
55	fve	Parameter	0	1	foreign exchange value of exports
32	g	Variable	1	3	foreign exchange cost of imports
12	gam	Parameter	1	3	intercept on export revenue function
33	h	Variable	1	3	foreign exchange value of exports
1	i	Set	1	4	sectors
5	j	Alias	1	0	Aliased with i
29	k	Variable	1	4	capital use per unit of output
22	kbar	Parameter	0	1	capital stock
46	kc	Equation	0	1	capital constraint
28	l	Variable	1	4	labor use per unit of output
20	lbar	Parameter	0	1	total supply of labor
45	lc	Equation	0	1	labor constraint
3	lmh	Set	1	3	possible elasticities
31	m	Variable	1	3	quantity of imports
40	mb	Equation	1	4	material balance
10	mew	Parameter	1	3	intercept on import cost function
27	p	Variable	1	4	prices
36	pd	Variable	0	1	price deflator
7	pdat	Parameter	4	64	production data

List View

lmh	* 2	sde	i 4	Value	light-ind	food+agr	heavy-ind	services
low	a	distr			0.915	0.944	2.6	0.8
		effic			3.83	3.24	4	1.8
	b	distr			0.276	1.034	2.6	0.77
		effic			2.551	3.39	4	1.77
medium	a	subst			0.11	0.29	0.2	0.05
		distr			0.326	0.443	0.991	0.00798
		effic			3.97	3.33	1.67	1.84
	b	subst			0.22	0.58	0.4	0.1
		distr			0.41	0.47	0.92	0.08
		effic			3.99	3.33	1.8	1.89
high	a	subst			0.45	1.15	0.4	0.2
		distr			0.456	0.483	0.917	0.23
		effic			4	3.33	1.8	1.92
	b	subst			0.93	1.15	0.8	0.4
		distr			0.484	0.483	0.769	0.344
		effic			4	3.33	1.96	1.96

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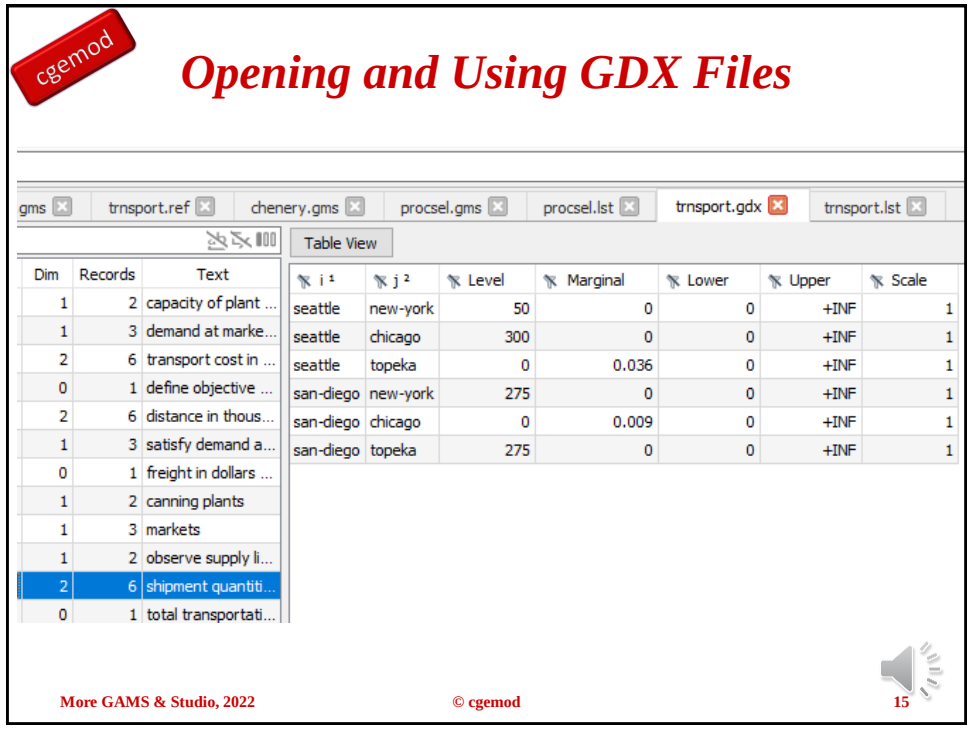
Opening and Using GDX Files



Dim	Records	Text
1	2	capacity of plant ...
1	3	demand at marke...
2	6	transport cost in ...
0	1	define objective ...
2	6	distance in thous...
1	3	satisfy demand a...
0	1	freight in dollars ...
1	2	canning plants
1	3	markets
1	2	observe supply li...
2	6	shipment quantiti...
0	1	total transportati...

i [1]	j [2]	Level	Marginal	Lower	Upper	Scale
seattle	new-york	50	0	0	+INF	1
seattle	chicago	300	0	0	+INF	1
seattle	topeka	0	0.036	0	+INF	1
san-diego	new-york	275	0	0	+INF	1
san-diego	chicago	0	0.009	0	+INF	1
san-diego	topeka	275	0	0	+INF	1

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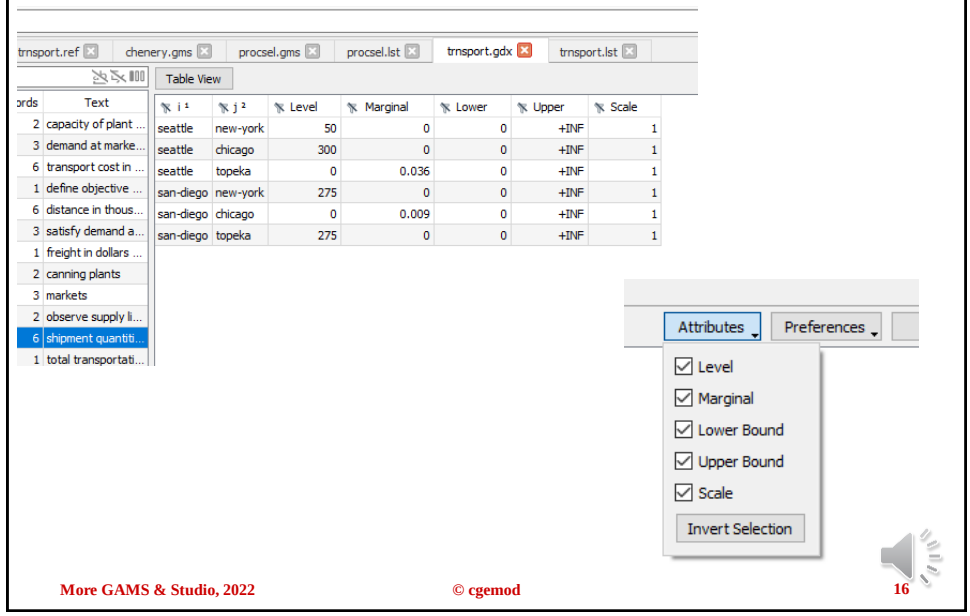
Opening and Using GDX Files



Text
capacity of plant ...
demand at marke...
transport cost in ...
define objective ...
distance in thous...
satisfy demand a...
freight in dollars ...
canning plants
markets
observe supply li...
shipment quantiti...
total transportati...

i [1]	j [2]	Level	Marginal	Lower	Upper	Scale
seattle	new-york	50	0	0	+INF	1
seattle	chicago	300	0	0	+INF	1
seattle	topeka	0	0.036	0	+INF	1
san-diego	new-york	275	0	0	+INF	1
san-diego	chicago	0	0.009	0	+INF	1
san-diego	topeka	275	0	0	+INF	1

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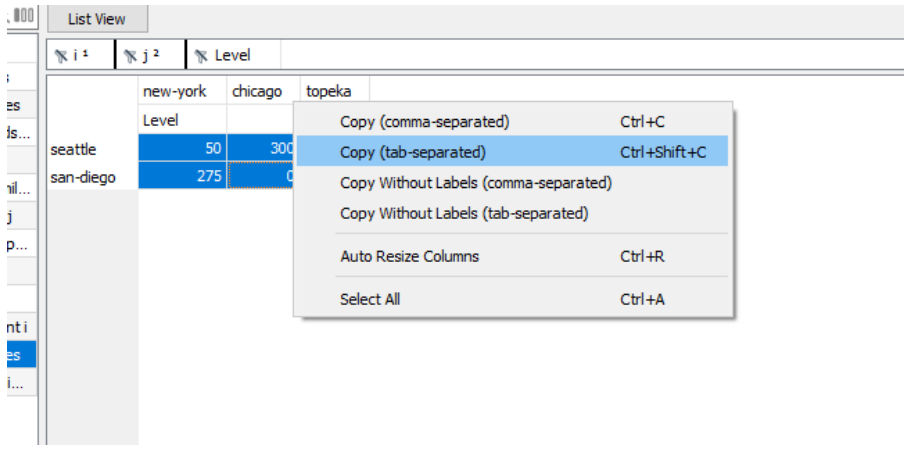
Opening and Using GDX Files



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Reference Files

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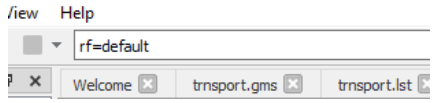
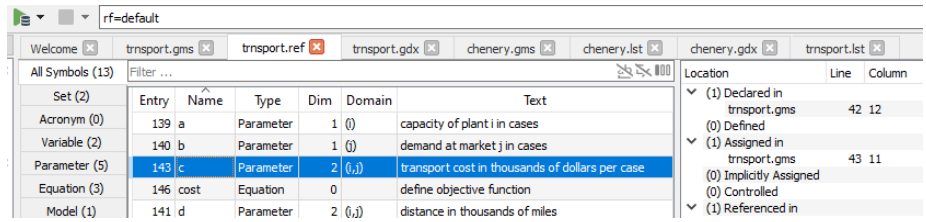
Reference Files





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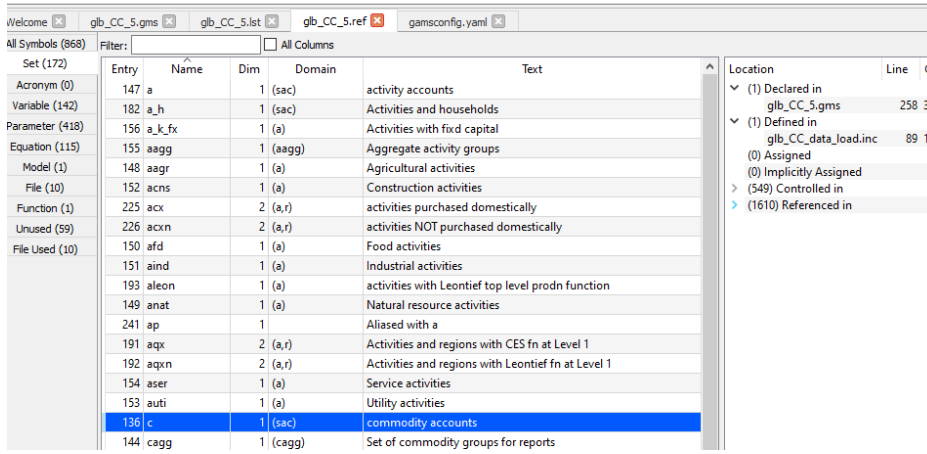
Reference Files



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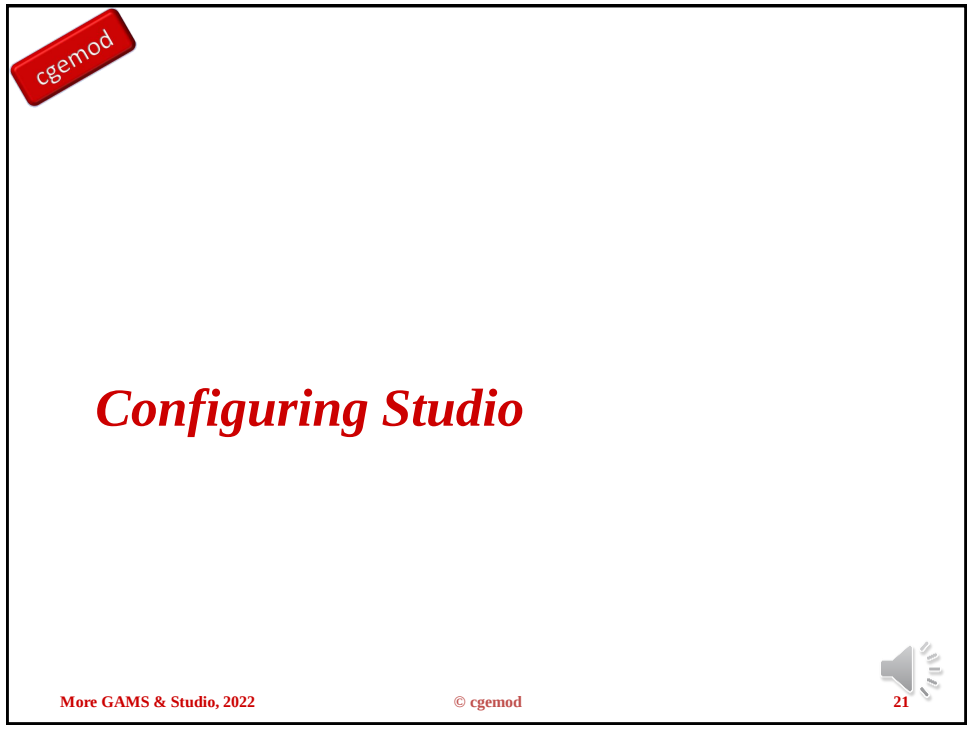
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Configuring Studio
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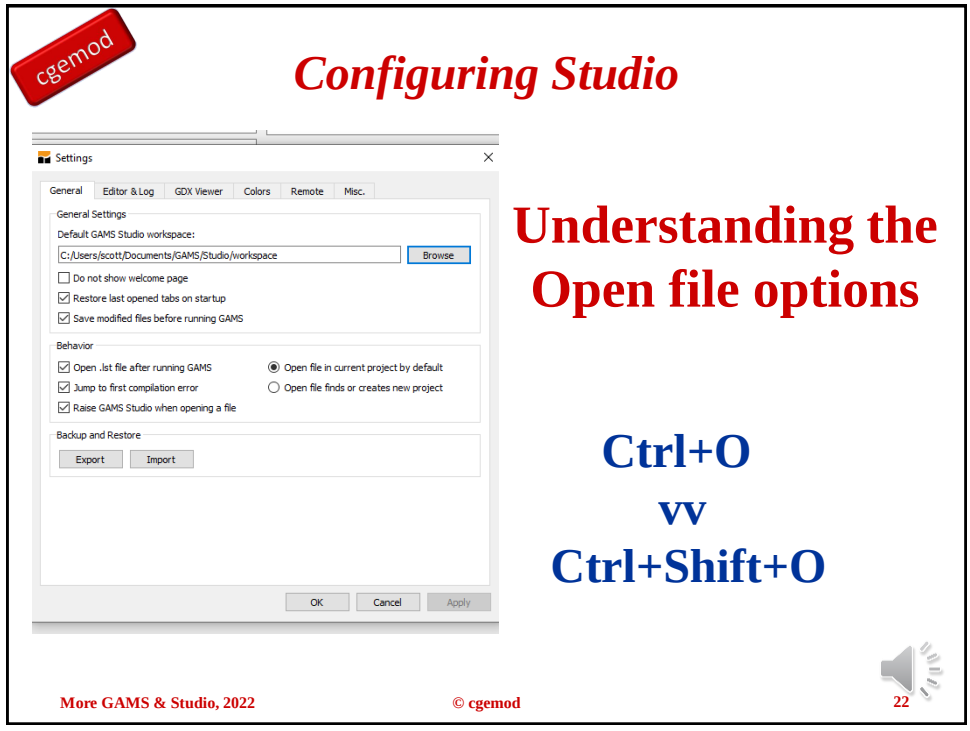
cgemod
Configuring Studio
Settings
General
Editor & Log
GDX Viewer
Colors
Remote
Misc.
General Settings
Default GAMS Studio workspace:
C:/Users/scott/Documents/GAMS/Studio/workspace
Browse
Do not show welcome page
Restore last opened tabs on startup
Save modified files before running GAMS
Behavior
Open .lst file after running GAMS
Jump to first compilation error
Raise GAMS Studio when opening a file
Open file in current project by default
Open file finds or creates new project
Backup and Restore
Export
Import
OK
Cancel
Apply
Understanding the Open file options
Ctrl+O
vv
Ctrl+Shift+O
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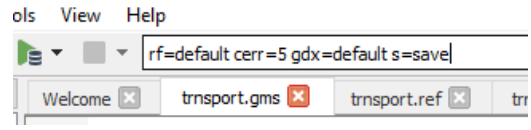
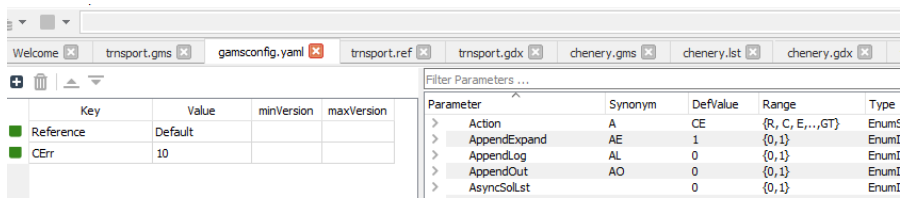
Configuring Studio





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User Model Libraries

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Libraries and User Model Libraries

User Model Libraries are libraries additional to those provided by GAMS

- In Windows Explorer create a directory, `C:\cgemod_training`. We suggest doing this on the top level of you working drive (C drive).
- Add the sub directory `cgemod_lib` to the master directory, i.e., `C:\cgemod_training\cgemod_lib`. (Each course adds more files and the index will be updated.
- Add the sub directory downloads to the master directory, i.e., `C:\cgemod_training\downloads`.
- Download the trans.zip file from the cgemod site (`http://cgemod.org.uk/int_gams.html`) (save in the download sub directory).
- Unzip the contents of the file `trans.zip` into the sub directory called `cgemod_lib`.

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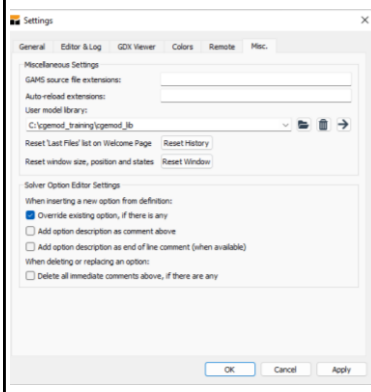
Libraries and User Model Libraries v1

Making the User Library available in Model Library Explorer



- Open Studio settings - `File > Settings or F7` and go to the `Misc` tab.
- Change the path for the User Model library, `C:/Users/…/Documents/GAMS/modellibs` (the exact path will depend on the settings on your PC) to `C:/cgemod_training/cgemod_lib`.
- Close down the Studio Settings window remembering to click OK at the bottom of the `Misc` tab.

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Libraries and User Model Libraries v2

Making the User Library available in Model Library Explorer

- Copy all of the files in the `cgemod_lib` sub directory – just the contents of the directory NOT the directory.
- Open Studio settings - `File > Settings` or `F7` on the toolbar and go to the `Misc` tab.
- Click on the '`Open Location`' button (→), which will open a Windows Explorer window. Make sure the directory …`\GAMS\modellibs` is open.
- Create a sub directory called …`\GAMS\modellibs\cgemod_lib`
- Then Paste the contents of the `C:\cgemod_training\cgemod_lib` directory into the …`\GAMS\modellibs\cgemod_lib` directory.
- Close down the Studio Settings window remembering to click OK on the `Misc` tab.

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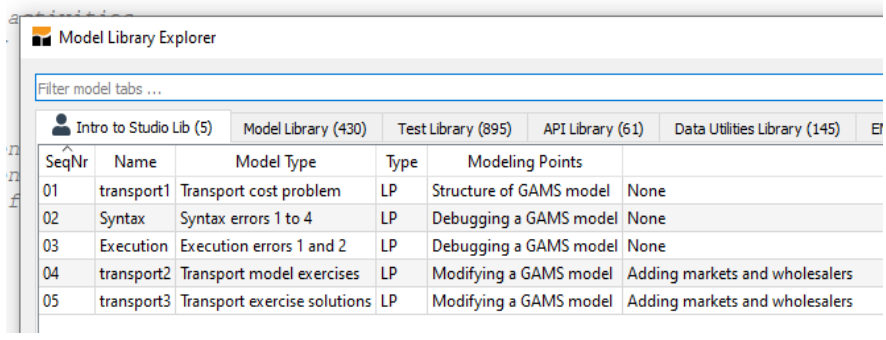
Libraries and User Model Libraries



SeqNr	Name	Model Type	Type	Modeling Points	
01	transport1	Transport cost problem	LP	Structure of GAMS model	None
02	Syntax	Syntax errors 1 to 4	LP	Debugging a GAMS model	None
03	Execution	Execution errors 1 and 2	LP	Debugging a GAMS model	None
04	transport2	Transport model exercises	LP	Modifying a GAMS model	Adding markets and wholesalers
05	transport3	Transport exercise solutions	LP	Modifying a GAMS model	Adding markets and wholesalers

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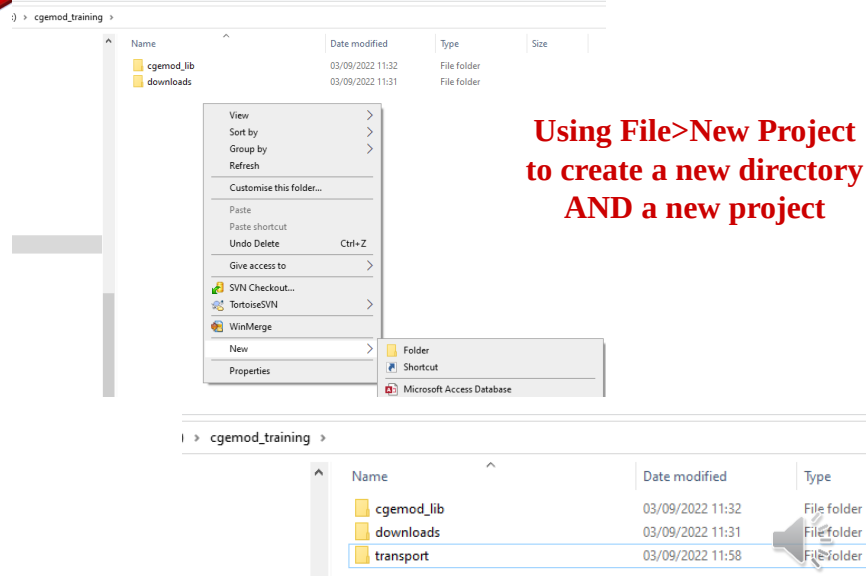
Libraries and User Model Libraries



Using File>New Project to create a new directory AND a new project

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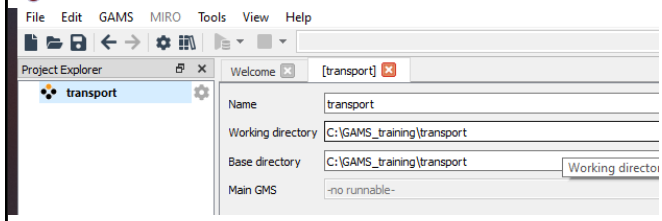
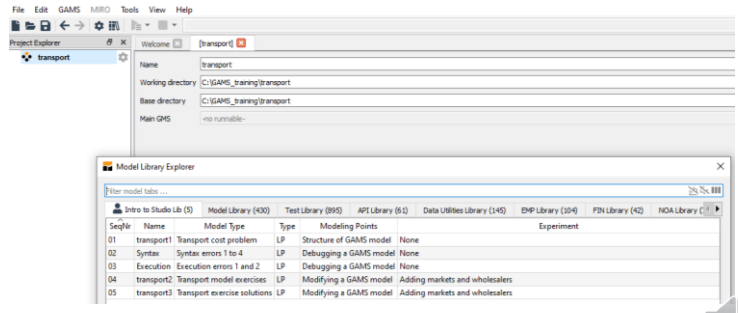
Libraries and User Model Libraries





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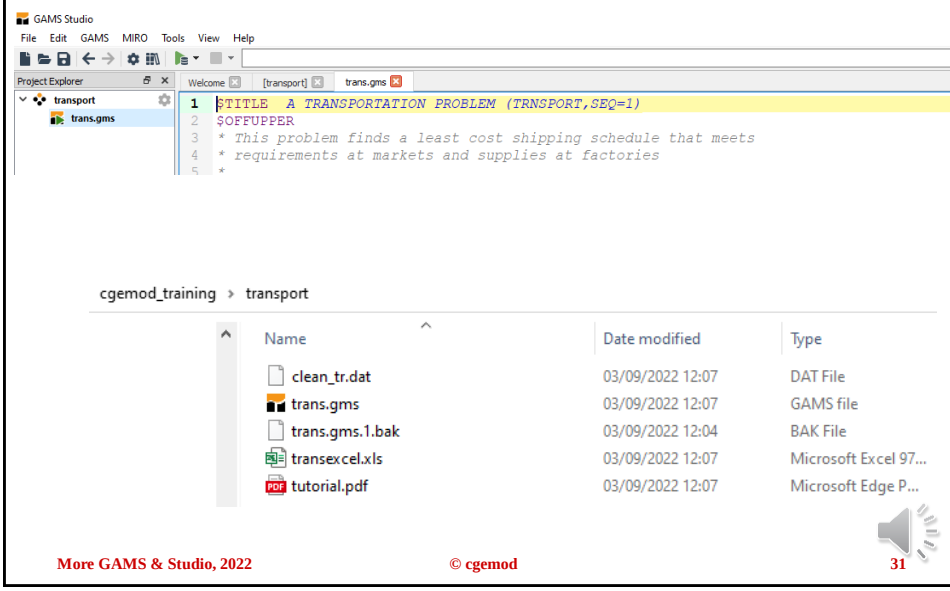
Libraries and User Model Libraries



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Comparing Files

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Comparing Files

Access to comparison software is valuable. They allow easy comparisons between different model versions, which can be helpful when searching for 'changes', 'errors' and 'bugs'.

1. MS Word: using `Review>Compare` produces a comparison of two selected documents
2. WinMerge: using `File>Open` than then selecting 2 or 3 documents to compare
3. NotePad++: open two documents and then using `Plugins>Compare`

The courses offered by cgemod assume the participant has access to comparison software. Our examples assume WinMerge.

With open-source programmes be careful when installing them, especially if they come from third-party sites.

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Studio with Modular Projects

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Studio with Modular Projects

Name	Status	Date modified	Type
10_CS_Data		31/08/2022 11:02	File folder
11_DYN_Data		31/08/2022 11:02	File folder
20_GDX_Data		31/08/2022 11:02	File folder
21_Restart		31/08/2022 11:02	File folder
30_CS_Calib		31/08/2022 11:02	File folder
31_CS_Close		31/08/2022 11:02	File folder
32_CS_Expts		31/08/2022 11:02	File folder
40_DYN_Calib		31/08/2022 11:02	File folder
41_DYN_Close		31/08/2022 11:02	File folder
42_DYN_Updates		31/08/2022 11:02	File folder
43_DYN_Expts		31/08/2022 11:02	File folder
50_CS_Analysis		31/08/2022 11:02	File folder
51_DYN_Analysis		31/08/2022 11:02	File folder
60_Results		31/08/2022 11:02	File folder
clean_stg_t.bat		13/03/2020 09:41	Windows Batch File
stg_t.gms		10/03/2021 08:00	GAMS file
stg_t_dyn.gms		04/10/2021 16:17	GAMS file
stg_t_dyn_expt.gms		13/03/2020 09:41	GAMS file

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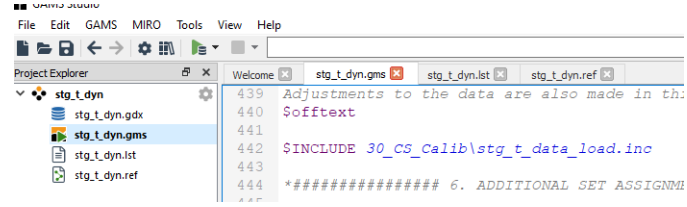
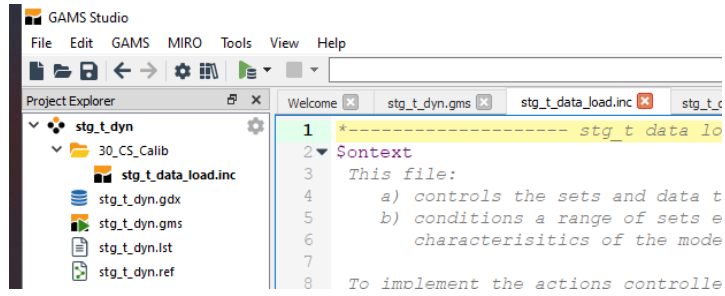
cgemod

Studio with Modular Projects





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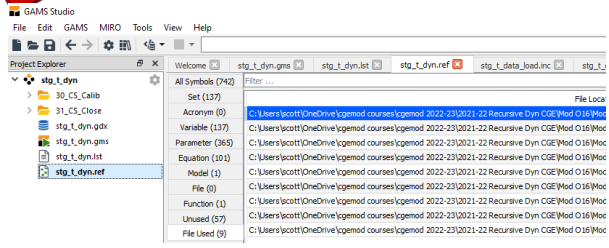
Studio with Modular Projects



Reference file option

Process Log option

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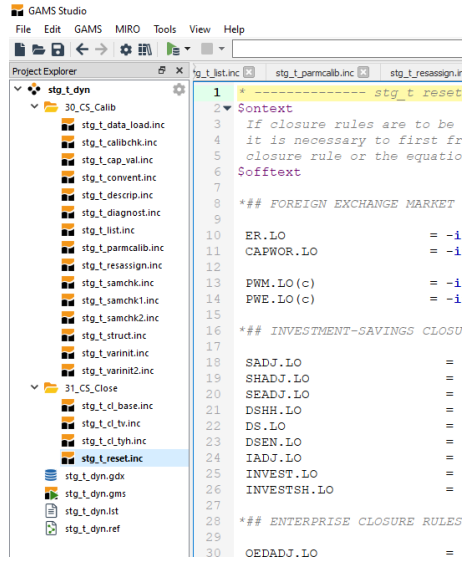
Studio with Modular Projects



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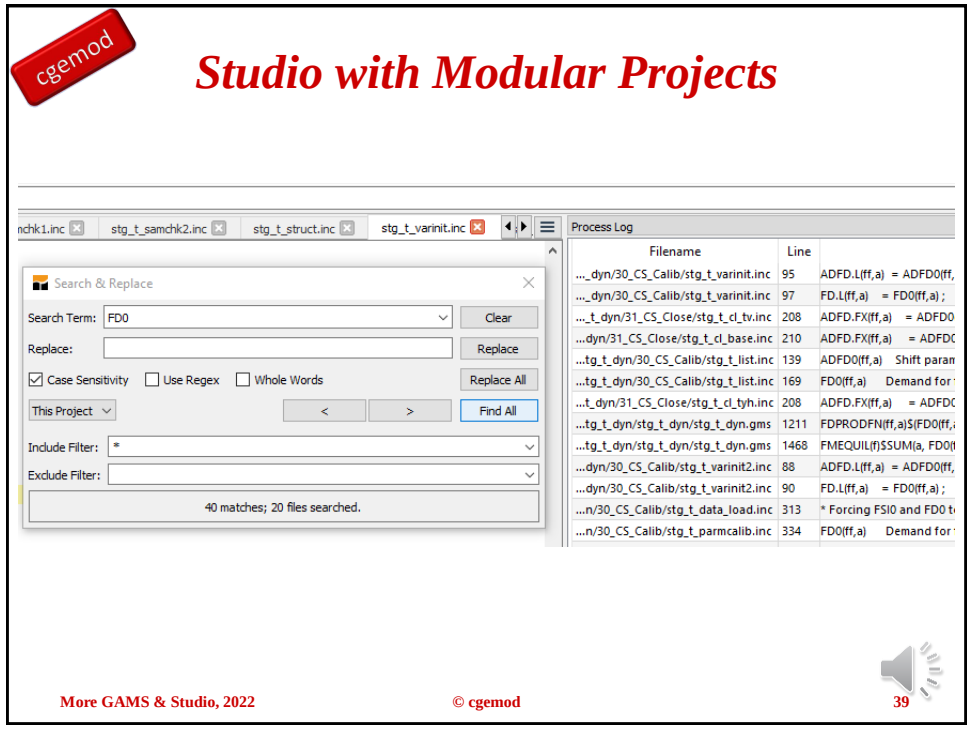
cgemod
Studio with Modular Projects
nchk1.inc
stg_t_samchk2.inc
stg_t_struct.inc
stg_t_varinit.inc
Search & Replace
Search Term: FD0
Clear
Replace:
Replace
Case Sensitivity
Use Regex
Whole Words
Replace All
This Project
<
>
Find All
Include Filter: *
Exclude Filter:
40 matches; 20 files searched.
Process Log
Filename
Line
..._dyn/30_CS_Calib/stg_t_varinit.inc 95 ADFD.L(ff,a) = ADFD0(ff,
..._dyn/30_CS_Calib/stg_t_varinit.inc 97 FD.L(ff,a) = FD0(ff,a) ;
...t_dyn/31_CS_Close/stg_t_cl_tv.inc 208 ADFD.FX(ff,a) = ADFD0
...dyn/31_CS_Close/stg_t_cl_base.inc 210 ADFD.FX(ff,a) = ADFD0
...tg_t_dyn/30_CS_Calib/stg_t_list.inc 139 ADFD0(ff,a) Shift param
...tg_t_dyn/30_CS_Calib/stg_t_list.inc 169 FD0(ff,a) Demand for
...t_dyn/31_CS_Close/stg_t_cl_tyh.inc 208 ADFD.FX(ff,a) = ADFD0
...tg_t_dyn/stg_t_dyn/stg_t_dyn.gms 1211 FDPRODFN(ff,a)$(FD0(ff,
...tg_t_dyn/stg_t_dyn/stg_t_dyn.gms 1468 FMEQUIL(f)$SUM(a, FD0(
...dyn/30_CS_Calib/stg_t_varinit2.inc 88 ADFD.L(ff,a) = ADFD0(ff,
...dyn/30_CS_Calib/stg_t_varinit2.inc 90 FD.L(ff,a) = FD0(ff,a) ;
...n/30_CS_Calib/stg_t_data_load.inc 313 * Forcing FSI0 and FD0 t
...n/30_CS_Calib/stg_t_parmcalib.inc 334 FD0(ff,a) Demand for
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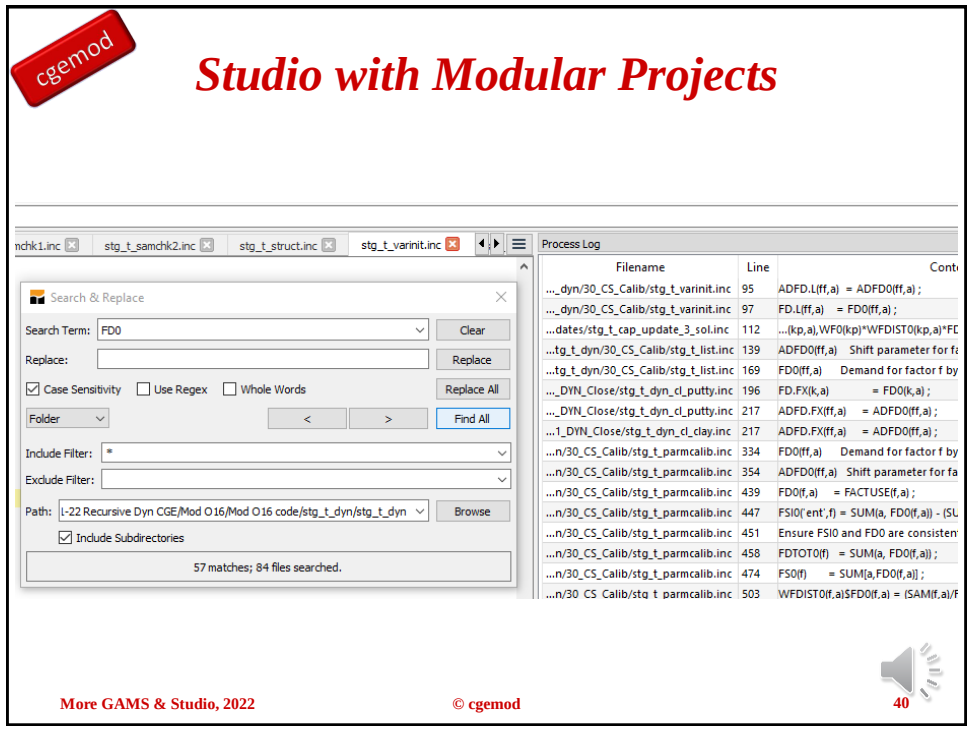
cgemod
Studio with Modular Projects
nchk1.inc
stg_t_samchk2.inc
stg_t_struct.inc
stg_t_varinit.inc
Search & Replace
Search Term: FD0
Clear
Replace:
Replace
Case Sensitivity
Use Regex
Whole Words
Replace All
Folder
<
>
Find All
Include Filter: *
Exclude Filter:
Path: l-22 Recursive Dyn CGE/Mod O16/Mod O16 code/stg_t_dyn/stg_t_dyn
Browse
Include Subdirectories
57 matches; 84 files searched.
Process Log
Filename
Line
..._dyn/30_CS_Calib/stg_t_varinit.inc 95 ADFD.L(ff,a) = ADFD0(ff,a) ;
..._dyn/30_CS_Calib/stg_t_varinit.inc 97 FD.L(ff,a) = FD0(ff,a) ;
...dates/stg_t_cap_update_3_sol.inc 112 ...(kp,a),WF0(kp)*WFDIST0(kp,a)*FD
...tg_t_dyn/30_CS_Calib/stg_t_list.inc 139 ADFD0(ff,a) Shift parameter for fa
...tg_t_dyn/30_CS_Calib/stg_t_list.inc 169 FD0(ff,a) Demand for factor f by
..._DYN_Close/stg_t_dyn_cl_putty.inc 196 FD.FX(k,a) = FD0(k,a) ;
..._DYN_Close/stg_t_dyn_cl_putty.inc 217 ADFD.FX(ff,a) = ADFD0(ff,a) ;
...1_DYN_Close/stg_t_dyn_cl_clay.inc 217 ADFD.FX(ff,a) = ADFD0(ff,a) ;
...n/30_CS_Calib/stg_t_parmcalib.inc 334 FD0(ff,a) Demand for factor f by
...n/30_CS_Calib/stg_t_parmcalib.inc 354 ADFD0(ff,a) Shift parameter for fa
...n/30_CS_Calib/stg_t_parmcalib.inc 439 FD0(f,a) = FACTUSE(f,a) ;
...n/30_CS_Calib/stg_t_parmcalib.inc 447 FSI0('ent',f) = SUM(a, FD0(f,a)) - (SU
...n/30_CS_Calib/stg_t_parmcalib.inc 451 Ensure FSI0 and FD0 are consisten
...n/30_CS_Calib/stg_t_parmcalib.inc 458 FDTOT0(f) = SUM(a, FD0(f,a)) ;
...n/30_CS_Calib/stg_t_parmcalib.inc 474 FS0(f) = SUM[a,FD0(f,a)] ;
...n/30_CS_Calib/stg_t_parmcalib.inc 503 WFDIST0(f,a)$FD0(f,a) = (SAM(f,a)/F
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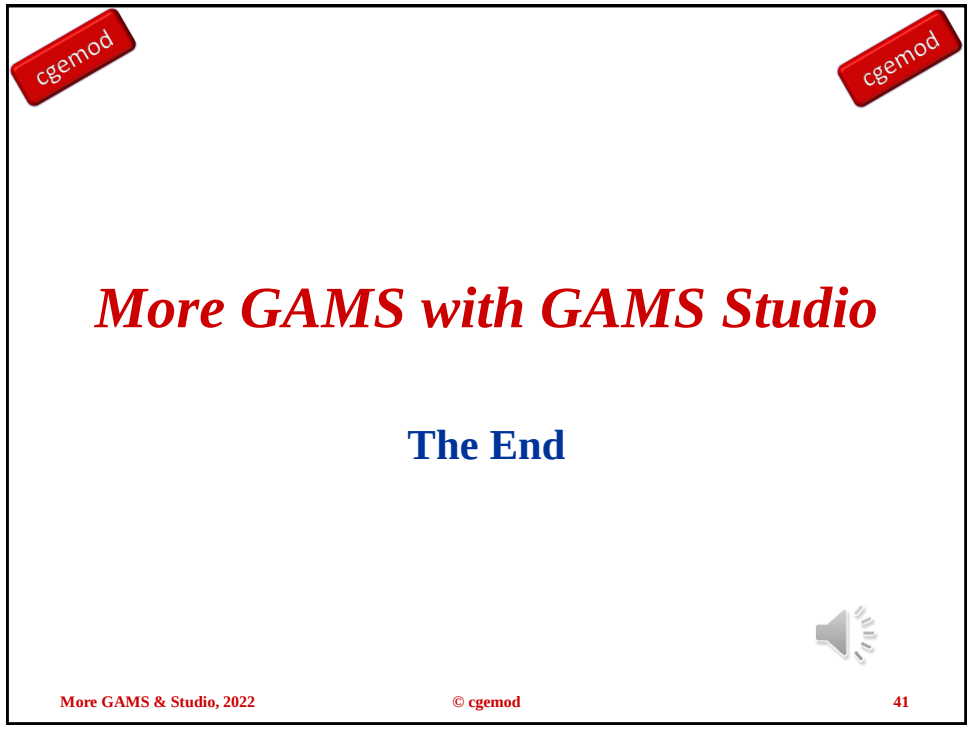
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The End
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