

The PeopleSoft Contest: How to Operate the Gsim Program

By Eli Schragenheim

General Description

The PeopleSoft contest is about the ability to plan and control a very simple manufacturing shop floor, in a way that ensures delivery of all demand.

You can approach the challenge in any way you like. You can utilize sophisticated planning algorithms or simply use your intuition. The basics of the Theory of Constraints (TOC) methodology was described in “The Goal”, which this year marks its 20th anniversary. A more detailed description of the TOC planning and control concepts, which uses simulations to highlight the messages, can be found in Dr. Goldratt’s self-learning kit *Production in the TOC Way*.

The Gsim program is a straight forward simulation of a very simple manufacturing plant. The plant produces only three standard end products. The weekly demand for the products is fixed. New demand does not come surprisingly and customers do not change their minds. Quality is perfect. What you’ve failed to deliver by the end of the week is lost demand. So, you better plan your actions to deliver all weekly demand within that week (if that is possible).

You get to manage the shop floor for only two consecutive weeks. There are five working days in each week, and each day has 8 working hours. The simulation stops at the end of each day to let you think and plan the next day. At the end of the week, you’ll get a report on how well you did during the week. At the end of the 2nd week the simulation ends. At that point you’ll be able to save your results in a special file that will have your email address as the name of the file. The program will monitor your results and will save only when the new run’s results are better than your prior attempts.

The objective is to get the maximum profit possible. The only way you can achieve the maximum profit is by shipping all the weekly demand within that week. Expenses on the purchase of raw materials do not affect the profit calculations as they are considered ‘investment’. On the other hand if you have purchased too many materials and lack the cash to pay your weekly fixed expenses, you are considered bankrupt – no matter how much profit you made.

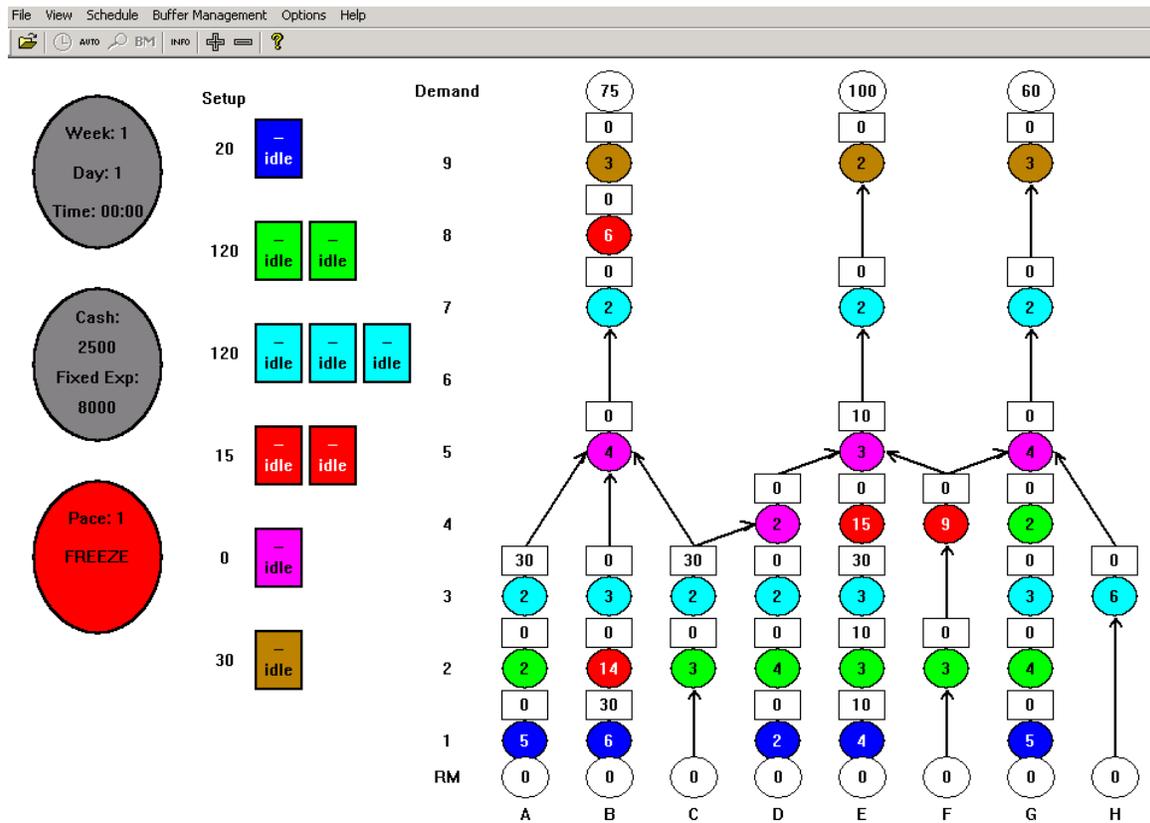
Once you are satisfied with your results, send an email, with the result file, which carries your email address as the name of the file, to:
contest@toc-goldratt.com.

You are allowed to run the simulation as many times as you wish. The best result is what counts. You are allowed to model the simulation scenario into any scheduling software or you are free to schedule manually.

Technical support can be obtained at: amir_sr@bezeqint.net.

The Gsim Program

Invoke the program by clicking on the PeopleSoft Contest icon. The main screen of the simulation appears:



The layout of the contest simulation

The structure of the main screen

At the left side of the screen there are three colored status information ellipses.



The top ellipse shows the week, day, and time.

The contest simulation requires you to run for two consecutive weeks. There are five days in a week; each day runs from 00:00 until 07:59 – eight hours exactly. The clock runs minute by minute.



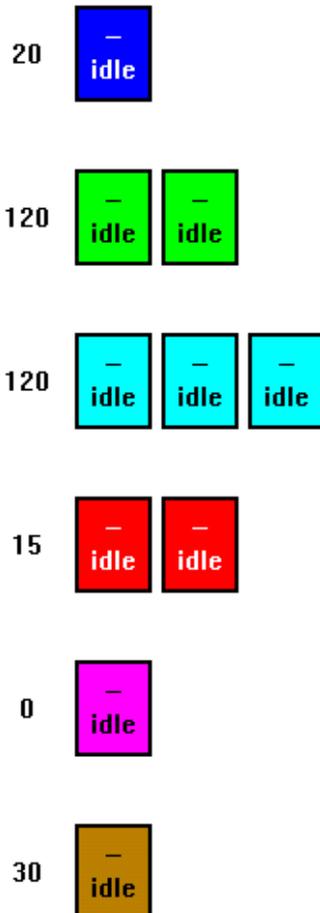
The second ellipse shows the cash you have available. The starting cash is: \$2,500. At the end of each week you need to pay the fixed weekly expenses, which are: \$8,000.



The pace of the simulation represents how fast the time is running. Pace 1 is the slowest. You can accelerate the run by clicking on the  icon (or the '+' button on the keyboard). Do not increase the pace too much as it will make it difficult for you to react fast enough to changes in the situation. Click on the  icon to reduce the pace (or the '-' button on the keyboard).

The ellipse is colored in red to signal that the simulation is in 'Freeze' mode. You have all the time you need to calculate your actions and give instructions; like assigning a machine to a different operation or purchase raw materials. When you are ready to let the simulation run, simply click on the red ellipse and the color will turn green, the time will start to move, and the simulation will continue.

Setup



The machine area is shown next. Each type of machine has a certain color. This plant has six different types of machines: Blue, Green, Light Blue, Red, Magenta, and Brown. There is only one Blue machine. There are three identical Light Blue units. This means that up to three operations that require the Light Blue machine can be done in the same time.

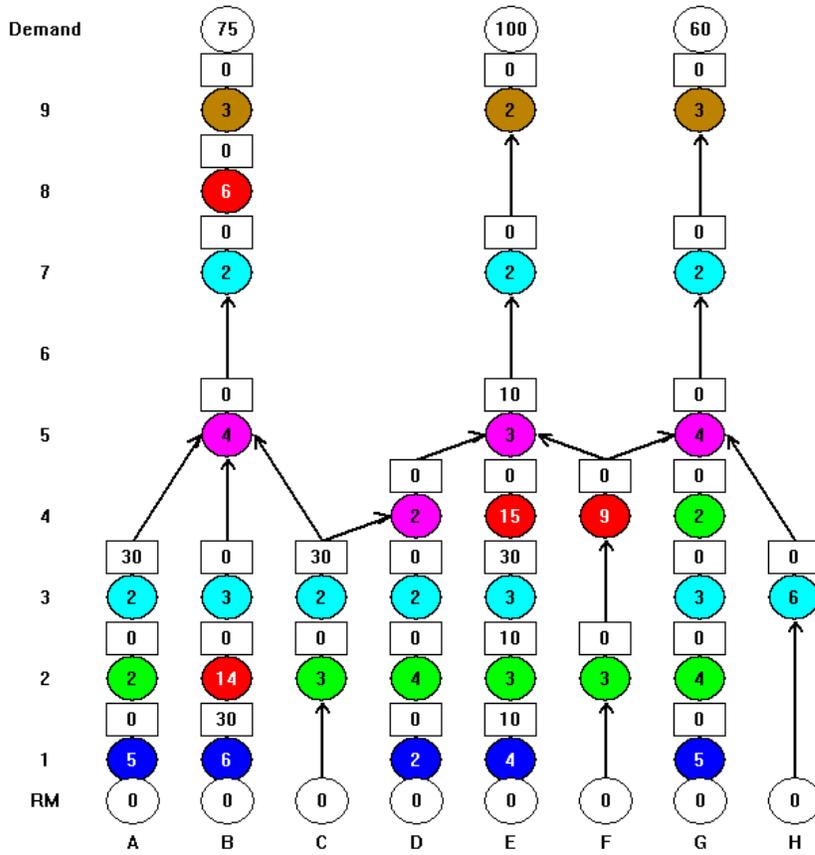
Each machine has to be set up when it switches from one operation to another. The **average** setup time, expressed in minutes, appears to the left of the machine units. Both the Green and the Light Blue machines require about two hours to set up when they switch to another operation.

At the start of the simulation all the machines are in 'idle' mode and are not setup for any operation. That means each machine unit would have first to setup for any operation you might assign it to. The only machine that does not need to setup is the Magenta, for which the setup time is 0. Once the simulation starts four different machine statuses might appear: Setup, Production, Idle, and Break. When a machine is assigned to an operation the operation identifier will appear in the machine box.

Note that the setup time data is an average. A very accurate average, but the actual setup time can vary significantly.

The main part of the screen is dedicated to the **logical flow of the products**. Raw materials flow through the operations until the product is completed. The flow is described by a matrix where the columns are denoted by characters (A-H) and the rows by numbers. At the top row – the completed product – appears the remaining of the weekly market demand. As we are in the beginning of the week, the numbers shown are the full weekly demand. For example, the week's demand for Product B, at the top of column B, is 75 units. What else does the screen show us about Product B?

- It is made out of three raw materials: A, B, and C (at the bottom of the chart).
- Material A is first processed at operation A1 (at column A, row no. 1), by the Blue machine. The time per part (TPP) is on average 5 minutes per unit (after the Blue machine has been setup).
- Material C is first processed by the Green machine at operation C2, with time-per-part of three minutes.
- There is stock of 30 units that have completed operation A3 and are waiting for assembly at operation B5 by the Magenta machine.
- There is also a stock of 30 units completed by operations C3, which is needed for the same assembly. However, these parts can also be used by the subassembly operation D4, which is also done by the Magenta machine. The D4 subassembly is part of product E, while assembly C5 is for product B.
- After the assembly at B5 there are three more operations until completion: a Light Blue operation, a Red operation and then the Brown operation completes the production of the product.

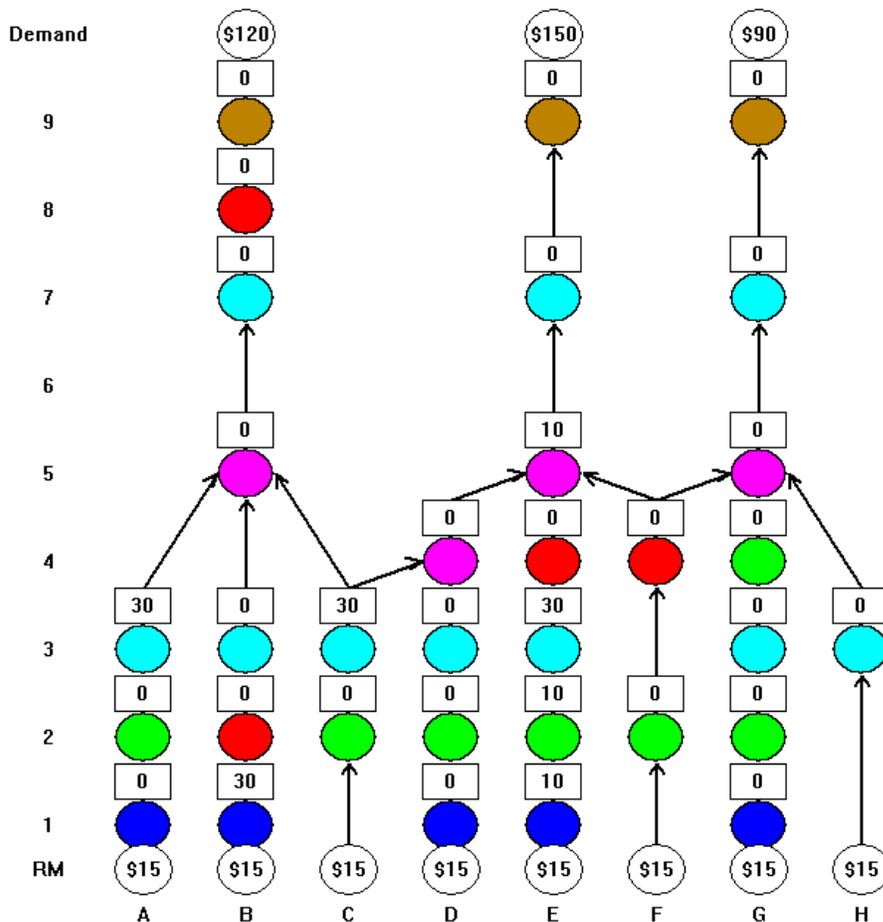


The logical flow layout.

At the start of the simulation the B5 assembly cannot start to work as the parts from operation B3 are missing. When we look at the route from the B material to the assembly, we see that 30 units are stuck between B1 and B2. The Blue machine has finished working on those 30 units and they are waiting for the Red machine to work on them. It is possible to assign one of the two Red machine units to operation B2 and then it will automatically process all 30 units or more, provided additional parts were available.

Additional Info

Just below the main menu at the very top-left there is a row with icons. Not all the icons are active in this special version of the Goldratt Simulator. The icons that are not active appear in gray. The fifth icon from the left,  can display the selling prices of the end items and the purchasing prices of the raw materials



The selling prices and the material prices appear by clicking on the 'Info' icon.

When the simulation is active and some of the machine units are in setup or are in break status (downtime), then the Info icon shows the time, expressed in minutes, left for that operation.

The Icons

The main menu is not truly necessary for running the simulation, but the icons, just below it, are.

Here is the line with the icons:

Open: this allows you to stop the current simulation and restart.

AUTO: Auto-activation: this feature automatically assigns machines to operation-steps.

INFO: Info: additional information on prices etc.

Increase: speeds the pace of the simulator.

Decrease: slows the pace of the simulator.



About GSim. At this time there is no internal Help for the simulator. Technical support is available by sending an e-mail to amir_sr@bezeqint.net

Basic Actions

Until now we just described the data. Now let's see how we run the simulation.

Assigning a machine to an operation: Click on the specific machine unit you wish to assign, and drag it all the way to the operation-step. Then release the button.

Purchasing material: Click on the circle for the raw material. A window opens and lets you enter the quantity (note: a negative sum sells the raw material back to the supplier).

Running – freezing: Clicking on the Freeze area starts the run. Clicking on it while running freezes the run.

Changing the pace: Click on the  icons to increase or decrease the pace.

Running the simulation

We suggest you first view the situation and decide what instruction you wish to give including the operations you like the machine units to work on and the raw materials you like to purchase. First assign the machines to the operations and purchase the materials. **Do this while the simulation is on Freeze mode.**

Once you give all your initial instructions – click on the Freeze area and then the simulation will start running.

While running, you can freeze the simulation at any point in time. Simply click on the green ellipse and it'll turn red and go into the Freeze mode. Remember, it is safer to assign the machines and/or purchase materials while the simulation is in Freeze.

In purchasing materials, remember to determine that you have enough cash. The program will refuse to buy if you have insufficient money. Also, remember that at the end of the week you must have at least \$8,000 to pay for the fixed weekly expenses.

At the end of each day the simulation stops, shows the total throughput (the sales minus cost of the raw materials), and enters into 'Freeze' mode.

At the end of the first week, you'll see a detailed report of what you've achieved in the first week. If your results look good enough, continue to the second week.

Note that the demand you've failed to complete in the first week is lost! The second week will have exactly the same demand as the first week.

At the end of the second week, you'll first get the weekly report and then the total/global report of the two weeks.

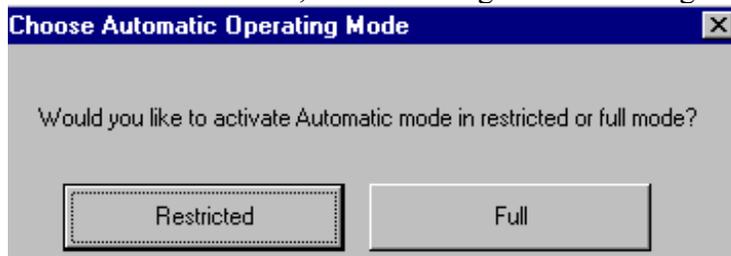
If your result is better than the previous best run the program will save it into the file with your email address name. This is the file you should send to prove your results.

Remember that the contestant with the best results wins a brand new Toyota!*

*If there is more than one contestant with the best results, a drawing will determine the winner of the Toyota vehicle.

Two advanced features

Auto Mode: It is possible to let the simulation automatically activate the machines that have materials at one or more of their operations. The auto-activation is invoked by the third icon from the left, . You'll get the following window:



The restricted mode means not to automatically assign to any machine input that can go to another operation. For instance, the parts that were available at operation C3 at the start of the simulation can go either to the assembly operation B5 or to the assembly operation at D4. The problem is that if the Magenta is automatically assigned to B5 while you've planned those parts to go to product E, then that automatic assignment damaged your plan. By clicking on the 'Restricted' button the Magenta machine will not be automatically assigned to B5, D4, E5, and G5. In other words, the 'Restricted' mode will not assign the Magenta! You'll have to assign the Magenta manually.

Limit: It is possible to limit an operation-step from processing more than a fixed number of parts. This is especially critical for operations that take their input from a common part, like the Magenta operations.

A click on the operation box would open a window where you can set the limit. The default limit is 9999. Once you have entered a smaller number, the limit counter would go down. At zero the machine unit will stop processing and enter a new mode of: Hold.

Ignore the 'Transfer Batch' field that appears also in the window when you click on an operation.

Technical Assistance

If you have a technical problem in activating the simulator and controlling it, feel free to write an email to Amir Schragenheim at amir_sr@bezeqint.net.

Good luck!