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OpenSolver uses the COIN-OR CBC optimization engine Welcome to OpenSolver, the Open Source linear, integer and non-linear optimizer for Microsoft Excel. The latest stable version, OpenSolver 2.9.3 (1 Mar 2020) is available for download; this adds support for using Gurobi 9.0 as a solver. OpenSolver 2.9.4 Beta Release version is now also available for download. Refer to the release blog for the new 2.7, 2.8, 2.8.3, 2.8.4, 2.8.5, 2.8.6, 2.9.0, 2.9.3 & 2.9.4 improvements. View all releases. OpenSolver is also available for Google Sheets OpenSolver for Google Sheets; see our dedicated OpenSolver for Google Sheets page for more info on the Google Sheets versions of OpenSolver. COIN-OR Cup Winner: We are pleased to announce that OpenSolver is the winner of the 2011 INFORMS COIN-OR Cup sponsored by IBM. Thanks, COIN-OR, for this honour. OpenSolver is an Excel VBA add-in that extends Excel's built-in Solver with more powerful solvers. It is developed and maintained by Andrew Mason and students at the Engineering Science department, University of Auckland, NZ. Recent developments are courtesy of Jack Dunn at MIT. OpenSolver provides the following features: OpenSolver offers a range of solvers for use in Excel, including the excellent, Open Source, COIN-OR CBC optimization engine which can quickly solve large Linear and Integer problems. Compatible with your existing Solver models, so there is no need to change your spreadsheets No artificial limits on the size of problem you can solve – have as many variables and constraints as your computer memory allows (but be aware that large problems can be slow to solve) OpenSolver is free, open source software. As well as providing replacement optimization engines, OpenSolver offers: A built-in model visualizer that highlights your model's decision variables, objective and constraints directly on your spreadsheet A fast QuickSolve mode that makes it much faster to re-solve your model after making changes An algorithm to build and update the model only using information present on the sheet A modelling tool that we think improves on the built-in Solver window OpenSolver has been developed for Excel 2007/2010/2013/2016 (including the 64bit versions) running on Windows, and supports Excel for Mac 2011 on Mac OS X, with limited support for Excel for Mac 2016. We currently test against Excel 2010/2013/2016 on Windows 7 and Windows 10, and Excel 2011/2016 on OS X 10.7 through 10.11. Note that we do not check our code against other versions of Excel or Windows/Mac than these. This means we cannot guarantee that the latest release will work on old versions. However, please give it a go and let us know of any problems so we can fix them. You can download OpenSolver.zip (which is hosted on our Open Solver Source Forge site). Version details (and dates of updates) are shown on the blog page. SolverStudio is a free alternative to OpenSolver that is better suited to larger problems. Available as a free download, SolverStudio lets you use Excel to edit, save and solve optimisation models built using modelling languages such as the Python-based PuLP, AMPL, GAMS, GMPL, COOPR/Pyomo and Gurobi's Python interface. The latest release allows GAMS and AMPL models to be solved in the cloud using the excellent free NEOS servers. The SolverStudio interface is fully Excel-based, with the model being edited and run from Excel and stored inside the Excel file. This approach provides a much better modelling solution for complex optimisation problems. Check out the screen shots to see how it works. SolverStudio is much better and faster for large problems. However, OpenSolver is still a great tool for simpler models, or spreadsheets that must be compatible with the built-in Solver. OpenSolver is being developed by Andrew Mason in the Department of Engineering Science at the University of Auckland, and Iain Dunning. Kat Gilbert also made valuable contributions to the code while working as a summer student. Current development is lead by Jack Dunn from MIT. Development of OpenSolver is made easier by the excellent Excel Name Manager which displays all the hidden worksheet names used to store an optimization model. OpenSolver is released as open source code under the GPL. (This simply reflects the fact that distributing a spreadsheet, such as OpenSolver, with embedded VBA code makes that code available to end users by default; to satisfy with our license, you must not password protect that code.) This program is distributed in the hope that it will be useful, but without any warranty; without even the implied warranty of merchantability or fitness for a particular purpose. OpenSolver uses a range of solvers, information on these is available here. Citing OpenSolver: Continued development of OpenSolver is only possible if we can demonstrate its impact. If you are publishing work that uses OpenSolver, please cite both this opensolver.org website and this paper: Mason, A.J., "OpenSolver – An Open Source Add-in to Solve Linear and Integer Programmes in Excel", Operations Research Proceedings 2011, eds. Klatte, Diethard, Lüthi, Hans-Jakob, Schmedders, Karl, Springer Berlin Heidelberg pp 401-406, 2012. You may wish to download a pre-print of this paper. [bg faq start] Latex Reference @INCOLLECTION{OpenSolver, author = {Mason, Andrew}}, title = {OpenSolver – An Open Source Add-in to Solve Linear and Integer Programmes in Excel}, booktitle = {Operations Research Proceedings 2011}, publisher = {Springer Berlin Heidelberg}, year = {2012}, editor = {Klatte, Diethard and Lathi, Hans-Jakob and Schmedders, Karl}, series = {Operations Research Proceedings}, pages = {401-406}, note = { }, doi = {10.1007/978-3-642-29210-1\_64}, isbn = {978-3-642-29209-5}, language = {English}, url = { } [bg faq end] To define an optimization model in Excel you'll follow these essential steps: Organize the data for your problem in the spreadsheet in a logical manner. Choose a spreadsheet cell to hold the value of each decision variable in your model. Create a spreadsheet formula in a cell that calculates the objective function for your model. Create a formulas in cells to calculate the left hand sides of each constraint. Use the dialogs in Excel to tell the Solver about your decision variables, the objective, constraints, and desired bounds on constraints and variables. Run the Solver to find the optimal solution. Within this overall structure, you have a great deal of flexibility in how you choose cells to hold your model's decision variables and constraints, and which formulas and built-in functions you use. In general, your goal should be to create a spreadsheet that communicates its purpose in a clear and understandable manner. Creating an Excel Worksheet Assuming that you have organized the data for the problem in Excel, the next step is to create a worksheet where the formulas for the objective function and the constraints are calculated. Because decision variables and constraints usually come in logical groups, you'll often want to use cell ranges in your spreadsheet to represent them. In the worksheet below, we have reserved cells B4, C4, D4 and E4 to represent our decision variables X1, X2, X3, and X4 representing the number of pallets of each type of panel to produce. The Solver will determine the optimal values for these cells. (Click on the worksheet for a full-size image.) Notice that the profit for each pallet of panels (\$450, \$1,150, \$800 and \$400) was entered in cells B5, C5, D5 and E5, respectively. This allows us to compute the objective in cell F5 as: Formula for cell F5: =B5\*B4+C5\*C4+D5\*D4+E5\*E4 or equivalently, Formula for cell F5: =SUMPRODUCT(B5:E5,B4:E4) In cells B8:E11, we've entered the amount of resources needed to produce a pallet of each type of panel. For example, the value 15 in cell C9 means that 15 hours of pressing is required to produce a pallet of Pacific style panels. These numbers come directly from the formulas for the constraints shown earlier. With these values in place, we can enter a formula in cell F8 to compute the total amount of glue used for any number of pallets produced: Formula for cell F8: =SUMPRODUCT(B8:E8,\$B\$4:\$E\$4) We can copy this formula to cells F9:F11 to compute the total amount of pressing, pine chips, and oaks chips used. (The dollar signs in \$B\$4:\$E\$4 specify that this cell range stays constant, while the cell range B8:E8 becomes B9:E9, B10:E10, and B11:E11 in the copied formulas.) The formulas in cells F8:F11 correspond to the left hand side values of the constraints. In cells G8:G11, we've entered the available amount of each type of resource (corresponding to the right hand side values of the constraints). This allows us to express the constraints shown earlier as: F8:F11





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