


An Introduction to GAMS and GAMSIDE


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Outline

- Introduction
- Installing GAMS 2.50 with GAMSIDE
- GAMSIDE
- Configuring GAMSIDE
- Testing a GAMS/GAMSIDE Installation
- Running a First GAMS Programme
- Using a GAMS User Model Library
- Setting up directories for the course

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Introduction

- General Algebraic Modeling System (GAMS)
 - High level programming language
 - Mostly used to solve optimisation problems
 - Allows preparation of transparent programmes
- GAMS consists of
 - Base Module
 - Series of solvers
 - GAMS Integrated Development Environment


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Introduction

- GAMS
 - allows use of specialised solvers without knowledge their syntax;
 - separates data and the logic of a problem;
 - a GAMS programme is its own documentation; and
 - looks after a number of common programming problems, e.g., dimensionality.
- “GAMS was developed to [overcome a series of mathematical programming problems] by
 - Providing a high-level language for the compact representation of large and complex models
 - Allowing changes to be made in model specifications simply and safely
 - Allowing unambiguous statements of algebraic relationships
 - Permitting model descriptions that are independent of solution algorithms” (Brooke et al., 1998, p1).


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Introduction


- This course
 - Requires the demo/student version of GAMS that is free from the GAMS website;
 - Uses GAMSIDE as the editor programme; and
 - The documentation assumes the user is using a PC with the Windows operating system

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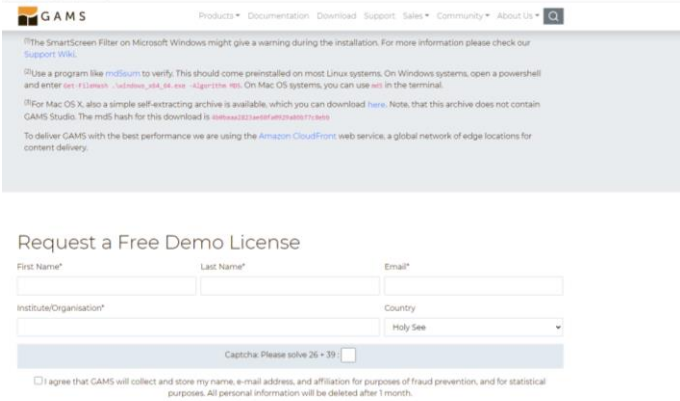

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GAMS Demo Licence

Go to: www.gams.com/download



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GAMS

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Download GAMS Release 36.1.0

Released August 02, 2021

Please consult the [release notes](#) before downloading a system. We also have [detailed platform descriptions](#) and [installation notes](#). The GAMS distribution includes the [documentation](#) in electronic form.

MS-Windows

Microsoft Desktop and Server Operating Systems¹

x86_64 architecture

MDS hash²

45ca32a8775f48c339b8e1284889c9

Download

Linux

GNU/Linux System

x86_64 architecture

MDS hash²

4aba5898953a3256cc7465af37f27a7

Download

Mac OS X

Package installer for Mac³

x86_64 architecture

MDS hash²

f49f5a854ac36c4fa222962c38534249

Download

¹This is a 64-bit version of the software. If you are using a 32-bit version of Windows, you will need to download the 32-bit version. Error message information please check the release notes.

1. Get the GAMS programme from the GAMS web site

• Save the file (e.g., windows_x64_64.exe) on your PC

2. The Linux and Mac OS X versions to do support GAMS IDE

3. The instructions in this presentation refer to the Windows version and GAMS IDE.

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Installing GAMS

1. Run the GAMS installer file

2. Select the directory in which GAMS will be installed

3. We recommend using C:\GAMS – this is not the default

Setup - GAMS

Welcome to the GAMS Setup Wizard

This will install GAMS 36.1.0 on your computer.

It is recommended that you close all other applications before continuing.

Click Next to continue, or Cancel to exit Setup.

☐ Use advanced installation mode

Next Cancel

Setup - GAMS

Select Destination Location

Where should GAMS be installed?

Setup will install GAMS into the following folder.

To continue, click Next. If you would like to select a different folder, click Browse.

C:\GAMS Browse...

At least 1.54 GB of free disk space is required.

Back Next Cancel

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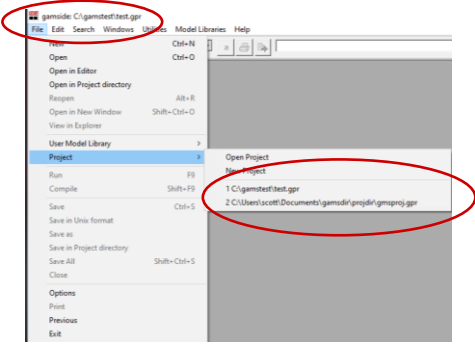
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Test Directory

1. Create a directory called ‘gamstest’ on the top level of your ‘C’ drive (or default data drive)

- This directory is temporary and will only be used to test GAMS

2. In ‘gamstest’ create a project file ‘test.gpr’



The screenshot shows the GAMSIDE application window with the 'File' menu open. The 'Project' option is selected, and the 'New Project' submenu is visible. Two options are listed: '1 C:\gamstest\test.gpr' and '2 C:\Users\acoff\Documents\gamstest\project\project.gpr'. The first option is circled in red.

This can all be done in GAMSIDE by selecting File>Project>New Project

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Configuring GAMSIDE

1. Choose Options from the File menu in GAMSIDE

2. Choose Editor page

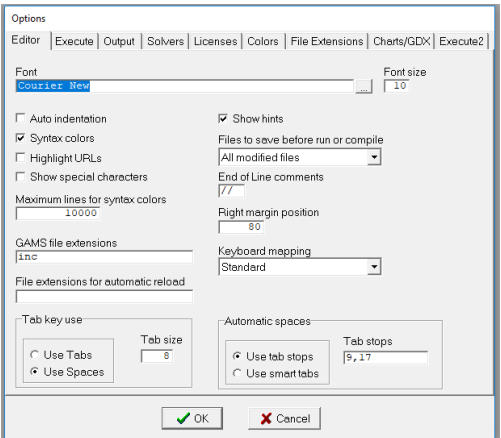
3. Set font to Courier New

4. Set the font size

5. Add ‘inc’ in the GAMS file extensions box

6. Leave the other setting for now

7. We will use these settings during the online course



The screenshot shows the 'Options' dialog box in GAMSIDE, with the 'Editor' tab selected. The 'Font' is set to 'Courier New' and the 'Font size' is 10. The 'GAMS file extensions' box contains 'inc'. The 'File extensions for automatic reload' box is empty. The 'Tab key use' section has 'Use Spaces' selected. The 'Automatic spaces' section has 'Use tab stops' selected. The 'OK' button is highlighted.


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A red, tilted rectangular logo with the text 'cgemod' in white.

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Model Library

In GAMSIDE select Model Libraries>GAMS Model Library

GAMS Model Library

Seq#	Lib	Name +	Application Area	Type	Contributor	Description
004	D	ABEL	Macro Economics	NLP	Kendrick, D.	Linear Quadratic Control Problem
208	G	ABSMIP	Mathematics	MIP	GAMS Develop	Discontinuous functions: abs(), min(), max(), sign() as MIPs
088	D	AGRESTE	Agricultural Economics	LP	Kutcher, G. P.	Agricultural Farm Level Model of NE Brazil
008	D	AIRCRAFT	Management Science and OR	LP	Dantzig, G. B.	Aircraft Allocation Under Uncertain Demand
189	L	AIRSP	Stochastic Programming	LP	Dantzig, G. B.	Aircraft Allocation
196	L	AIRSP2	Stochastic Programming	DECIS	Dantzig, G. B.	Aircraft Allocation - stochastic optimization with DECIS
060	D	AJAX	Management Science and OR	LP	CDC	Ajax Paper Company Production Schedule
124	G	ALAN	Finance	MINLP	Manne, A. S.	A Quadratic Programming Model for Portfolio Analysis
165	D	ALKYL	Chemical Engineering	NLP	Berna, T. J.	Simplified Alkylation Process
396	D	ALLBASES	Micro Economics	MIP	Dantzig, G. B.	Enumerate all Feasible Basic Solutions of the Transportation Problem
170	L	ALPHAMET	Recreational Models	MIP	de Wetering,	Alphametics - a Mathematical Puzzle
031	L	ALUM	International Trade	MIP	Brown, M.	World Aluminum Model
074	D	AMPL	Management Science and OR	LP	Fourer, R.	AMPL Sample Problem
044	L	ANDEAN	Micro Economics	MIP	Mennes, L. B.	Andean Fertilizer Model
197	D	APL1P	Stochastic Programming	DECIS	Infanger, G.	Stochastic Programming Example for DECIS

Linear Quadratic Control Problem (ABEL,SEQ=64)
Linear Quadratic Riccati Equations are solved as a General Nonlinear Programming Problem

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Testing GAMS and GAMSIDE

Six programmes from the GAMS Model Library used

1. trnsport (LP :objective value: 153.675)


2. chenery (NLP: objective value: 1058.9)

3. bid (MIP: optimal solution: 15210109.512)

4. procsel (MINLP: optimal solution: 1.9231)

5. scarfmcp (MCP: no objective function)

6. scarfmge (MPSGE: no objective function)



Run programme button GAMSIDE menu bar

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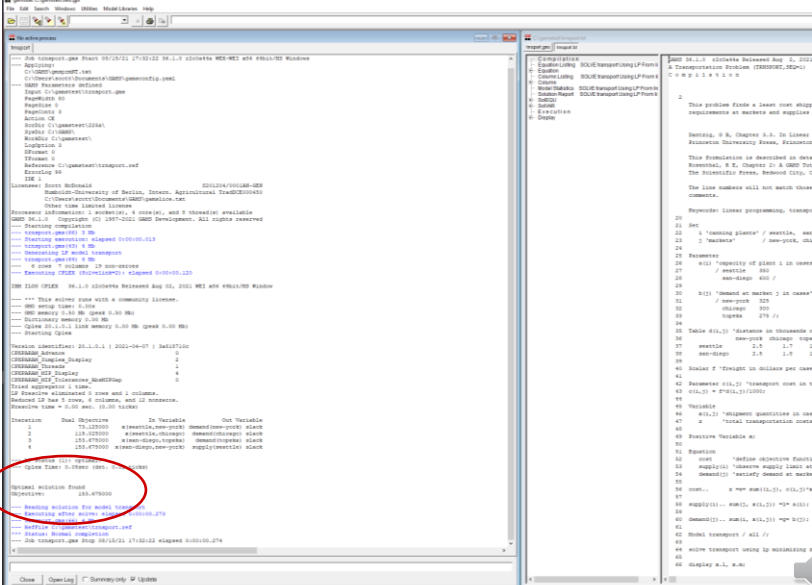
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Testing GAMS and GAMSIDE



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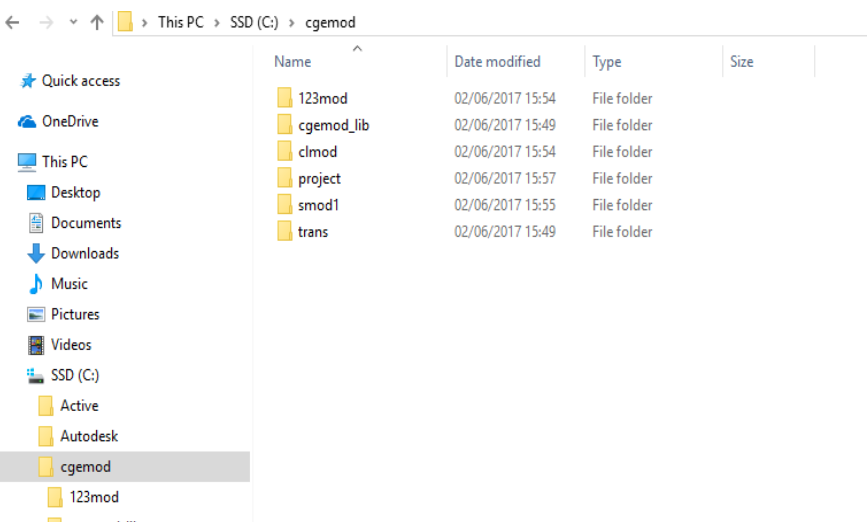
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*An Introduction to GAMS and
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The End

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