SUPPLY CHAIN SETUP PROCEDURE

This software helps the instructor or administrator to set a four-stage serial supply chain under different settings/parameters and evaluates the same by using various performance measures.

Home Page and Admin Login

The screenshot of home page of Supply Chain Role Play Game is given in Figure 1.

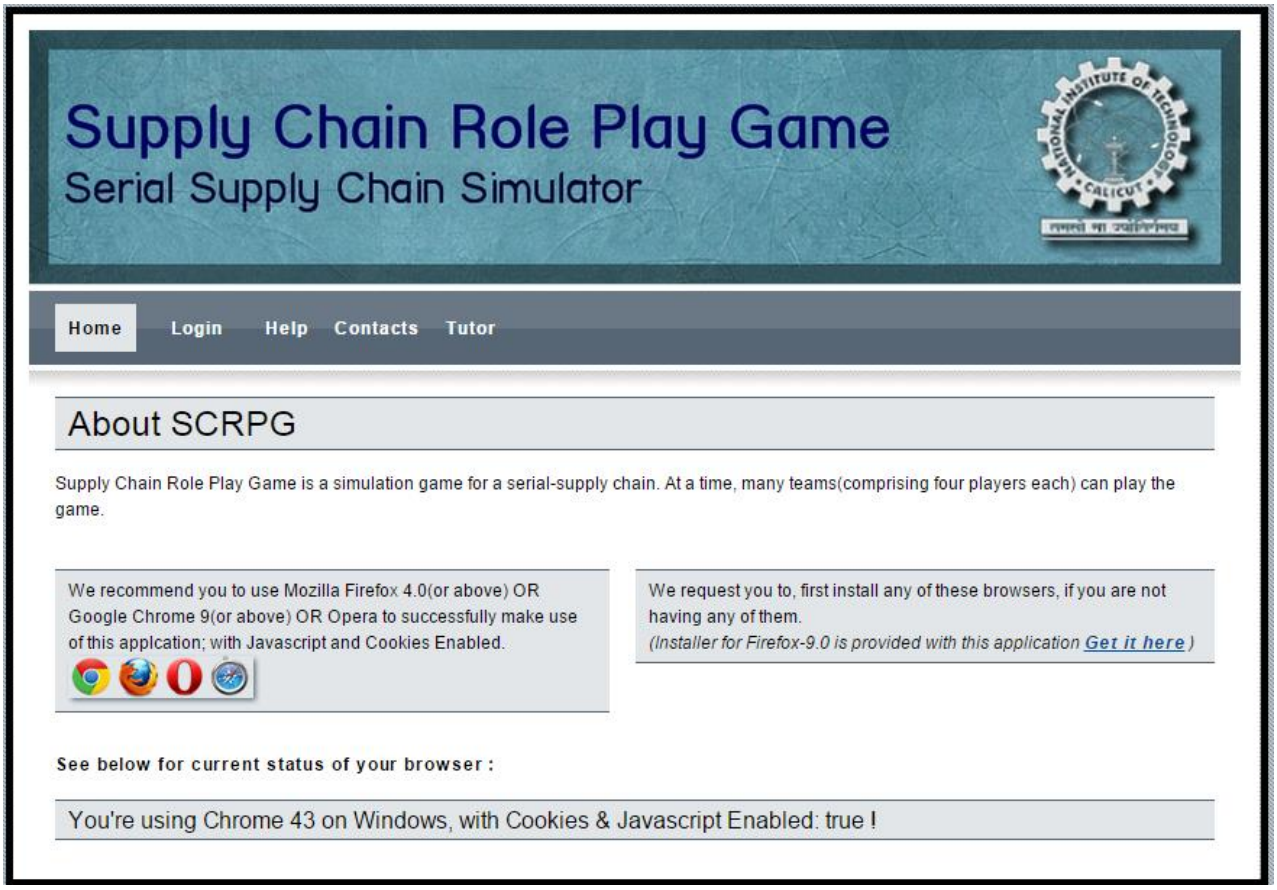

Fig.1. Screenshot of home page Supply Chain Role Play Game

Click on admin login given at the bottom of the page for the administrator to login. After login administrator can take action to enable player registration and setup the game. The admin login window is given below.

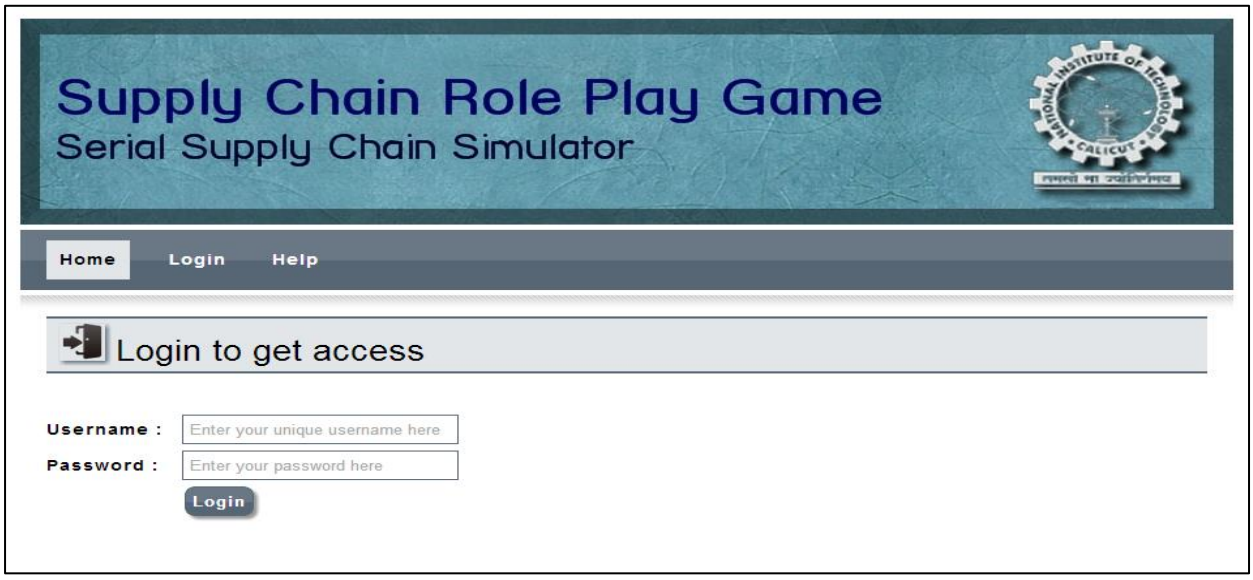

Fig.2. Screen shot of administrator login page

Enter the user name, password and then click on login button. It will open the instructor page as shown below.

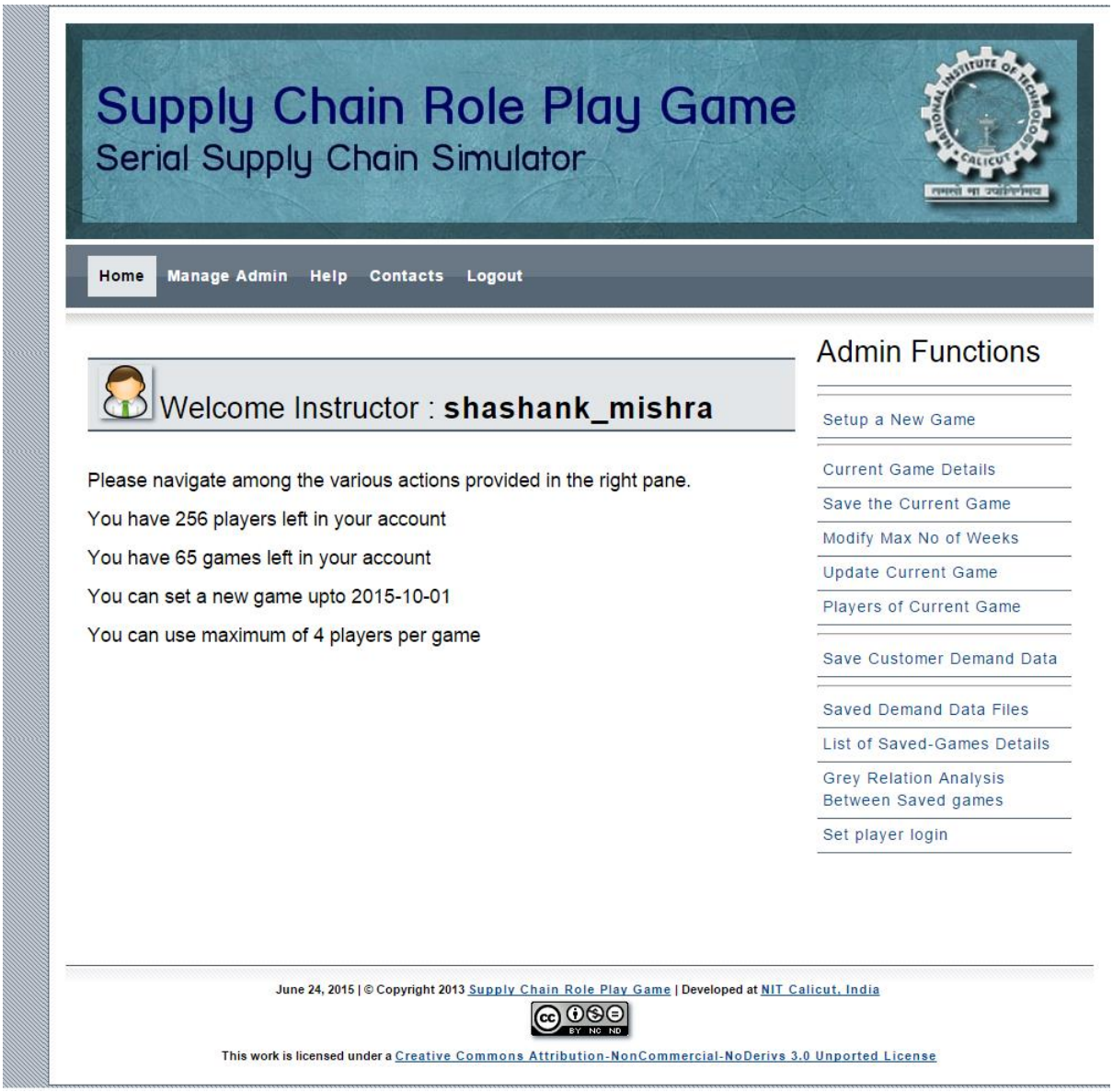

Fig.3. Screen shot of admin functions

New Game Setup Procedure

Click on the 'Setup a New Game' given under 'Admin Functions' in Figure 3 and follow the steps to set the game. A six step sequential procedure (See Figure 4) is involved in setting up a new game. First step is enabling player registration and it involves setting of passphrase (See Figure 5). It is a four digits number. After this step the players can register and passphrase is one of the information required for registration.

Fig.4. Screen shot of game setup

Fig.5. Screen shot of enable player registration

After registration of all the players, 'Disable Player Registration' is to be enabled and it will lead to the following window:

Fig.6. Screen shot of disable player registration

Follow the instruction in the window and if the 'Disable Player Registration' button is clicked, the following validation window will appear.

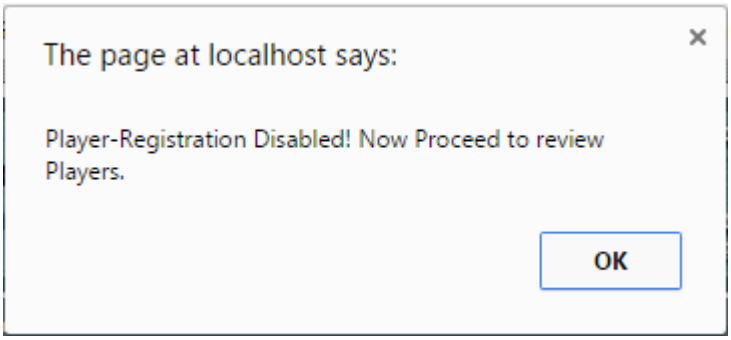

Fig.7. Screen shot of accept window

On agreeing the current action, the following window will appear. This screen shot shows the typical registered players. Now administrator can approve or disapprove the players. Follow the instruction given in Figure 8.

Fig.8. Screen shot of review player requests

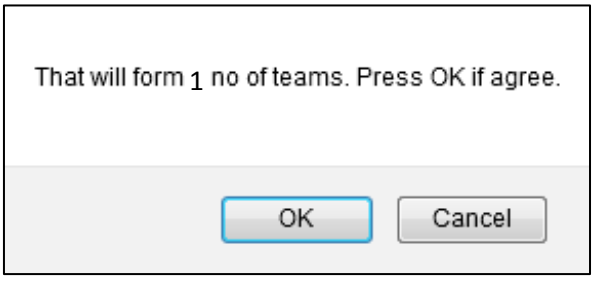

Fig.9 Screen shot of validation window in step 3

The next step is assign role to players and in this step the window will be as shown n Figure 10.

Fig.10. Screen shot of assign role

Next step involves setting the game parameters

Supply Chain Parameter Settings:

The following parameters can be set at in each setting by the administrator. The screen shots are given below.

Fig.11. Screen shot of setting the initial details for the game and some parameters of supply chain

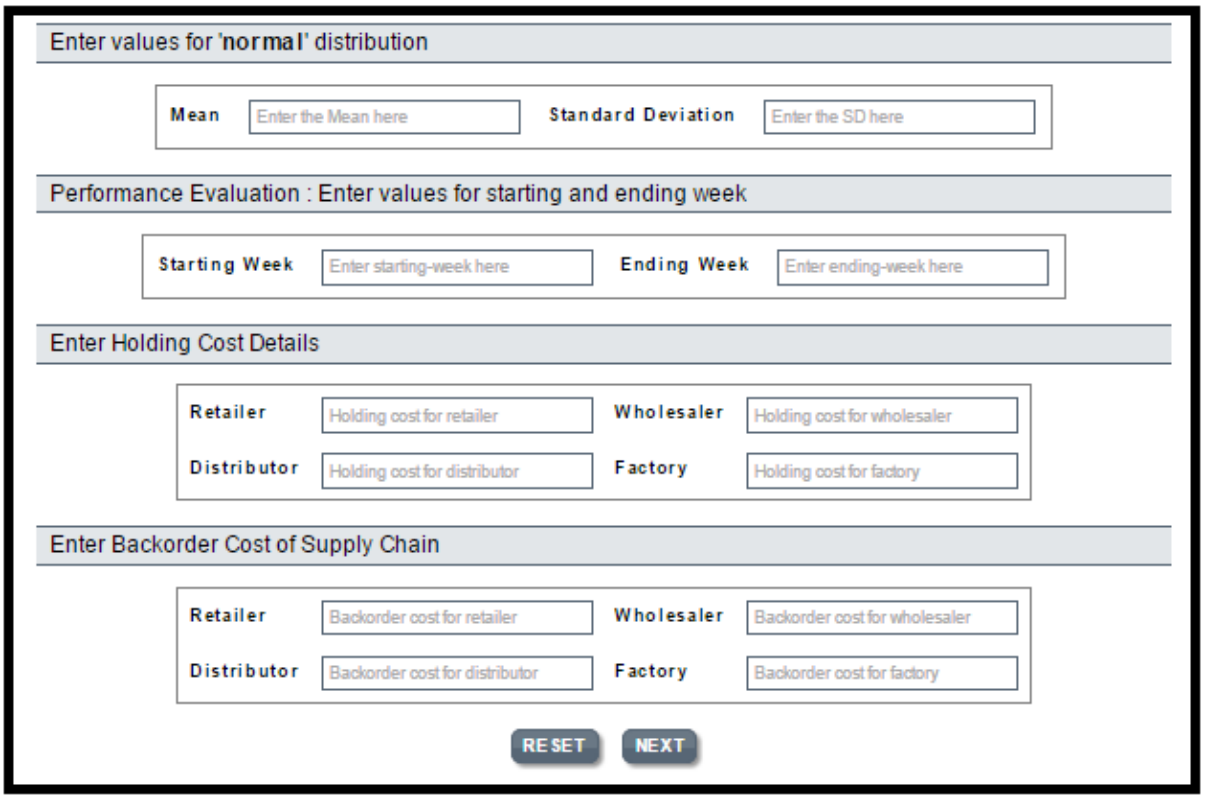

Fig.12. Screen shot of demand and cost settings window

Some of the details given in Figure 11are explained below.

- Number of Teams: This shows the number of teams involved in the current game. A team (a supply chain) consists of 4 members.
- Business Environment: The environment considered are (i) Backorder and (ii) Lost sales
  - Backorder:
  - ✓ Demand (immediate or past due) against an item whose current stock level is insufficient to satisfy demand. Customer order that cannot be filled when presented, and for which the customer is prepared to wait for some time.
  - ✓ For example, the customer demand is 100 units and the current inventory is 90 units, then the back order is 10 units which will be satisfied in the following weeks.
  - Lost Sales:
  - ✓ Demand occurs and the item is out of stock - the customer will not wait for the stock to be replenished, thereby the demand is a lost sale.
  - ✓ For example, the customer demand is 100 units and the current inventory is 90 units, then the lost sales are 10 units because of out of stock.

Type of Information Sharing:

The following are the possible categories of Information sharing and this can beset under *backorder* or *lost sales* cases.

Traditional supply chain:

In this type of supply chain, an order placed by each stage is the only information shared between the stages, i.e. Retailer order goes to Wholesaler, Wholesaler order goes to Distributor and so on based on the order lead time. The screenshot of traditional game window of retailer in week 5 is given below.

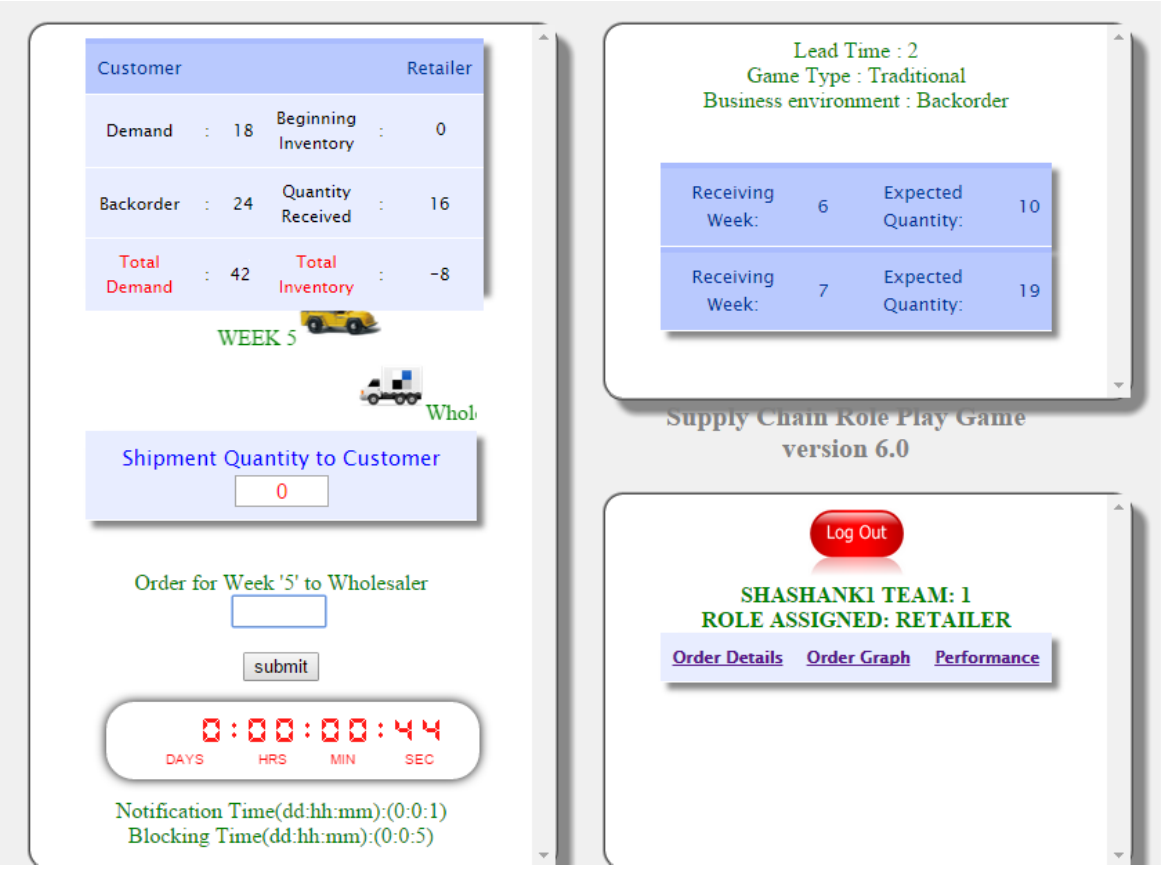

Fig.13.Screen shot of Retailer window of week 5 of traditional game type

Advance Demand Information (ADI):

The distribution of the customer demand to be faced by the retailer is shared to all the stages in this type of sharing. The screen shot of ADI is given below.

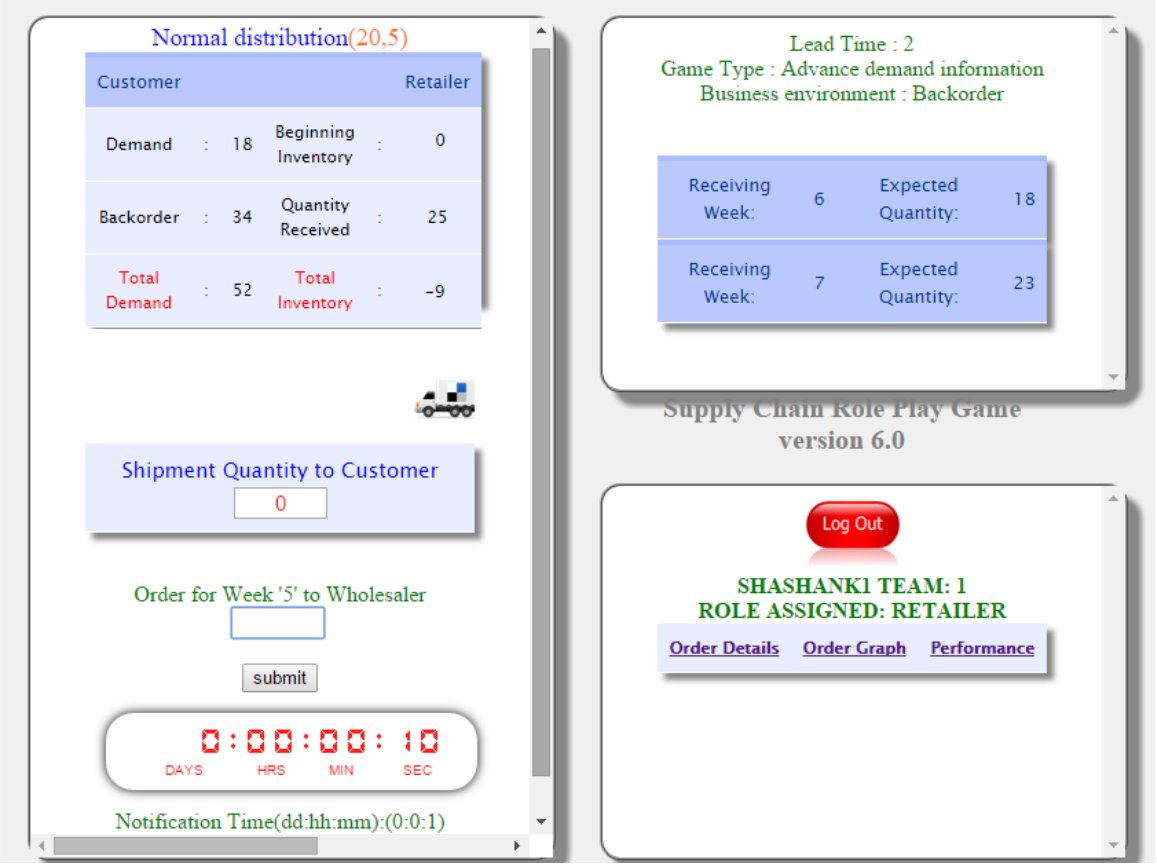

Fig.14.Screen shot of Advance Demand Information sharing

For the above fig demand distribution is N (20, 5), and it is shown to all the stages of the supply chain as Normal distribution (20, 5).

Point of Sale (PoS) at per period:

- In this type of sharing sales quantity at retailer stage is shared to all other stages in each period. Screen shot of Retailer and Wholesaler window is given below of 9^{th}& 10^{th} week respectively.

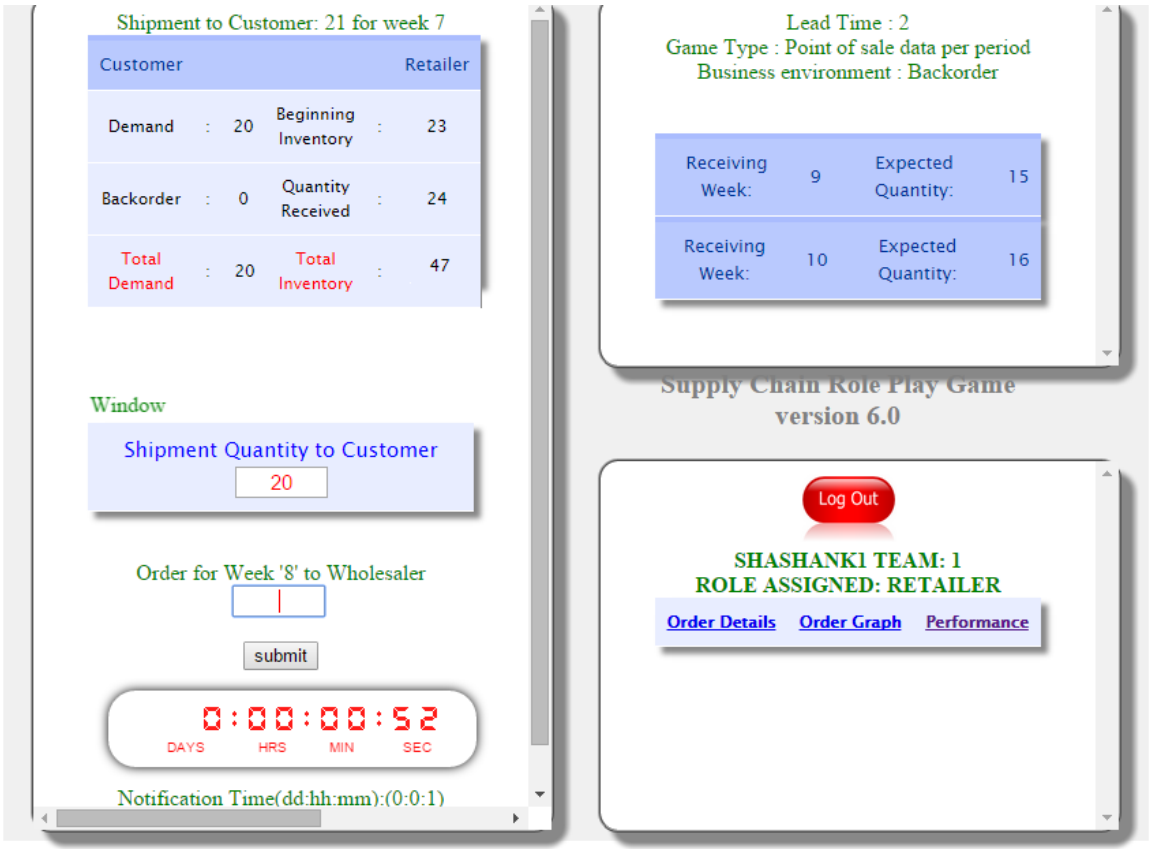

Fig.15.Screen shot of POS data per period of Retailer in week 9

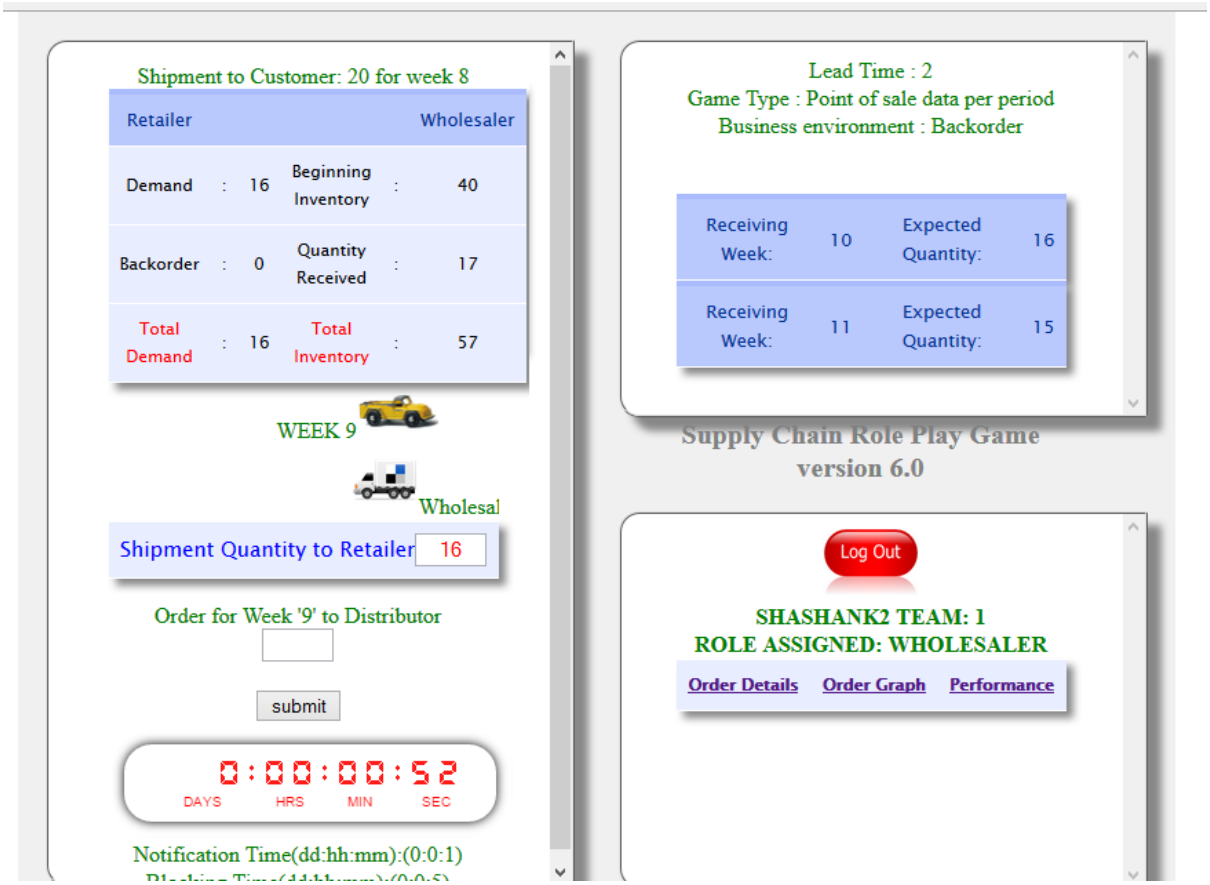

Fig.16.Screen shot of POS data per period of Wholesaler in week 10

From the Retailer window the shipment quantity to customer in week 8 is 20, it is shown in the Wholesaler window in week 9 as shipment to customer: 20 for week 8. This information shows to all other windows also in week 9.

Point of Sale (POS) data History:

The history of sales quantity at retailer stage is updated at each period and is shared with all other stages in the form of table. The screen shots of POS data history of Retailer window in week 5 is given below.

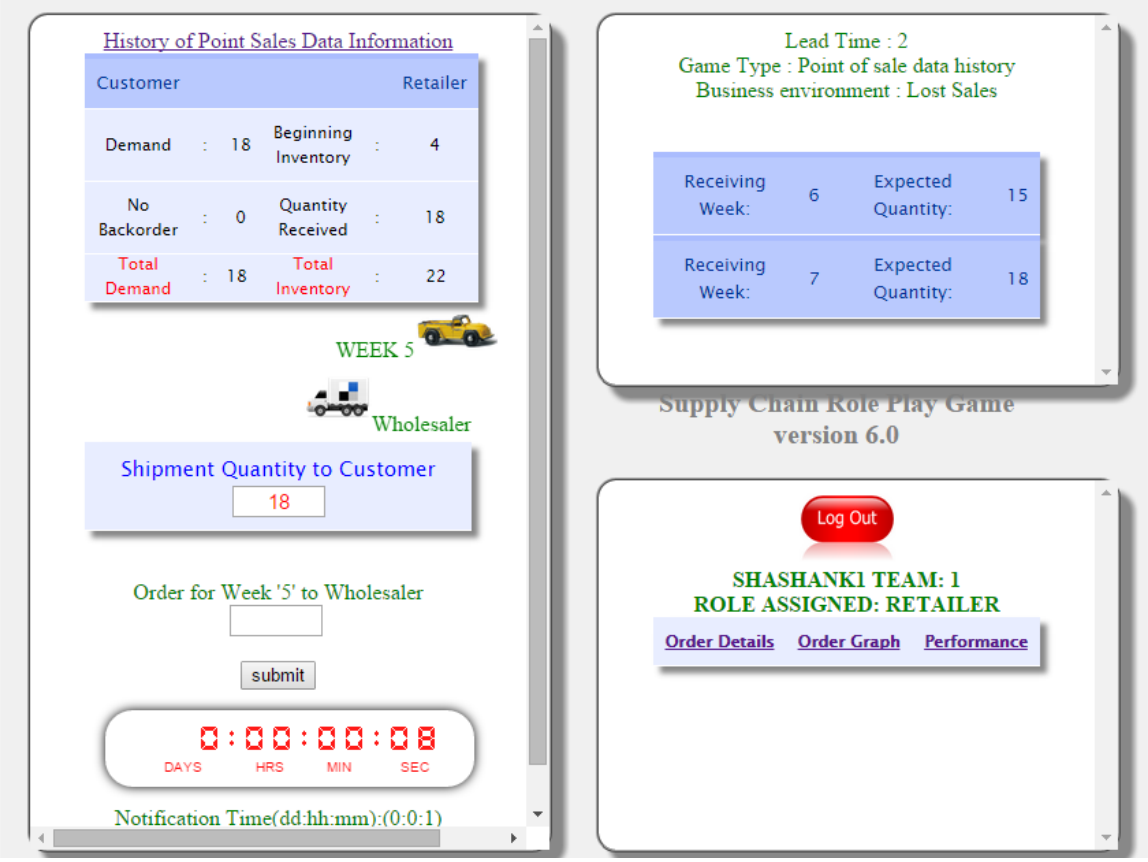

Fig.17.Screen shot of Retailer window in week 12

In the above fig by clicking the History of point sales data information it shows the previous 4 weeks history. This type of information is visible to all other windows of the supply chain. The screen shot of table for 4 weeks information is given below.

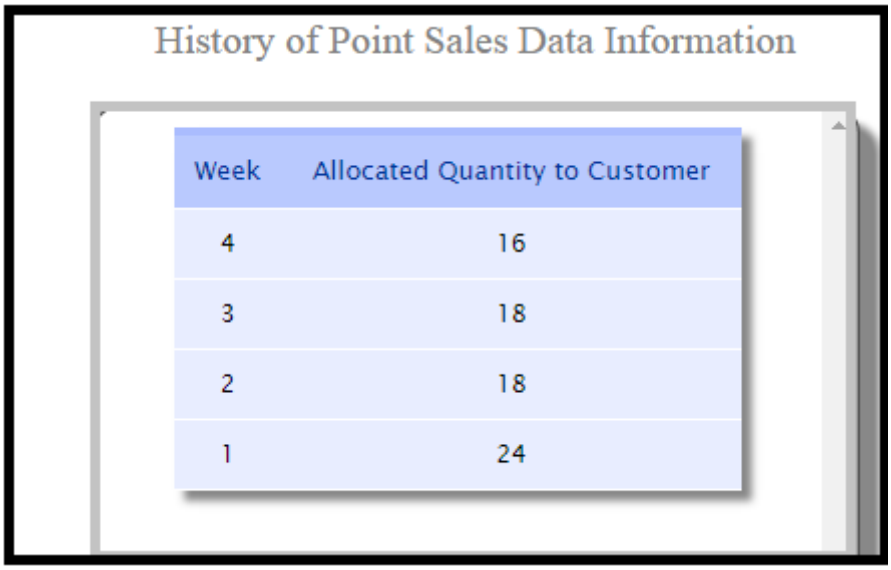

Fig.18.Screen shot of History of point sales data information

Customer Demand per period:

In this type customer demand arouse at each period is shared to all other stages. The screen shot of Retailer window is given below.

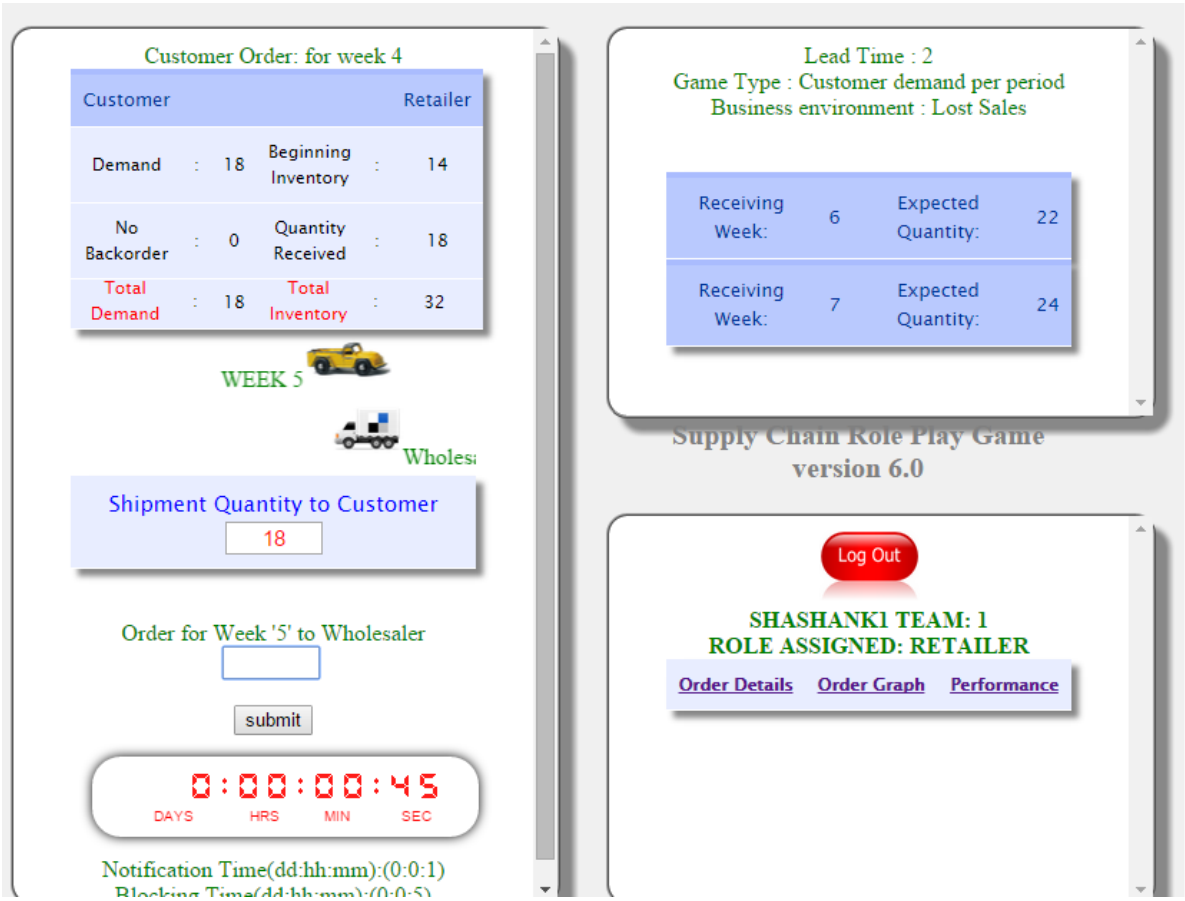

Fig.19.Screen shot of customer demand per period

In the week 4 the customer order is 15, it is shown to all the stages in week 5 as customer order: 15 for week 4.

Customer Demand History:

The history of customer demand arouse at retailer stage is updated at each period and is shared with all other stages in the form of table. The screen shot is given below.

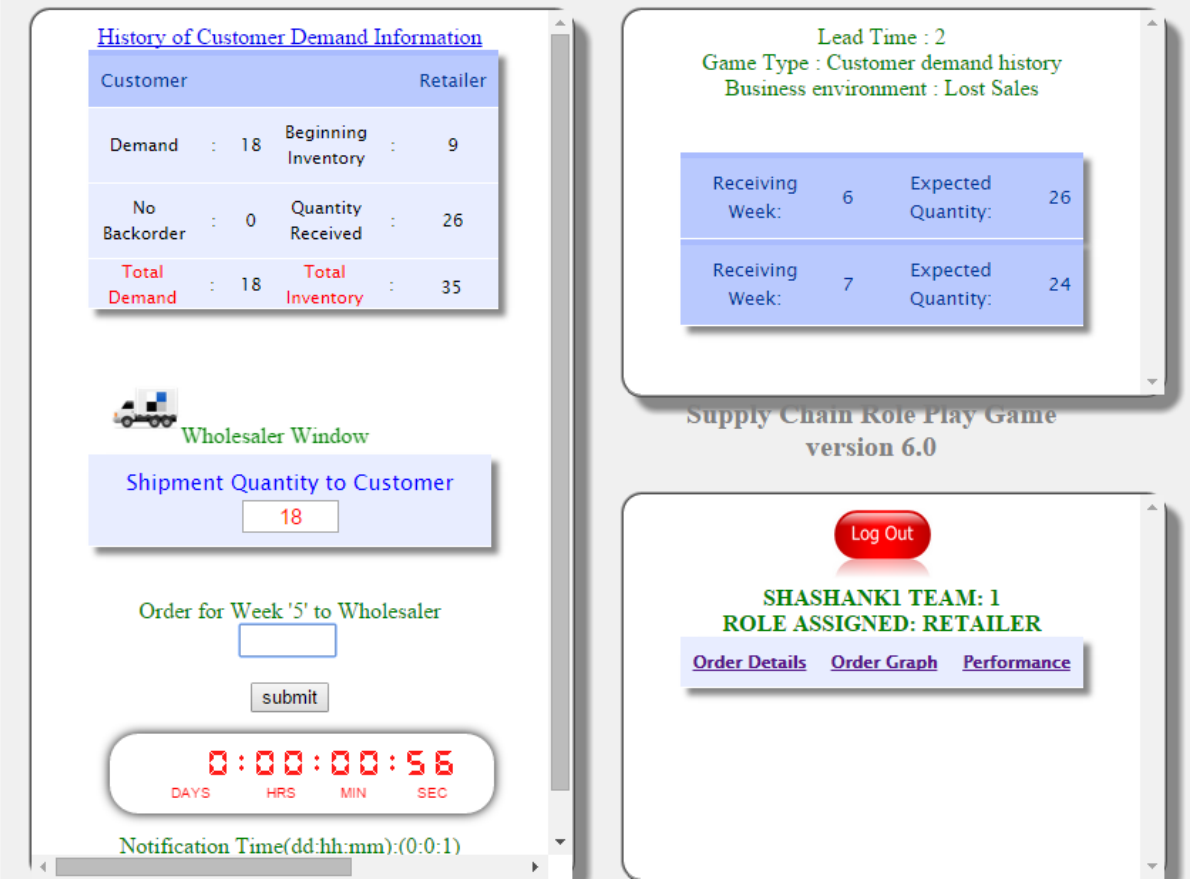

Fig.20.Screen shot of History of customer demand information

In the above fig by clicking the history of customer demand information it gives the history of previous weeks in a form of table.

Demand and End Period Inventory:

In this type of information sharing latest period demand arose, latest period demand met and latest end period inventory of each stage is shared in addition to the information of order placed by each stage. The information displayed is as given in screen shot.

Fig.21.Screen shot of Demand and End Period Inventory

In the above fig by clicking the Demand and End Period Inventory link the following screen shot window will appear.

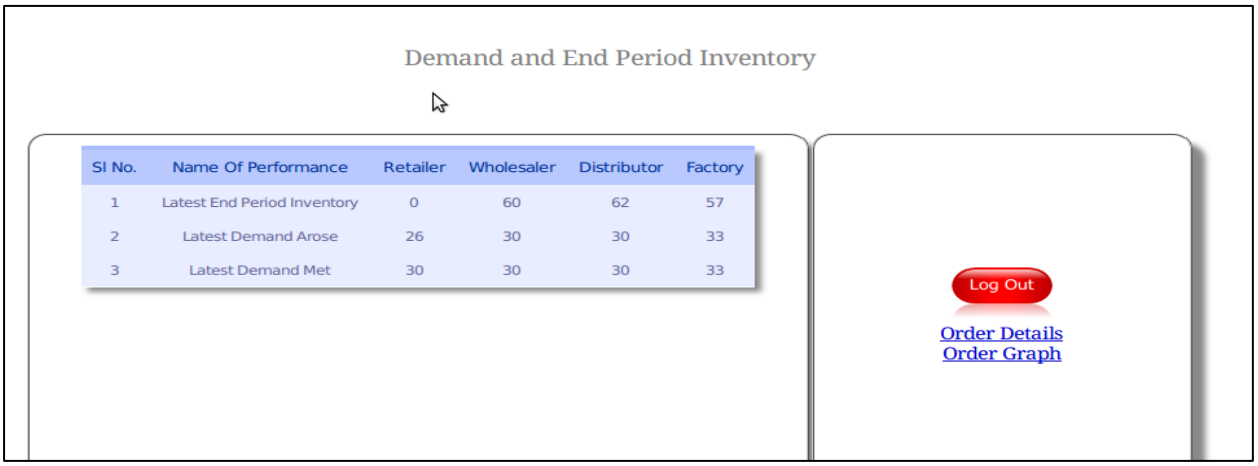

Fig.22.Screen shot of Demand and End Period Inventory of all stages

Forecasted Demand Information:

In this type of sharing the customer demand is forecasted by *n*-period moving average method. The average value and standard deviation for the available history of

customer demand data is calculated and is shared to all stages if sufficient (*n*-period) data is not available. The screen shot is given below.

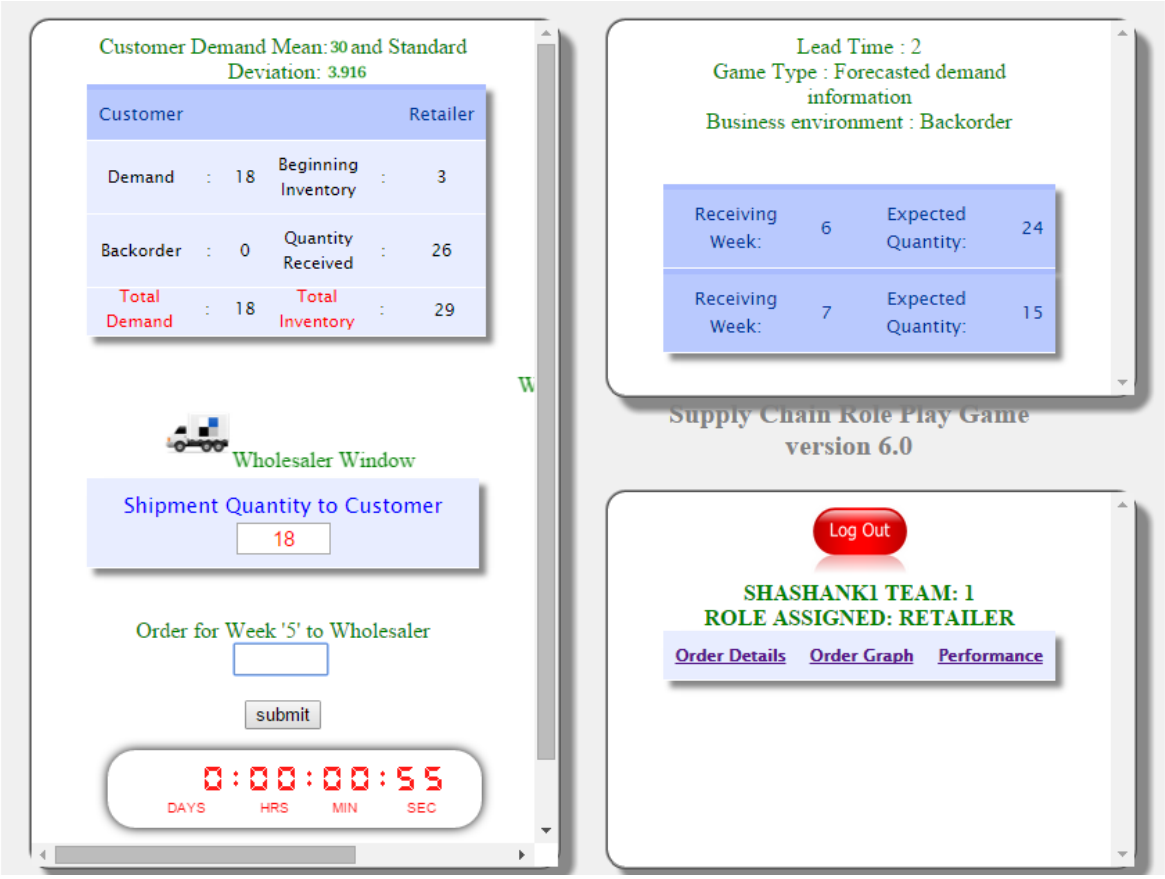

Fig.23.Screen shot of Forecasted Demand Information

End Period Inventory:

In this type of information sharing latest end period inventory of each stage is shared in addition to the information of order placed by each stage. The information displayed is as given in screen shot.

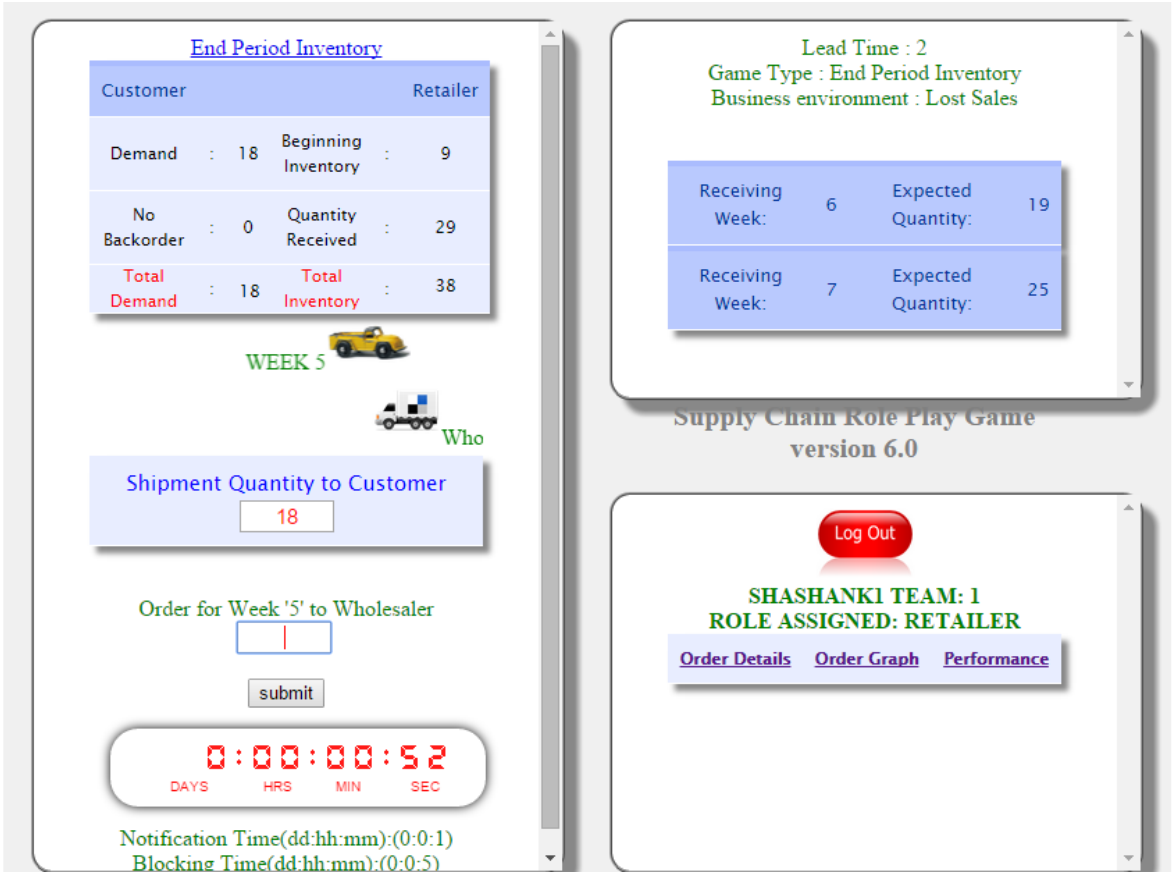

Fig.24.Screen shot of End Period Inventory

In the above fig by clicking the End Period Inventory link the following screen shot window will appear to all the stages.

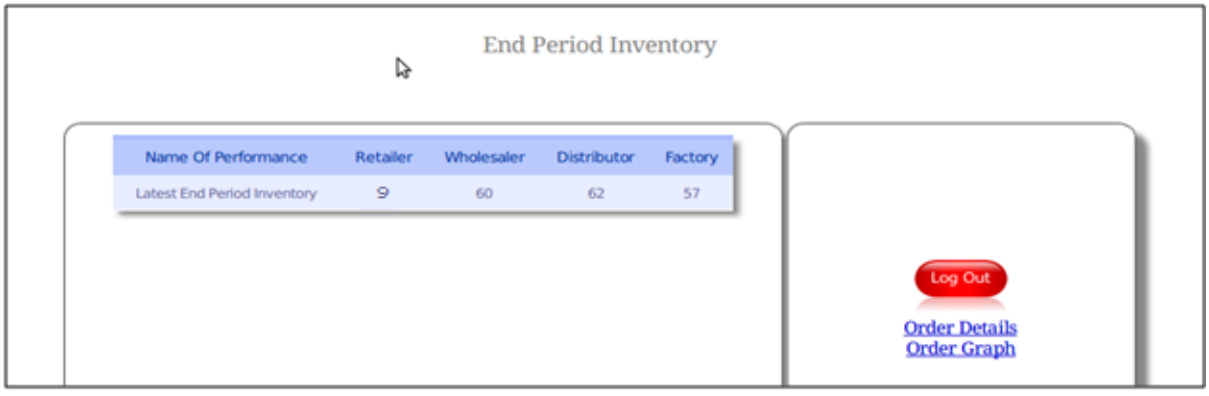

Fig.25.Screen shot of Latest End Period Inventory of all stages

Demand and Inventory Position:

In this type of information sharing latest period demand arose, latest period demand met and inventory position of each stage is shared in addition to the information of order placed by each stage. Inventory position is calculated as beginning inventory + receiving quantity + outstanding orders – backorder in case of backorder. In case of

lost sales Inventory position is calculated as beginning inventory + receiving quantity + outstanding orders. The information displayed is as given in screen shot.

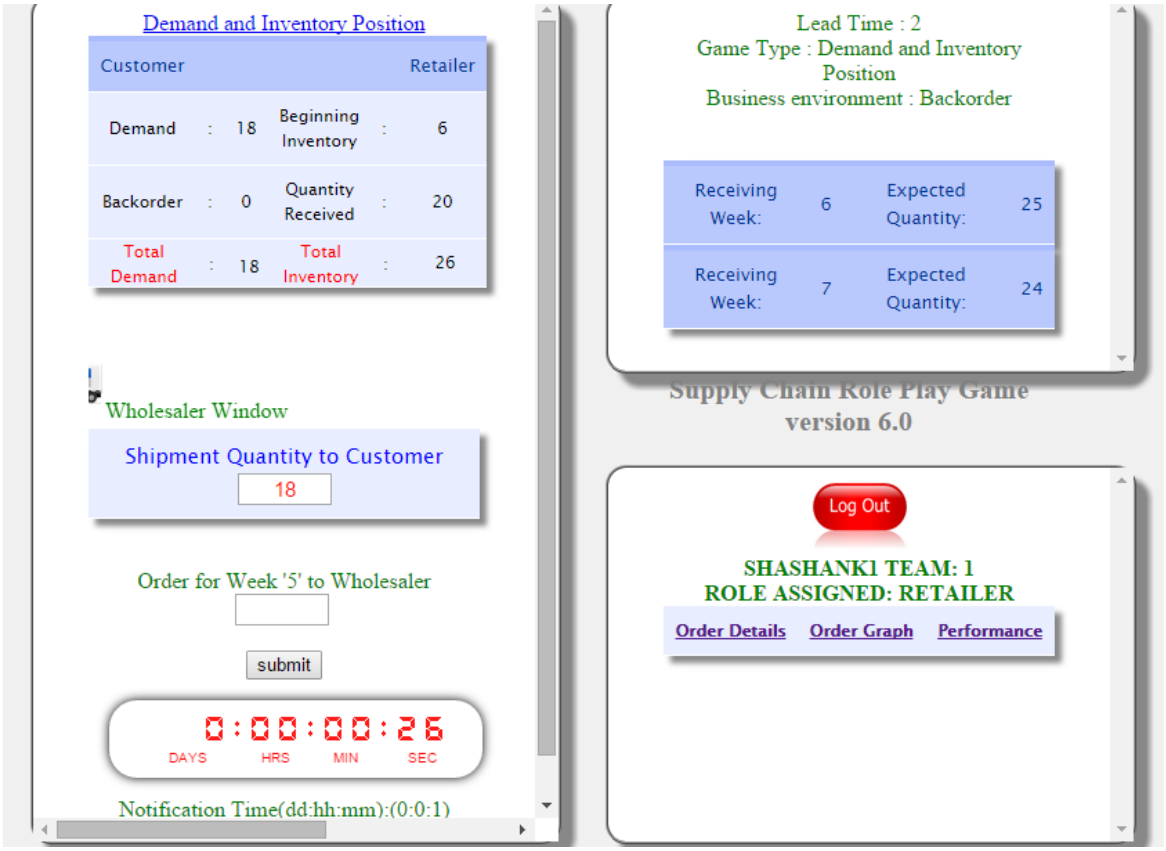

Fig.26. Screen shot of Demand and Inventory position

In the above fig by clicking the Demand and Inventory position link the following screen shot window will appear.

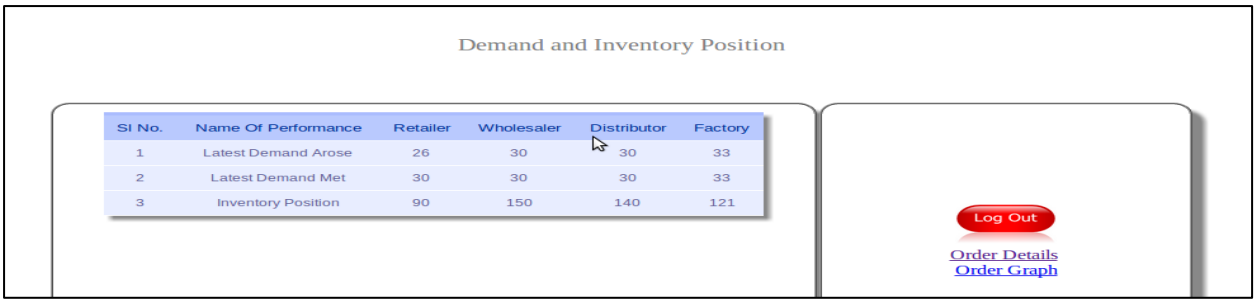

Fig.27.Screen shot of Demand and Inventory position of all stages

Inventory Position:

In this type of information sharing inventory position of each stage is shared in addition to the information of order placed by each stage. The information displayed is as given in screen shot.

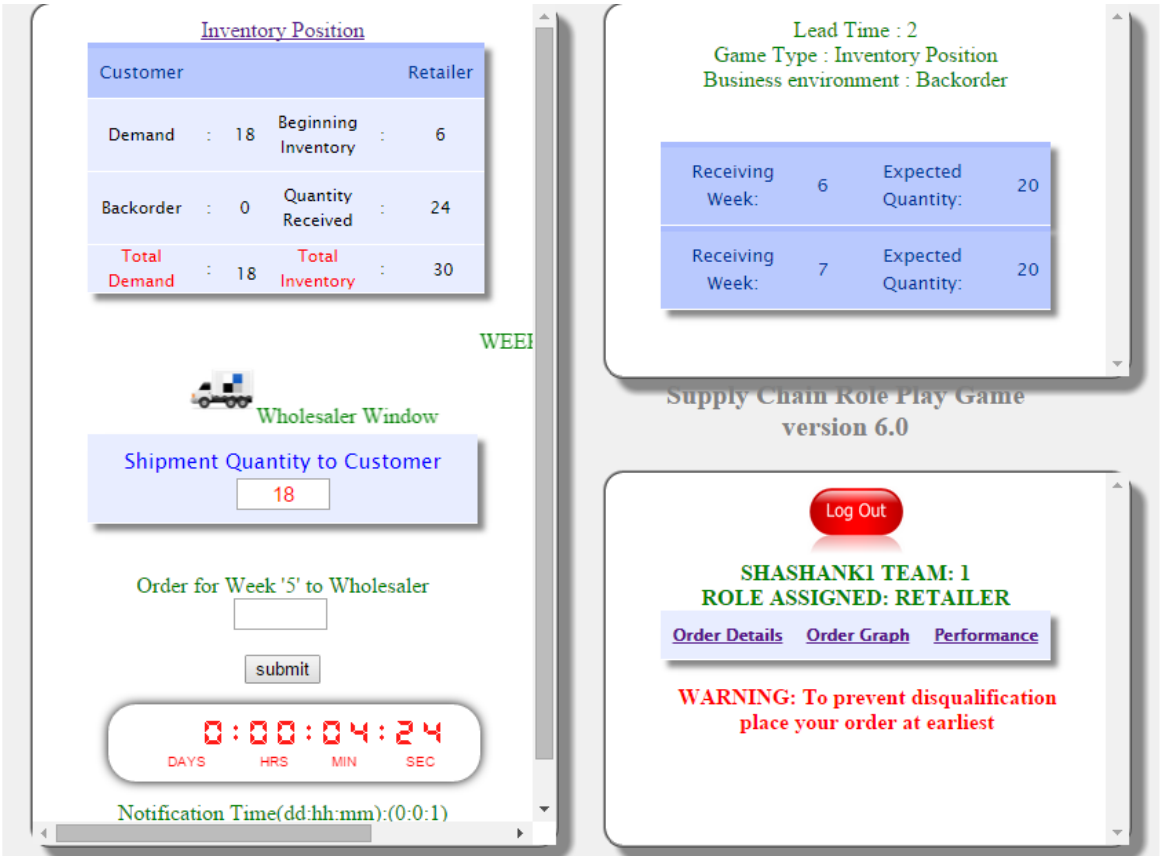

Fig.28.Screen shot of Inventory Position

In the above fig by clicking the Inventory position the following screen shot window will appear to all the stages.

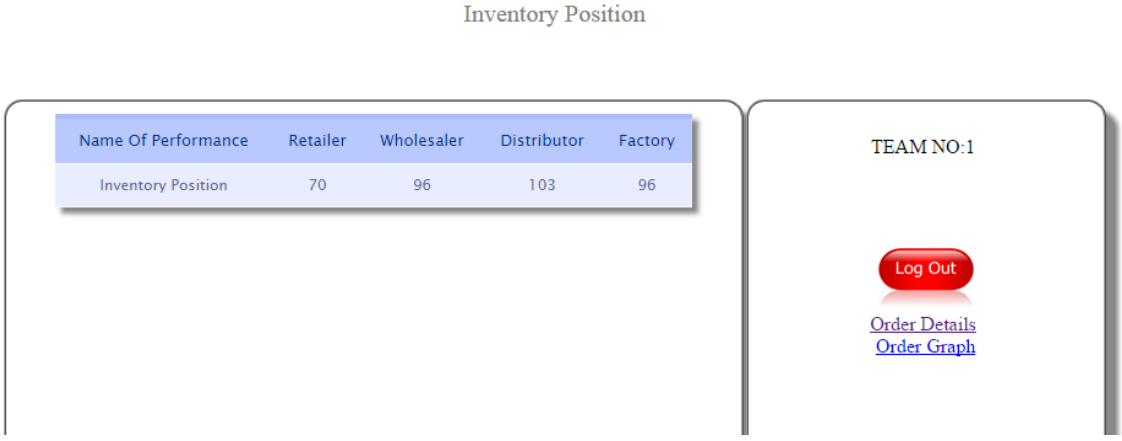

Fig.29.Screen shot of Inventory Position of all stages

Input Customer Demand Distribution

- ✓ This software helps to generate the customer demand as a random variable which follows normal or uniform distribution.
- ✓ It also provides the facility to enter the demand data manually which follows any distribution. which helps to compare the performance at same customer demand

- Maximum number of weeks of the play:

  It is the duration of the play.

- Lead time

  Lead time of a stage is the sum of the order lead time and replenishment or delivery lead time. These two can be set for the each stage separately.

  Order lead time: This is the time required by the order to reach next upstream stage from a downstream stage. For example, *retailer order lead time* is the time required by the retailer order to reach the next upstream stage, wholesaler.

  Replenishment or Delivery lead time: This is the time required by the shipment quantity to reach downstream stage from its immediate upstream stage. For example, *retailer replenishment lead time* is the time required by the shipment quantity to reach the retailer from wholesaler.

- Initial inventory at each stage:

  It is calculated based on the lead time and review period. For example if mean of customer demand is 20,order lead time is one, replenishment lead time is one and review period is one. The initial inventory is 60 (20*3), calculated as mean of customer demand multiplied by sum of lead time and review period.

- Performance analysis period:

  It is the time duration under which the performance of the supply chain is evaluated. It is better to eliminate some initial periods to reduce the initial bias. Similarly it is better to remove some end periods to eliminate the end game effect.

- Holding cost per unit per period at each stage
- Backorder or lost sales cost per unit per period at each stage

Performance Measures:

The performance of the supply chain under each setting can be evaluated for the performance evaluation period. Various performance measures possible at each stage of the supply chain are:

- Fill rate
- Variance of orders
- Total end period inventory
- Inventory variance
- Holding cost
- Total cost of the supply chain: This is the sum of the inventory cost of all stages in the supply chain
- Backorder or lost sales cost
- Total inventory cost: This is the sum of the holding and backorder or lost sales cost of a stage

The screen shot of performance measures provided by software are given below.

S.No.	Performace Measure	Checkbox
1.	Fill rate	☐
2.	Variance of Orders	☐
3.	Total End Period Inventory	☐
4.	Inventory Variance	☐
5.	Total Cost of Supply Chain	☐
	Some other Useful Data	
1.	Demand Arose	☐
2.	Demand Met	☐
3.	Total Inventory Cost	☐
4.	Lost/Backorder Sales Quantity	☐
5.	Lost/Backorder Sales Quantity Cost	☐
6.	Total End Period Inventory Cost	☐
	Player Window Display Property	
	Display Team No. on Game-Play Window	☐

Fig.30.Screen shot of performance measures

Timer Settings:

This setting includes notification time and blocking time. By setting this it shows the timer in each window of the supply chain. If the players do not take the decision within the specified time it will block the team. The screenshot of timer settings window is shown below. After setting the time click on start game, the game will start to play.

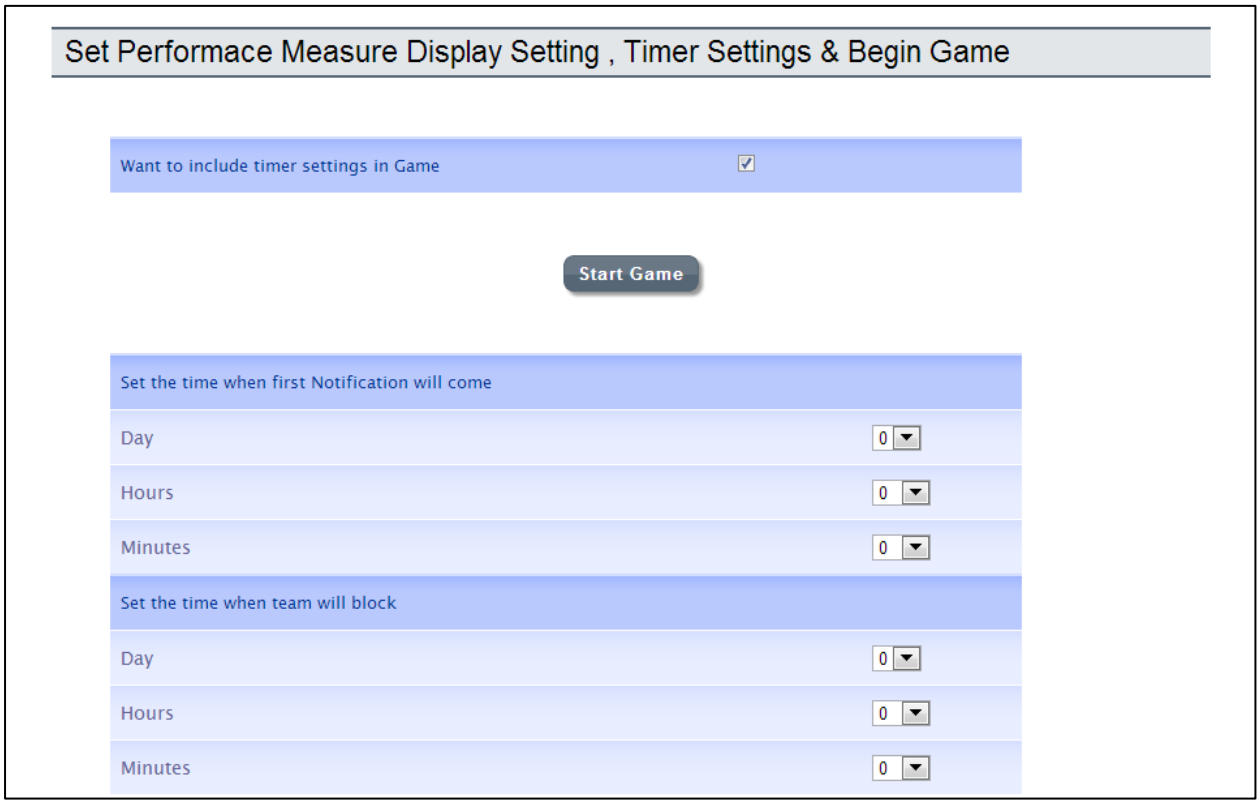

Fig.31.Screenshot of timer settings window

The minimum value of notification time is 3 minutes and blocking time is 2 minutes.

Saving the game data:

After completing the maximum number of weeks it is possible to save the game by the administrator.

Open the administrator window > click on the save current game > enter the name > click on save. After saving the game it is possible to see from the list of saved game details.