Decision Makers

Business Game and Economics Simulation Tool

Teacher's Manual

Version 3.1

(Build 1)

April 2011

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1. What is Decision Makers?

Welcome to ***Decision Makers***, an internet-based simulator in Business Management, Economics and Environmental Economics. ***Decision Makers*** is a new type of experience for both students and teachers. The simulator enables students to experience the process of business and economics related decision making in a computerized environment which simulates reality. ***Decision Makers*** enables the teacher to monitor the progress of each student both individually to determine the content and complexity of the learning material as well as the behavior of each model.

As an internet-based tool, no installation of proprietary software is needed. A standard browser (supporting a Java runtime environment) is sufficient both for the student and the teacher. A username and password is issued to each player (after registration) to ensure privacy of data. The teacher, using a special administrator username and password, may intervene in the simulation process when it is needed (e.g. at the end of the quarter).

Decision Makers simulates real life market behavior. Thus, any decision made by any participant immediately affects her/his opponents. However, the teacher may change and control the simulation's features in order to adjust it to class requirements and level.

Who should use the simulator?

Decision Makers should be used by several types of users for many purposes. Business management and Economics faculties may use ***Decision Makers*** as a teaching tool in integrative courses (mainly in the final stage of the learning program). As such, the tool may help simulate a complete business game and/or many well known models such as production and marketing, inventory management, production chain, human resources development, knowledge development, finance and cash flow.

Advanced modules of Decision Makers enable the teacher to include in the simulation subjects such export, trading between firms, services and Intellectual property development and trading.

Advanced versions of the simulator also include subjects as income distribution, externalities, environmental pollution and control, utilization of natural resources (renewable and non-renewable), capital markets and tax issues.

Organizations may use ***Decision Makers*** to train new managers and/or to evaluate existing managers in their decision making process while under pressure and in a controlled environment.

A more simplified version of Decision Makers may be used by high schools as part of an economics program.

Decision Makers enables one to test case studies tailored for specific educational purposes. It also enables the teacher to monitor, online or off-line, how students obtain their solutions and to evaluate their learning curve and skills.

Any comments and remarks as well as reporting of bugs are appreciated. Please submit them to:
http://www.decisionmakers.biz

Welcome Aboard to Decision Makers.

2. Simulation - Manager's Screens

2.1 The Role of the Simulation Manager

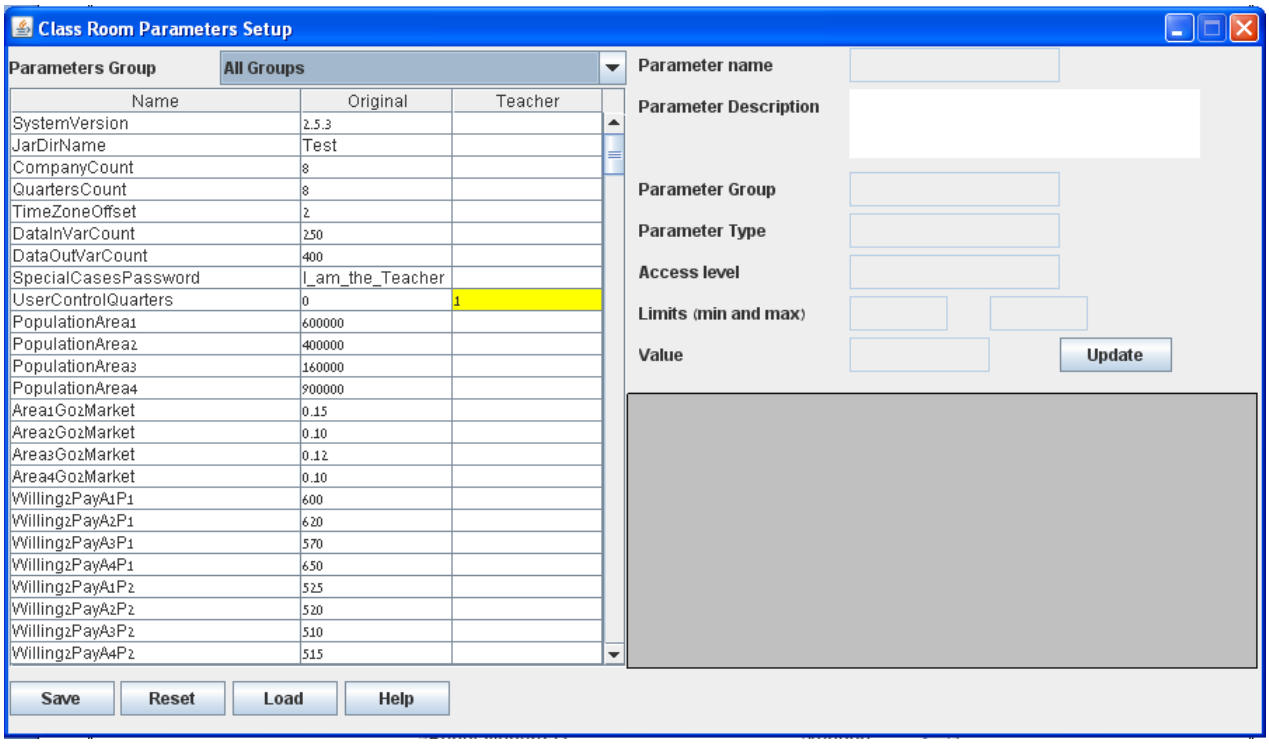
The Simulation Manager is a user of the Decision Makers Simulator with extra privileges that are not available to other users.

Their abilities include:

- Control of the different variables of the simulation
- Setting the starting and finishing time of every quarter
- Changes the status of different quarters
- Performing a 'Teacher's run' of the simulator, finishing the current quarter and advancing the game to the next quarter
- A moderator for disputes
- Generating reports which analyze the performance of players

2.2 System Variables

On every Decision Makers site (domain) there is a window which defines the system's variables. These variables define how the simulation will 'behave'. In order to display this window; from the main menu select Teacher->System Parameters Setup. The following window will appear.



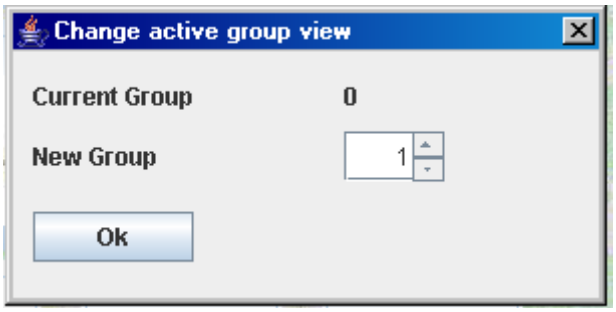
(Figure 2.2: System Variables window)

The list of variables appears on the left side of the window. On the right side of each variable appears their current value. The first segment of the list cannot be changed by the teacher.
In order to change the value of a parameter one must select the parameter by clicking on its row. Once a parameter has been selected, its description and value appears in the right window. In order to change the parameter value, set the new value in the field labeled 'Value' and click on the update button. The new value will be displayed in the column labeled teacher which is marked in yellow.

After changing parameter values, select the 'Save' button in order to save its value to the server. Click the 'Load' button in order to load the current variable configuration stored in the server. Clicking the load button will erase any changes that have not been saved.
Pressing the 'Help' button (when one of the variables is selected) displays information contained in the chosen variable.
Note that parameters are grouped into several groups. By default, all parameters are displayed. However, the list can be filtered by selecting a specific group from the drop down list located at the top of the page.

2.3 Viewing Different Groups

When a simulator manager logs in, the current firm viewed (group) is marked as 0 (when no specific group is viewed). In order to view different groups, click the 'Change Active Group View' from the 'Teacher' menu.



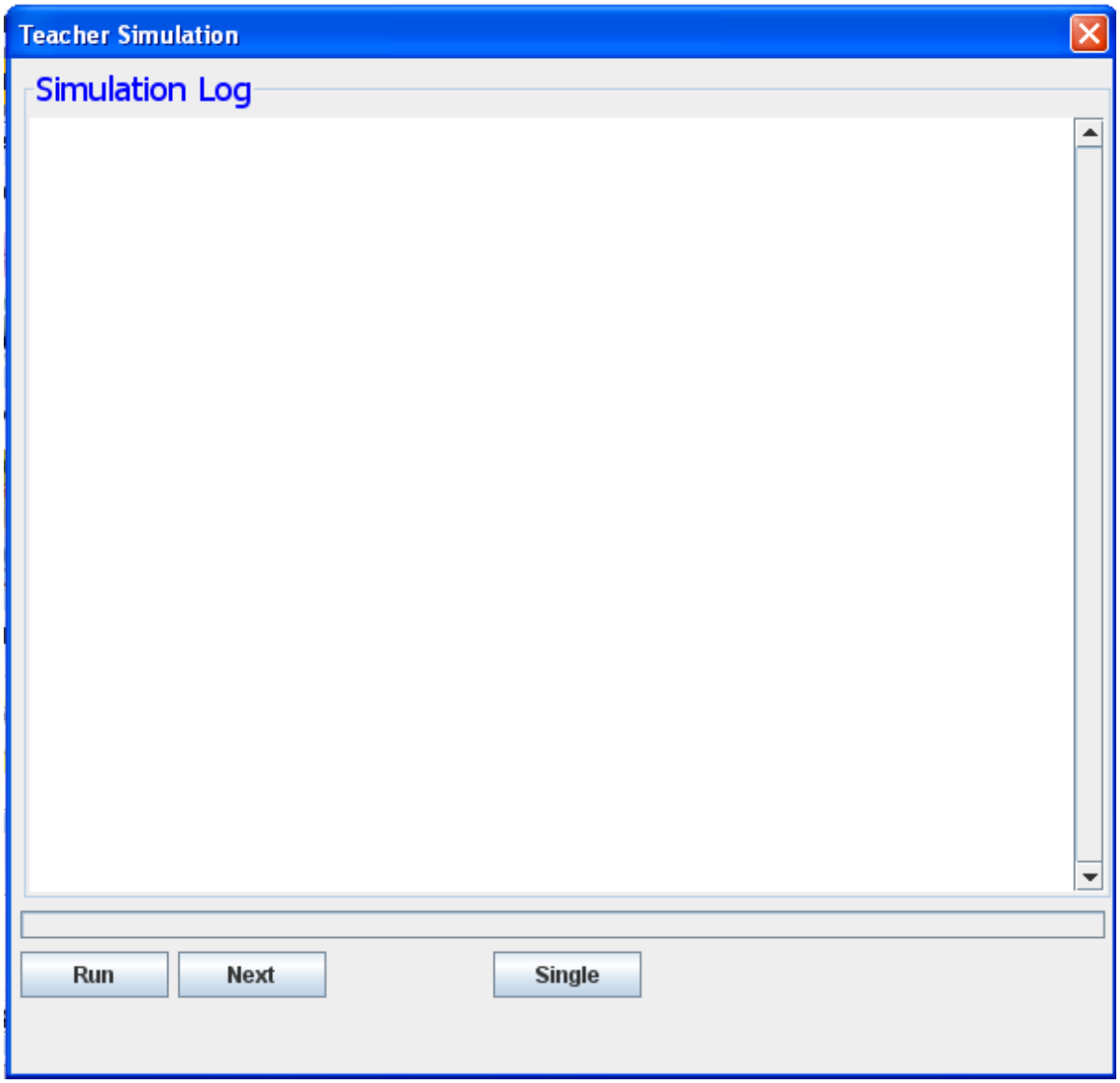
(Figure 2.3: 'Change Active Group' Window)

This window displays the current group selected and provides the option to switch to different groups. After choosing and clicking on 'Ok' a different group its data will be displayed.

Bear in mind that the simulation manager may change the decision variables of a group in the same way that the group's members would. However, the teacher ca not run group simulation.

2.4 Running the Teacher's Simulation

One of the simulation manager's (teacher's) duties is performing the final simulation at the end of each quarter. The simulation is performed from the 'Teacher's Simulation' Window, accessible under the 'Teacher' menu.



(Figure 2.4: Running the Teacher Simulation)

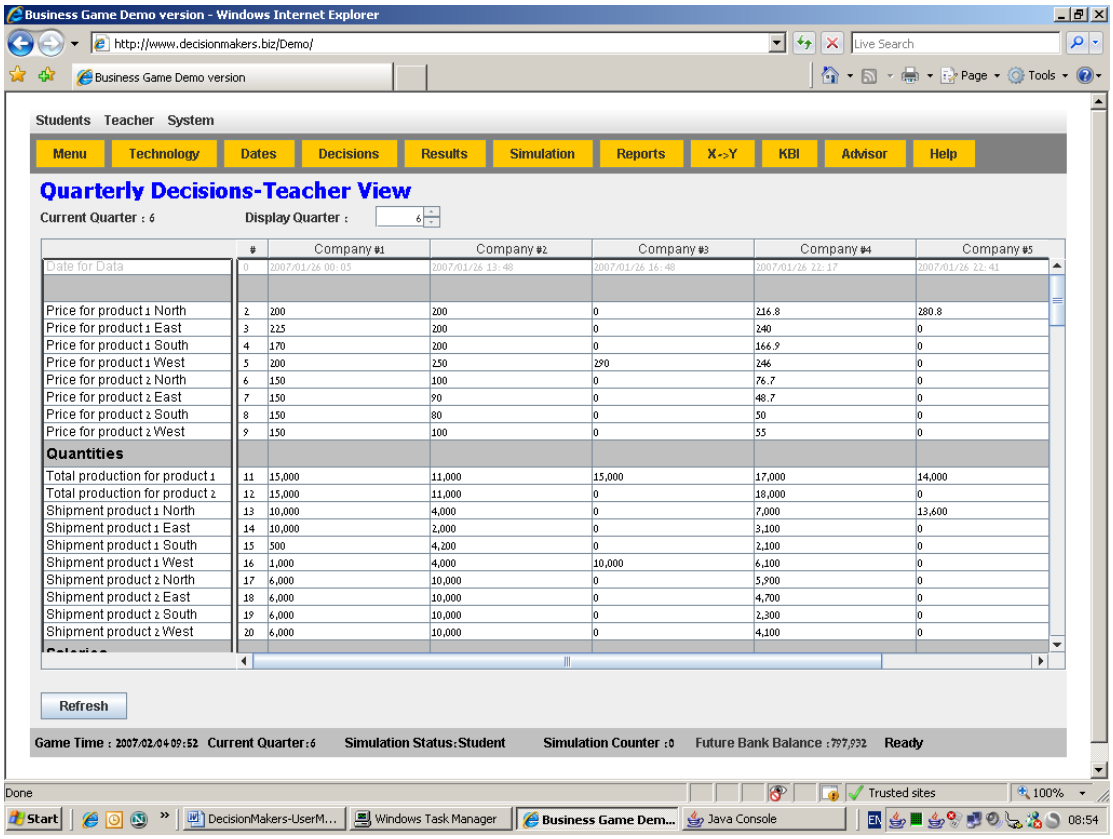
The simulation is performed by clicking the 'Run' button. While running the simulation, the simulator will perform the simulation for each group, one at a time. In case of error or problem, a message addressing the issue will be displayed on the center 'Simulation Log' Window.

Upon completion of the simulation, an appropriate message will follow.

Performing a 'Teacher's Run' of the simulator does not automatically change the status of the current quarter. To chang the status of the current quarter to the next quarter click the 'Next' button, or use the 'Quarters' table in the Dates screen. A detailed explanation regarding this option appears under the 'Managing Quarters' Section.

2.5 Decisions Screen - Teacher's View

The simulation manager can view a single table containing all of the users' decisions. The screen is available in the 'Teacher' menu.



#	Company #1	Company #2	Company #3	Company #4	Company #5
Date for Data	0	2007/01/26 00:05	2007/01/26 13:48	2007/01/26 16:48	2007/01/26 22:17	2007/01/26 22:41
Price for product 1 North	2	200	200	0	216.8	280.8
Price for product 1 East	3	225	200	0	240	0
Price for product 1 South	4	170	200	0	166.9	0
Price for product 1 West	5	200	250	290	246	0
Price for product 2 North	6	150	100	0	76.7	0
Price for product 2 East	7	150	90	0	48.7	0
Price for product 2 South	8	150	80	0	50	0
Price for product 2 West	9	150	100	0	55	0
Quantities						
Total production for product 1	11	15,000	11,000	15,000	17,000	14,000
Total production for product 2	12	15,000	11,000	0	18,000	0
Shipment product 1 North	13	10,000	4,000	0	7,000	13,600
Shipment product 1 East	14	10,000	2,000	0	3,100	0
Shipment product 1 South	15	500	4,200	0	2,100	0
Shipment product 1 West	16	1,000	4,000	10,000	6,100	0
Shipment product 2 North	17	6,000	10,000	0	5,900	0
Shipment product 2 East	18	6,000	10,000	0	4,700	0
Shipment product 2 South	19	6,000	10,000	0	2,300	0
Shipment product 2 West	20	6,000	10,000	0	4,100	0

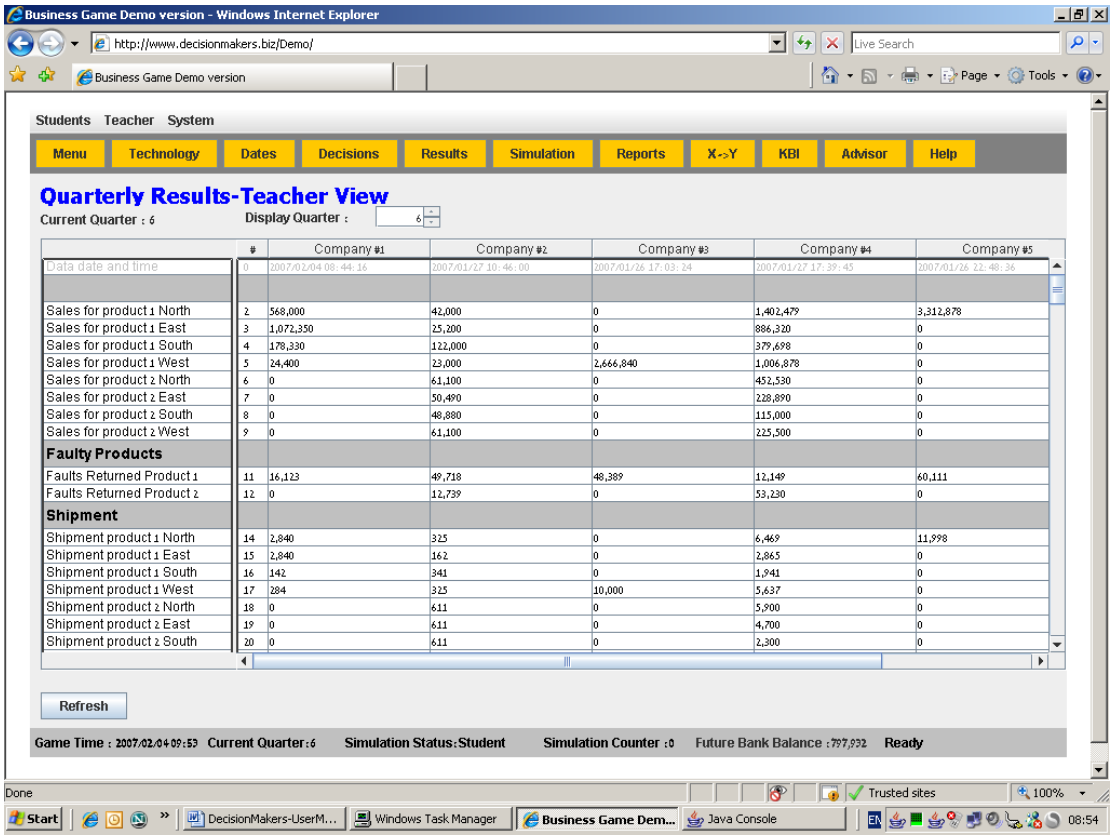
(Figure 2.5: Teacher's Decisions Screen)

This screen is similar in essence to the decisions screen available to a regular user with one main difference; columns in this table represent different firms in a single quarter, unlike the columns in a regular user's screen which represent the same firm's data in different quarters.

The displayed quarter can be changed using the top option box entitled 'Display Quarter'.
Data cannot be changed from this window.

2.6 Results Screen – Teacher's View

The simulation manager can view a single table containing all of the firms' results. The screen is available from the 'Teacher' menu.



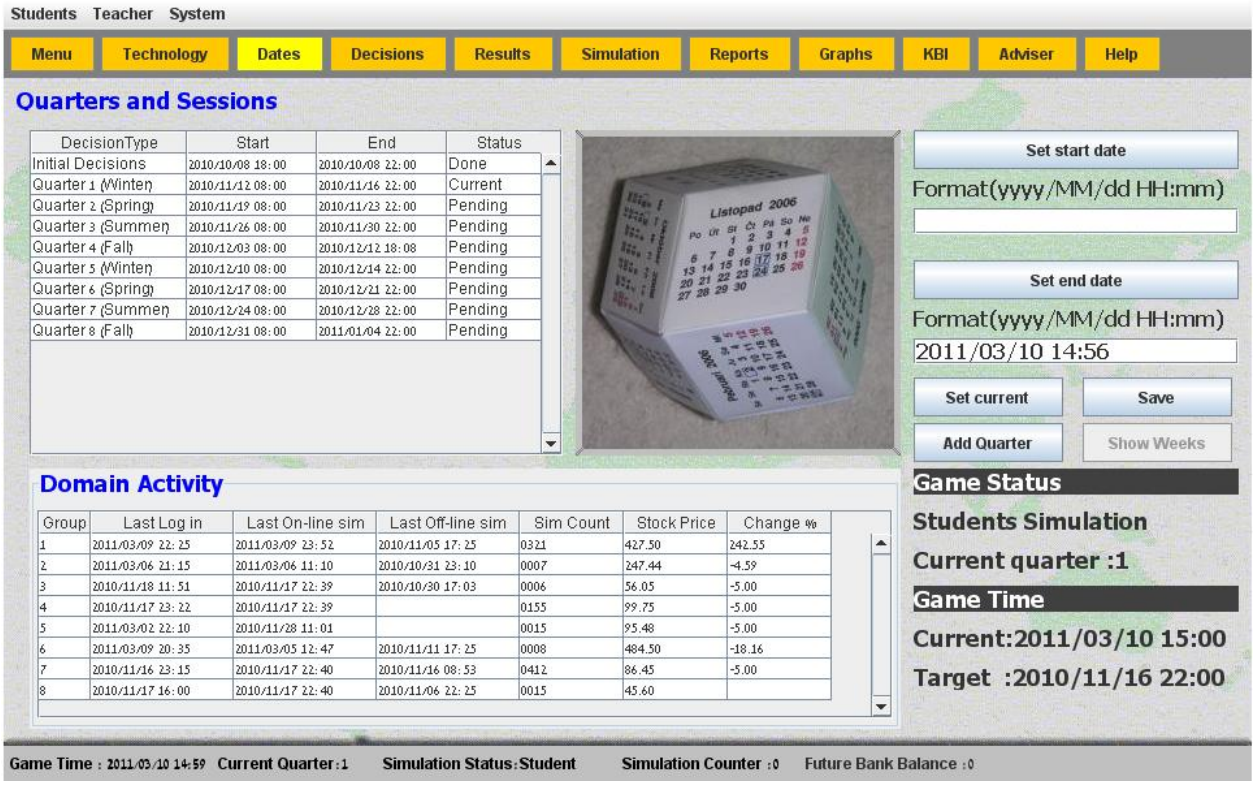
	#	Company #1	Company #2	Company #3	Company #4	Company #5
Data date and time	0	2007/02/04 08:44:16	2007/01/27 10:46:00	2007/01/26 17:03:24	2007/01/27 17:39:45	2007/01/26 22:48:36
Sales for product 1 North	2	568,000	42,000	0	1,402,479	3,312,878
Sales for product 1 East	3	1,072,350	25,200	0	886,320	0
Sales for product 1 South	4	178,330	122,000	0	379,698	0
Sales for product 1 West	5	24,400	23,000	2,666,840	1,006,878	0
Sales for product 2 North	6	0	61,100	0	452,530	0
Sales for product 2 East	7	0	50,490	0	228,890	0
Sales for product 2 South	8	0	48,880	0	115,000	0
Sales for product 2 West	9	0	61,100	0	225,500	0
Faulty Products						
Faults Returned Product 1	11	16,123	49,718	48,389	12,149	60,111
Faults Returned Product 2	12	0	12,739	0	53,230	0
Shipment						
Shipment product 1 North	14	2,840	325	0	6,469	11,998
Shipment product 1 East	15	2,840	162	0	2,865	0
Shipment product 1 South	16	142	341	0	1,941	0
Shipment product 1 West	17	284	325	10,000	5,637	0
Shipment product 2 North	18	0	611	0	5,900	0
Shipment product 2 East	19	0	611	0	4,700	0
Shipment product 2 South	20	0	611	0	2,300	0

(Figure 2.6: Teacher's Results Screen)

This screen is similar in essence to the results screen available to a regular user with one main difference; columns in this table represent different firms in a single quarter, unlike the columns in a regular user's screen which represent the same firm's data in different quarters.
The displayed quarter can be changed using the top option box entitled 'Display Quarter'.
Data cannot be changed from this window.

2.7 Quarters and Sessions Management

The Teacher can manage the quarters table from the 'Quarters and Sessions' Screen. This screen is accessible by clicking the orange 'Dates' button conainted in the navigation bar at the top of the screen.



(Figure 2.7: Quarters and Sessions Management Screen)

In order to change the date and time of a single quarter perform the following steps:

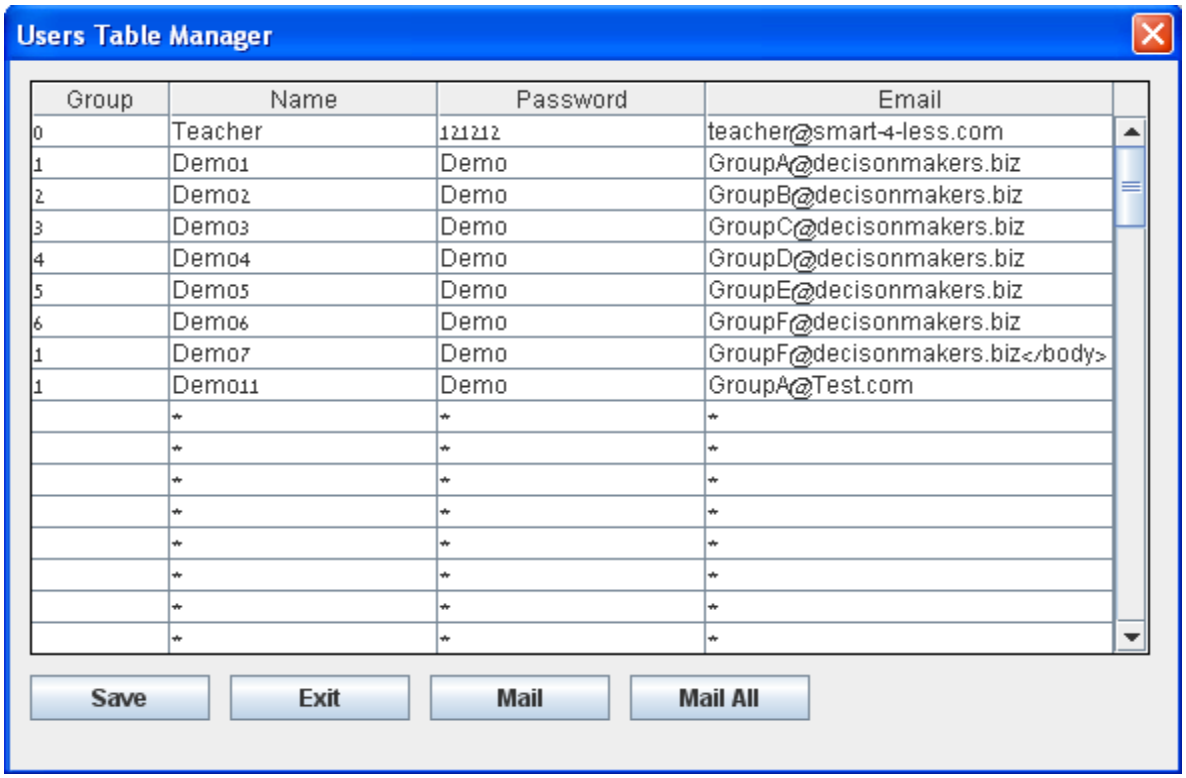
- Choose the appropriate line in the quarters' table
- Enter an appropriate date and time in the date and time field on the right side of the picture
- Click the set start date or set end date as needed

One can set the current quarter by clicking the 'Set current' (quarter) button. The status of the current quarter is automatically set by the game time.

Upon completion of any changes, press the 'Save' button.
Note: By saving the quarters table the firm's locations table is also updated. This action is automatically performed at the end of Quarter 1. A proper message is displayed where this action is performed.

2.8 User Management

Another table under the teacher's control is the users table. A window allowing management of users is accessible from the teachers menu. This option is active only when one is logged in as a teacher.



(Figure 2.8: Users Management Window)

The number of lines in this table is defined by the system variable as set by the teacher. The first line describes the teacher. This line allows the teacher to change his password and e-mail address. Other lines allow changing of the username, password and e-mail address of different groups. This e-mail address is the one which will be used in order to send to user e-mail messages.

After updating the table, press the 'Save' button. Upon completion, an appropriate message will appear, stating that the data has been successfully saved.

Note: Multiple passwords are not supported and validity of e-mail addresses is not checked.

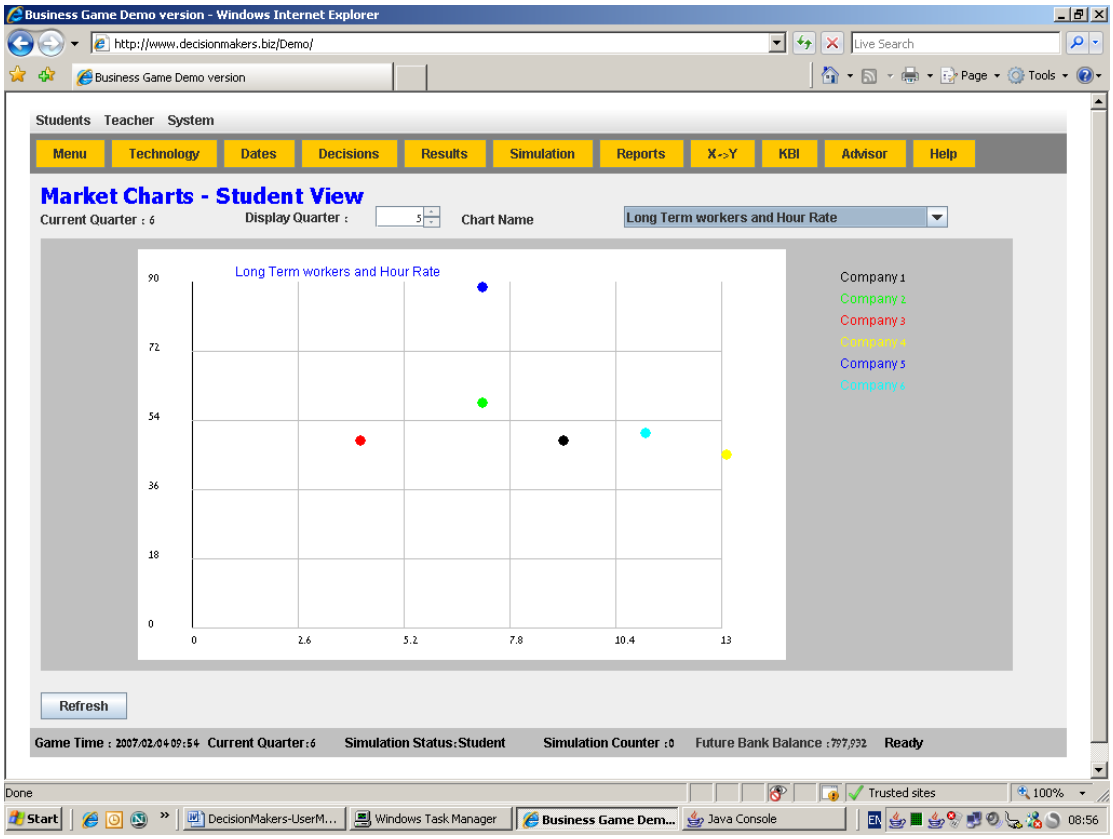
2.9 Market Charts

The teacher can produce different graphs that provide information regarding the market in general and that allow the teacher to compare the achievements of different groups. Market charts are available by clicking the 'Market Charts' option in the Teacher's Menu.

(Figure 2.9A: Selecting Market Charts from the Teacher's Menu)

After selecting the 'Market Charts' option, a screen as in figure 2.9B, below, will appear.
By choosing the type of report to be produced and the appropriate quarter, one can request different graphs.
Available graphs include the following information:

- The market shares of different firms, in a single region and all over The Green State
- Price levels
- Worker hourly rates
- The number of workers employed in each profession by each firm
- Product inventory
- Raw materials inventory
- Firm's capital value
- Bank balance
- Product quality
- Average manufacturing cost for a single unit of product

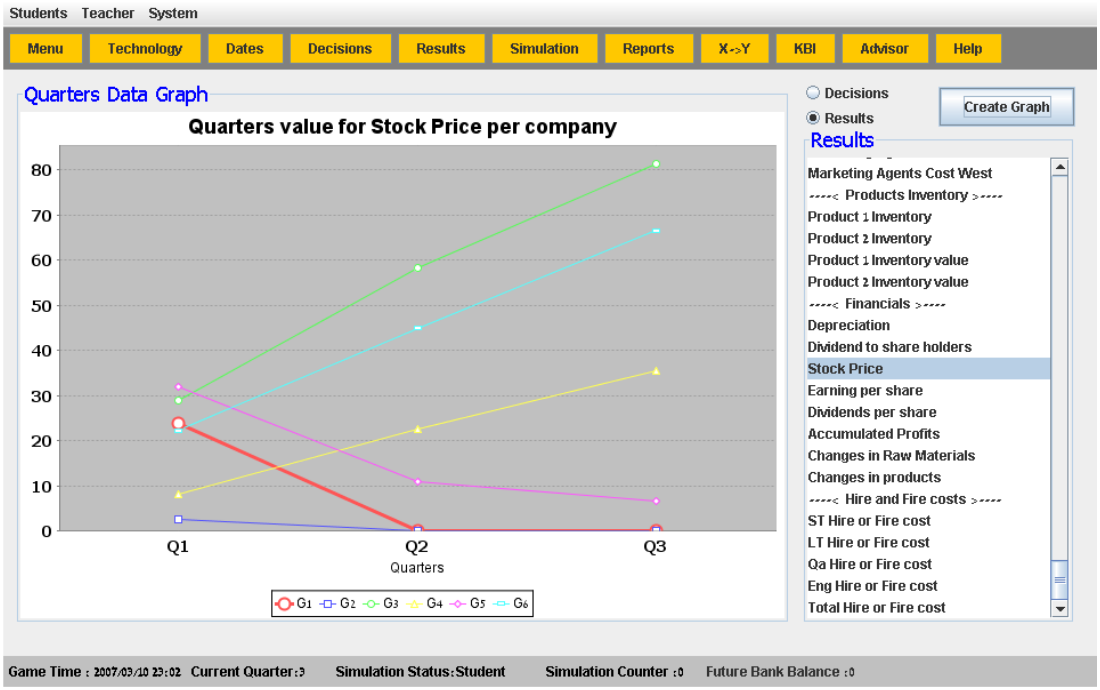


(Figure 2.9B: Market Charts Screen)

The teacher may set the cost of producing reports in the 'System Variables' Window.

2.10 Graphs By Quarter

Another type of graph the teacher can produce is charts representing data by quarter. These graphs are accessible by clicking the 'Quarters Charts' option from the Teacher's Menu. The first time this screen is accessed, loading may take 20-30 seconds. The following screen should then appear:



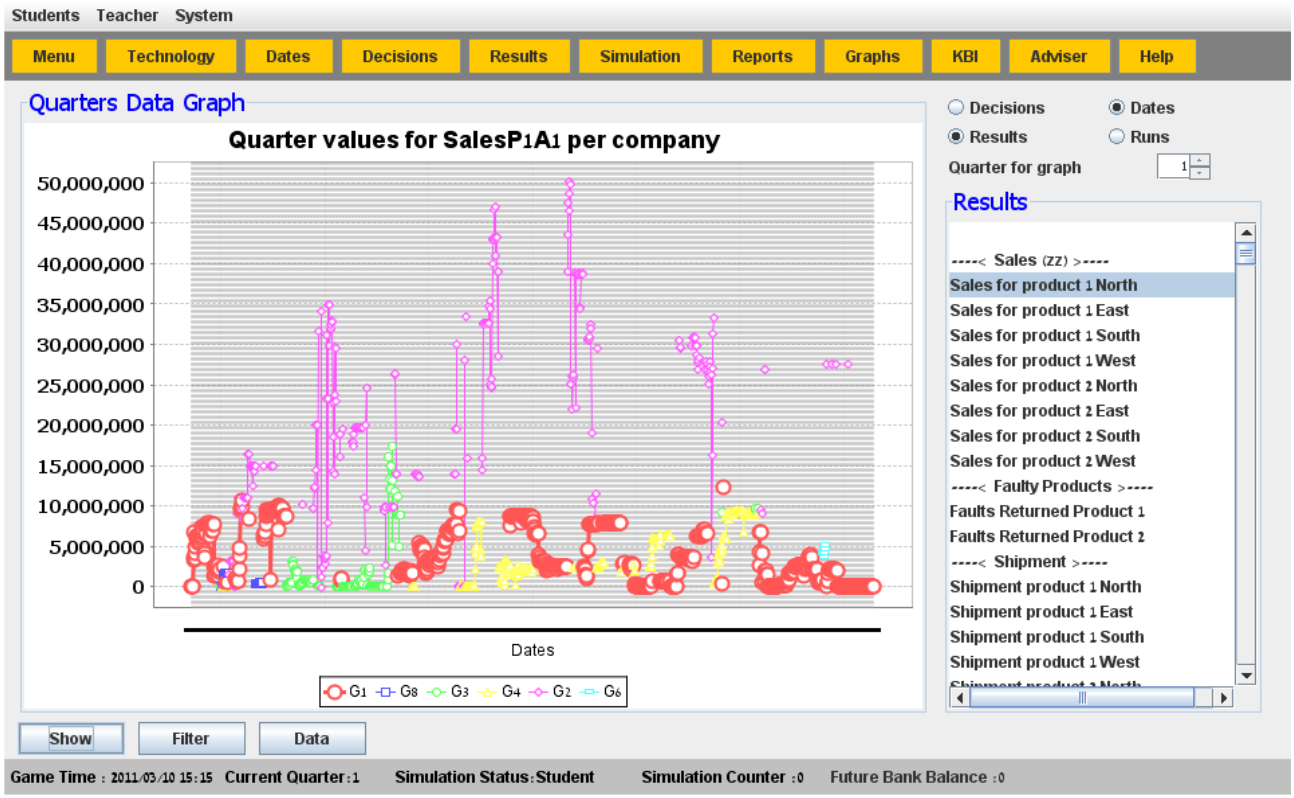
(Figure 2.10: Quarter's Graphs Screen)

This screen allows a Teacher to choose between decision variables and results variables. After choosing the type and variable from the list, press the 'Create Graph' option.

Data will be presented as a line chart. The horizontal axis displays the different quarters and the vertical axis displays the chosen variable's values. Each group will be presented in a different color. The first group is represented as G1, the second as G2 and so on.

2.11 Intra–Quarter Graphs

The Intra-Quarters Graph enables the teacher to view the progress of each group with in a quarter.



(Figure 2.11: Intra-Quarters Graph Screen)

The panel on the upper right-side enables one to choose between decisions and results and on which axis to run the count or dates. It is also possible to select which quarter to be displayed.
After selecting a variable click the 'Show' button.
The 'Filter' button enables the filtering of dates and firms for display. The 'Data' button enables the exporting of the data upon which the graph is based to a file.

2.12 Students' Performance Analysis

The student performance analysis report is a report that can be generated by the teacher in order to evaluate the performance of each student / group. The evaluation can be done relative to other groups or based on a reference table set by the teacher. The report may be generated for a single quarter or several quarters. The teacher may chose to include in the report any combination of variables from the list of output variables. Each variable may receive equal weight or a specific weight set by the teacher.

Based on the relative performance of each variable and based on the weight each variable receives the report ranks each one of the groups and calculates the weighted score. The score in the report is set according to the following algorithm. For each variable, the groups are ranked from the highest result to the lowest result. The highest results receive a score on K where K is the number of groups. The second result gets a score of K-1 and so on until the lowest results receive a score of 1. The total number of scores are summed up for a weighted score. An example of the output of such a report is provided in figure 2.12.

	Q4						
	G1	G2	G3	G4	G5	G6	G7
Total sales	23,083,067	98,387,573	86,094,910	74,989,902	65,591,925	57,799,382	10,425,928
Profits	-20,009,850	6,076,093	13,517,238	143,330	860,729	-18,476,101	-23,742,924
Share quarterly change %	-18.55	127.92	207.34	121.37	66.4	39.63	-18.55
ROA	-1.02	0.51	1.73	0.02	0.04	-1.32	-2.26
ROE	-2.7	0.7	3.65	0.01	0.09	-3.27	-1.72
Rank	2	7	6	5	4	3	1
	2	6	7	4	5	3	1
	2	6	7	5	4	3	2
	3	6	7	4	5	2	1
	2	6	7	4	5	1	3
sum	11	31	34	22	23	12	8

Figure 2.12: Students Performance Analysis.

As can be seen in the above example, the teacher chose five criteria in order to evaluate the performance of the students; Total sales, Profit, Share quarterly change %, ROA and ROE. The groups are ranked relative to one another the scores totals are summed up.

2.13 Advisor Summary Report

For each simulation the advisor generates a set of remarks. Some of them indicate possible mistakes, some are points for improvements and some are just information for the players. The advisor summary report displays the cumulative remarks submitted to the students by the advisor for each quarter. The structure of the report is as follows. Each line contains the data of a single remark. Each column is a single running simulation session. If the remark was on the square it gets a grey color. The bottom line holds the summation of all remarks per session.

Explanations of the remarks are given in the advisory remarks pages in the Decision Makers web site.

Advisor summary report
Group 1, Quarter 3

	1	2	3	4	5	6	7	8
15,Please check raw material balance	■	■	■		■		■	
18,Total production is greater than total shipment request for product 1	■		■	■	■	■		
25,Check quality monitor by QA team	■	■				■		
	3	2	2	1	2	2	1	0

Figure 2.13: Example of Advisor Summary Report.

3. Assignments

Decision Makers also enables the running of assignments using the simulator. An assignment is a situation in which the student is requested to perform a special (small) research-based assignment on the simulator. This chapter describes the assignment list. Assignments are performed in a special domain which enables students to save their work.

A case study domain is available only for institutions/schools that purchase a commercial license.

In order to perform an assignment, the student receives a personal password for an assignment domain. After loging to the assignment domain the student is requested to collect data from simulation runs and to write a report/analysis based on his/her investigation.

Below is a partial list of the case studies

No.	Assignment
1	**Demand Curve Estimation** Demand for each product is affected by several factors. The main factors are the seasonality, the product quality and the target region. The assignment's purpose is to estimate the demand curve for a single product with a given quality in a given region. The main assumption is that seasonality shifts the whole demand curve up or down. It is also assumed that each region has a different elasticity for the demand curve. The student is asked to estimate the demand curve for a single product for a selected region. As a first step, data for this estimation should ignore seasonality (thus, run data from first quarter only). Price range should cover the entire price range for products in The Green State. At the second stage, seasonality should be added through using plug variables.
2	**Short Term Cost Curve Estimation** A short term cost curve refers to the mathematical relationship between the amount of product produced and the cost of production given that some of the production inputs are fixed. In our case, it is assumed that technology, automation and the number of skilled workers are fixed. The only variable input is the number of unskilled workers. The assignment's purpose is the estimation of the short-term demand curve for a single product in a single technology's and automation levels. Once the demand curve is estimated, the student is requested to estimate the break-even point for several levels of market pricing for the product.
3	**Labor Supply Curve Estimation** Labor supply in The Green State is region specific. That is, in each region the number of workers from each type that can be recruited depends on the level of salary offered to these employees and to the number of open positions. The higher the hourly rate offered and the more open

	positions the larger the number of employees that can be recruited. This is valid with two exceptions. First, the population of each region is limited. The number of workers that can be recruited is related to population size. Second, according to economic theory, if salary is too high, workers prefer to work less in order to enjoy their free time. The purpose of this assignment is to estimate the supply curve for a given worker type in a given region (Reminder; in The Green State there are four regions with five workers types).
4	**NPV Estimation of R&D Project** One of the major activities the firm may have is R&D in an effort to reduced the production costs. Six different projects (labeled project 1 to 6) enable a firm to reduce different aspects of the production costs. Each project has different amounts of investment needed in order to generate a patent that can be implemented in the production line. It is important to note that the optimal amount of investment needed is not always the maximum allowed. Also note that the timing of investment affects their value. The efficiency of the R&D process depends (among other things) the number of engineers the firm recruits. The purpose of the assignment is to calculate the NPV (net present value) of an R&D project. The students needs to select one project, run a simulation over several quarters in which she/he needs to apply decisions related to the R&D process and based upon these results to build a project case that calculates the NPV of the project.
5	**Optimal Transportation Plan** As part of its sales activity the firm needs to transport its products from the production facility to the various regions. Transportation is performed by trucks that are hired based upon an annual contract. Any change in this contract generates a penalty. That is, the optimal policy is to set the number of truck for each line in quarter 1 (or 5) based upon the predicted demand for the whole year. However, demand is not constant and changes over the course of the quarters. The purpose of this assignment is to design a transportation plan. The plan should take into consideration the quantities the firm intends to ship to each region in each quarter. The target of the plan is to minimize the cost of transportation for a given marketing plan.
6	**Raw Material Management** Raw materials are one of the major costs in the production process. Raw materials can be purchased from one out of three suppliers. Each supplier maintains different commercial terms. The main challenge with raw materials is that while the raw materials are in the firm's inventory and waiting for their use in the production process some of the raw materials evaporate. The quantity of evaporation is relative to the amount of the raw material stock.

	The purpose of the assignment is to build an optimal plan for raw material orders. The plan should take into consideration the following aspects: - How much raw materials are needed during the eight quarters - Fixed and variable cost of the raw materials ordered from the selected supplier - Evaporation of raw material It should also be noted that raw materials should be ordered one quarter ahead of their use. Thus raw materials for the 2nd quarter should be ordered in the first quarter and so on and so forth.
7	**Two Goals Optimization- Optimal number of Engineers** Engineers are the most important human resource needed for the R&D process. The greater the number of the engineers the faster the development process. However, engineers are also relatively expensive. The purpose of this assignment is to determine the optimal number of engineers needed for the R&D process using the framework of the two goals optimization function.
8	**Build a CAPM Model** A CAPM model is a framework than enables one to select the optimal investment portfolio in the stock market. The CAPM model allows one to weigh risk against return on investment given the risk aversion level of the investor. The purpose of the current assignment is to build an investment portfolio based upon the firm's share history found in the decision makers simulator database.
9	**Build an optimal contract for sales agents.** Under construction
10	**Build an optimal allocation between marketing channels.** Under construction
11	**Optimal export policy** Under construction
12	**Estimate trade-off between price and quality for Product 1 or 2.** Under construction
13	**Build an optimal dividend policy**

	Under construction
14	**Optimal investment in machines maintenance** Under construction