1. BUSINESS AND DATA MODELING

Goal: Introduction to the main features of the BPWin package.

1.1. General (simplified) description of the subject area

Some companies buy products from different suppliers. Acquisition of products is carried out in batches and is made out in the form of contracts for delivery. Each contract for the supply of products has a unique number and can be concluded with only one supplier. The basis for delivery is a document (pre-order, invoice, etc.). The documents for each contract for each type of product indicate: name, size of the delivered lot and price (in UAH). Delivered products are posted to the warehouse, and then sold through sales, sales festivals, etc.

The analysis of the subject area allowed to identify and decompose the following main business processes related to the supply of products.

1. Formation of the order for delivery of production
    1.1. Determining the range of products ordered
    1.2. Determining the list of potential suppliers
    1.3. Price analysis of price lists of potential suppliers
    1.4. Analysis of possible delivery times
    1.5. Supplier selection
    1.6. Sending order data to the supplier
    1.7. Obtaining confirmation from the supplier about the possibility of fulfilling the order
2. Coordination with the supplier of terms of delivery and forms of payment of the delivered production
    2.1. Coordination of delivery terms
    2.2. Reconciliation of payment form (cash / non-cash payment)

2.3. Coordination of payment terms (prepayment (full or partial), subsequent payment, etc.)

2.4. Concluding a supply contract

2.5. Payment for delivery or issuance of a warranty document

3. Delivery of products

3.1. Search for a freight forwarder

3.2. Concluding a contract for transportation

3.3. Payment for transportation services

4. Receipt of delivered products

4.1. Checking the completeness of the delivered products

4.2. Drawing up of acts (and complaints)

4.3. Checking the quality of delivered products

4.4. Drawing up of acts (and complaints)

4.5. Posting of delivered products to the warehouse

Based on the analysis, we can identify the following main components required for modeling business processes in terms of IDEF0 (Functional Modeling), IDEF3 (Workflow Modeling), and DFD (Data Flow Diagram) models.

Input: orders from customers, data on the absence or insufficient quantity of products in stock.

Output: information about the availability of products in stock.

Control: rules and procedures that determine the process of ordering and delivery of products.

Mechanism: automated accounting system, supply department, marketing department.

1.2. Functional modeling

1.2.1. Creating a model (context chart)

1. Start BPWin and create a new model by selecting New (File -> New)

2. Enter the name of the model "Delivery of products" (without quotation marks) (Figure 1.1) and click "OK".

3. In the "Properties for New Models" window, enter (if necessary) information about the author (Figure 1.2) and click "OK".

4. As a result the context diagram will be created (Figure 1.3).

5. To set the basic properties of the model, right-click on any free space on the model and select "Model Properties ..." in the menu.

6. In the "Model Properties" window on the "General" tab in the "Project" field, enter the project name "Modeling the delivery process" (without quotation marks).

7. Open the "Purpose" tab and in the "Purpose" field enter "Model the existing product delivery process" (without quotation marks), and in the "Viewpoint" field – "Supply Department" (without quotation marks).

8. Close the "Model Properties" window by clicking "OK".

9. Go to the context chart and right-click on the job. In the menu, select "Name ..." and enter the name "Product Delivery" (Figure 1.4).

10. Save the created model, for which select the menu item Save (File -> Save) and enter the file name "delivery" (without quotation marks).

1.2.2. Create arrows on the context chart

To create an arrow you need.

1. Click the button with the arrow symbol ("Precedence Arrow Tool") on the toolbar.

2. Move the cursor to one side of the screen (for example, to the left if you enter the input arrow) until a dark bar appears.

3. Click once on the bar (where the arrow comes from) and again in the part of the work where the arrow ends (in the left part of the work for the input arrow).

4. In the toolbar, select the edit option, for which click on the "Pointer Tool".

5. Right-click on the arrow line and select "Name ..." in the menu, enter the name of the arrow (Figure 1.5) and click "OK".

The list of arrows that need to be created is given in Table 1.1.

Table 1.1

Arrow name (Arrow Name)	**Defining an arrow (Arrow Definition)**	**Arrow type (Arrow Type)**
Customer orders	Information about products that interest customers	Input
Data on the number of products in stock	Data on products in stock before delivery	Input
Data on the availability of products in stock	Data on products available in stock after delivery	Output
Automated accounting system	Accounting and processing of customer orders, the formation of data on warehouse balances, etc.	Mechanism
Arrow name (Arrow Name)	Defining an arrow (Arrow Definition)	Arrow type (Arrow Type)
Supply department	Selection of supplier, determination of delivery times, etc.	Mechanism
Marketing department	Formation of data on the need for products	Mechanism
Rules and procedures	Rules for processing customer orders, forming a purchase order, etc.	Control

As a result of creating arrows, the appearance of the obtained context diagram is shown in Figure 1.6.

1.2.3. Decomposition of the diagram

1. Click the "Go to Child Diagram" button in the toolbar.

2. In the window "Activity Box Count" set the number of works in the decomposition diagram is 4 (Figure 1.7).

3. As a result of decomposition the diagram which kind corresponds to Figure 1.8.

4. Right-click on the work, select "Name ..." in the menu, enter the name of the work (Figure 1.5) and click "OK". Names of works – "Formation of the order for delivery", "Coordination with the supplier of terms and forms of payment", "Delivery of production", "Receipt of the delivered production".

5. Connect the boundary arrows and draw the inner arrows on the diagram. for internal arrows enter names as shown in Figure1.9.

6. Save the created model.

1.2.4. Splitting of the model

1. Right-click on the work "Formation of the purchase order", in the menu select "Split Model ..." and in the window "Split Options" enter the name of the model - "Formation of the purchase order" (without quotation marks).

2. Switch to the new model (using the "Model Explorer" window).

3. Save the created model, for which select the menu item Save (File -> Save) and enter the file name "dlvr_dfd" (without quotation marks).

4. Right-click on the work "Agreement with the provider of terms and forms of payment", in the menu select "Split Model ..." and in the window "Split Options" enter the model name – "Agreement with the provider of terms and forms of payment" »(Without quotes).

5. Switch to the new model (using the "Model Explorer" window).

6. Save the created model, for which select the menu item Save (File -> Save) and enter the file name "dlvr_idef3" (without quotation marks).

7. As a result, in the window "Model Explorer" you can see the original model and models that appeared as a result of splitting (Figure 1.10).

8. The boundary arrows, which appeared as a result of decomposition, can be deleted from the works “Formation of a purchase order” and “Agreement with the supplier of terms and forms of payment”.

9. Close the split models.

1.2.5. Decompose the work "Formation of the purchase order"

1. Select the work "Generate a purchase order" and click "Go to Child Diagram" in the toolbar.

2. In the "Activity Box Count" window, set the number of jobs in the decomposition diagram to 7.

3. As a result of decomposition the diagram which kind corresponds to Figure 1.11.

4. For works on the diagram enter the following names: "Defining the range of products ordered", "Defining the list of suppliers", "Analysis of price lists", "Analysis of delivery times", "Selection of supplier", "Transfer of order data", " Receive order confirmation "(without quotes).

5. Rename the arrow "Data on the availability of products in stock" to "Purchase Order" and link to the work "Receipt of order confirmation". Connect all other boundary arrows with the works as shown in Figure 1.12.

6. Draw the inner arrows on the diagram, as shown in Figure 1.12.

1.2.6. Decompose the work "Coordination with the supplier of terms and forms of payment"

1. Select the work "Agreement with the provider of terms and forms of payment" and click on the button "Go to Child Diagram" in the toolbar.

2. In the "Activity Box Count" window, set the number of jobs in the decomposition diagram to 5.

3. For works on the diagram enter the following names: "Coordination of terms of delivery", "Coordination of the form of payment", "Coordination of

terms of payment", "Conclusion of the contract for delivery", "Payment of delivery or issue of the guarantee document" (without quotation marks).

4. Draw an arrow on the diagram, as shown in Figure 1.13.

5. It should be noted that in this diagram there is an additional limit arrow "Accounting", which reflects the participation of the company's accounting in the procedure of payment of the order or the issuance of a guarantee document in case of further payment.

1.2.7. Form a diagram of the node tree.

1. To create a node tree diagram, select "Diagram" in the menu and in which appeared in the vertical menu, select "Add Node Tree ...". As a result, the Node Tree Wizard window will be displayed.

2. Click the "Finish" button, which will display a chart, the appearance of which is shown in Figure 1.14.

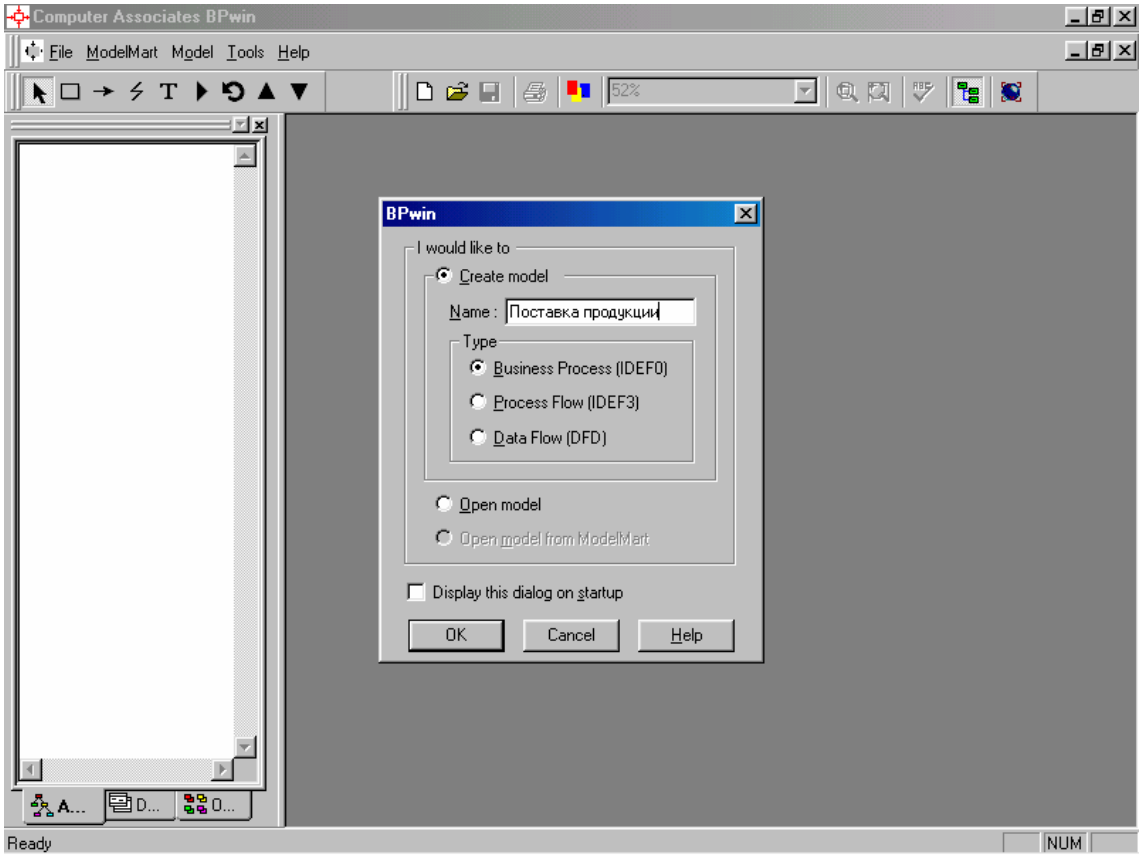

Figure 1.1

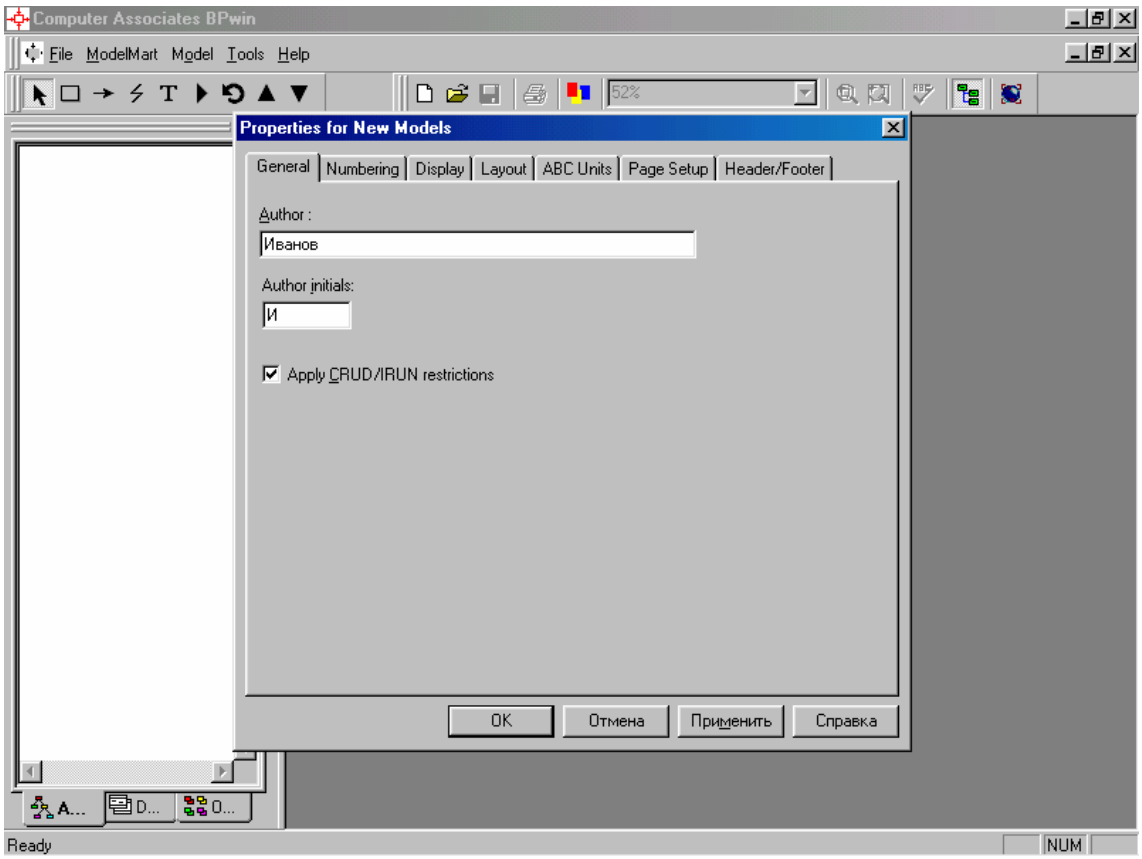

Figure 1.2

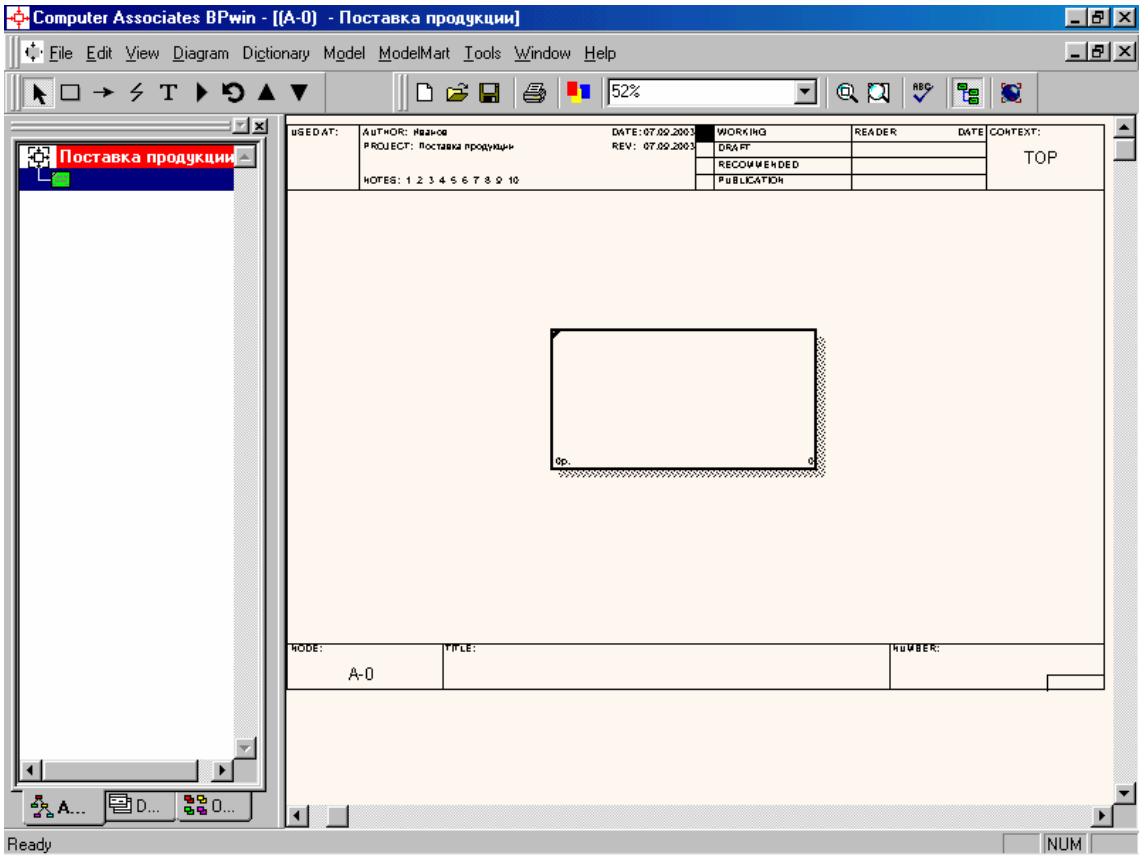

Figure 1.3

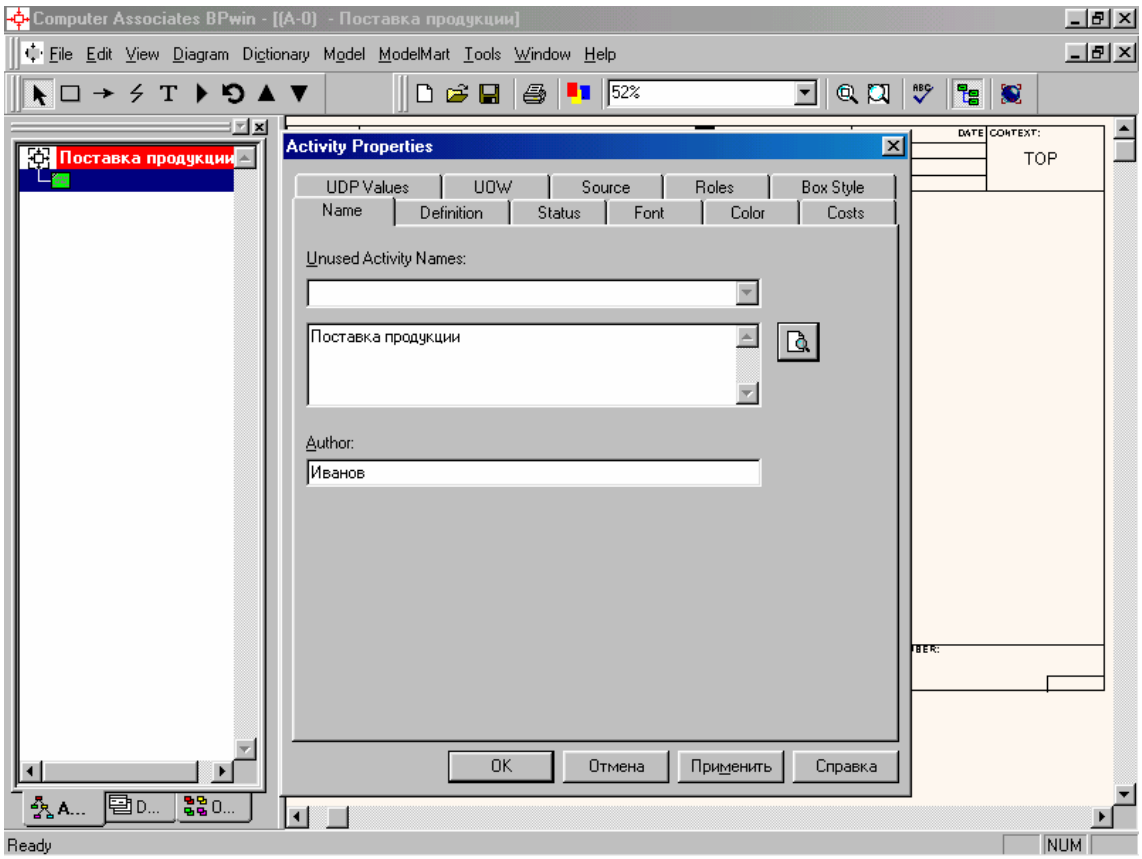

Figure 1.4

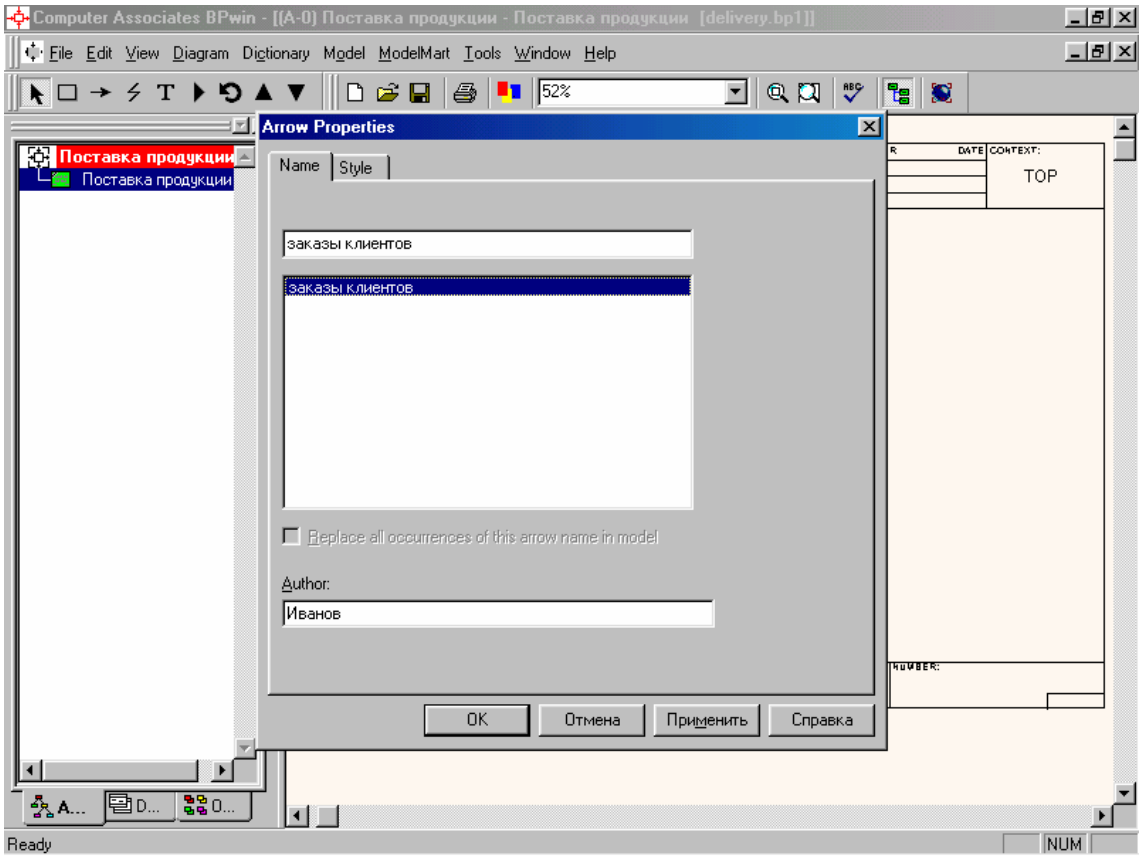

Figure 1.5

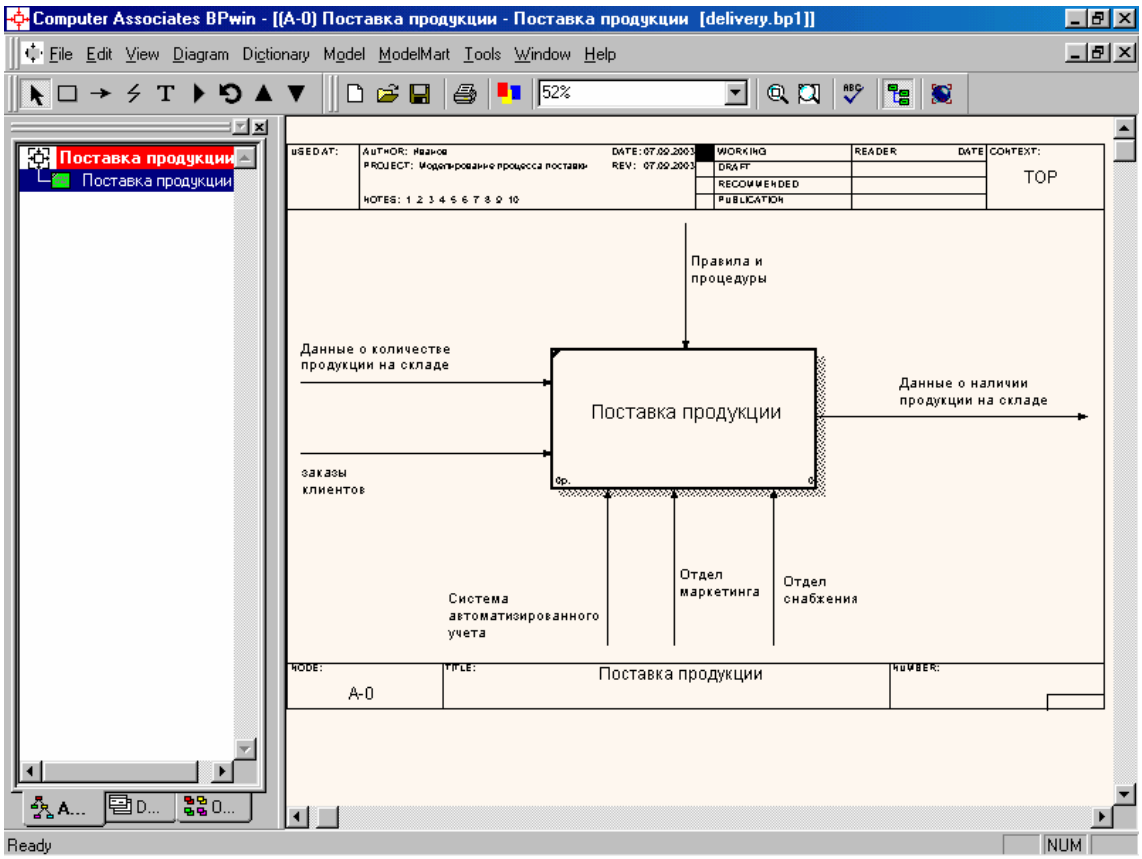

Figure 1.6

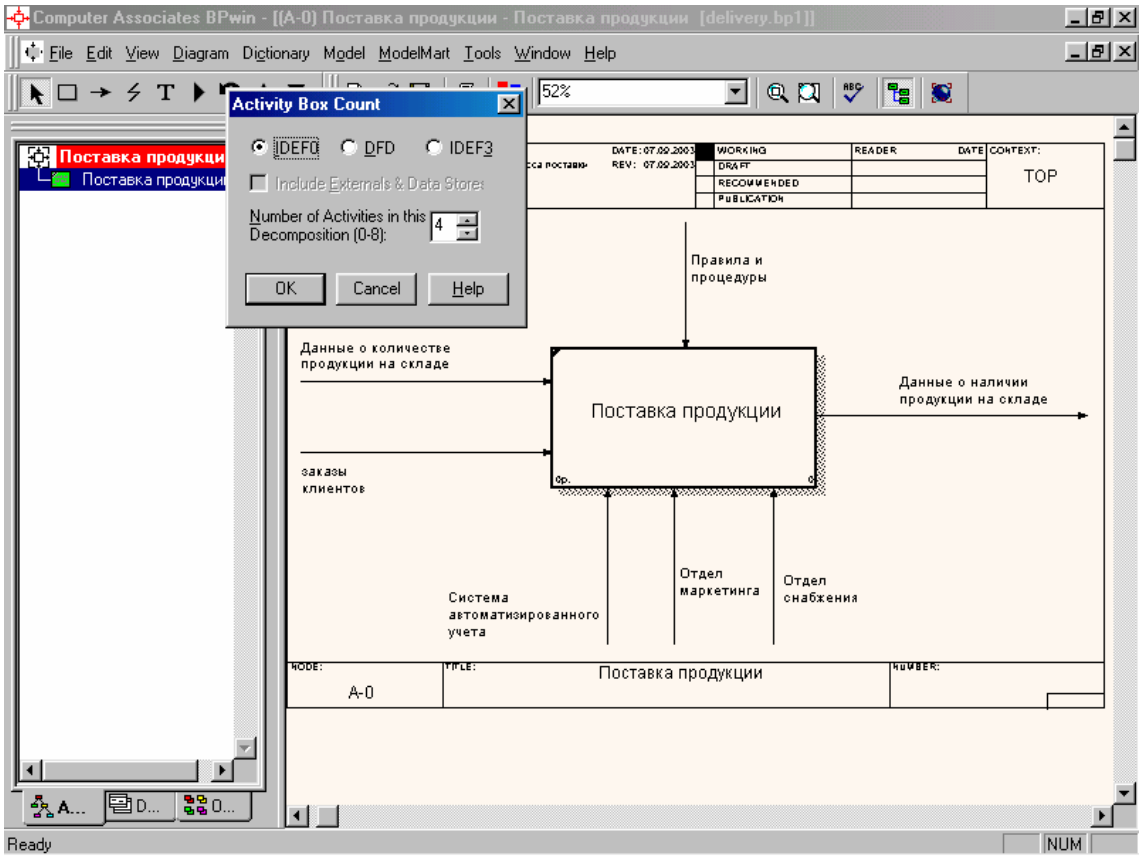

Figure 1.7

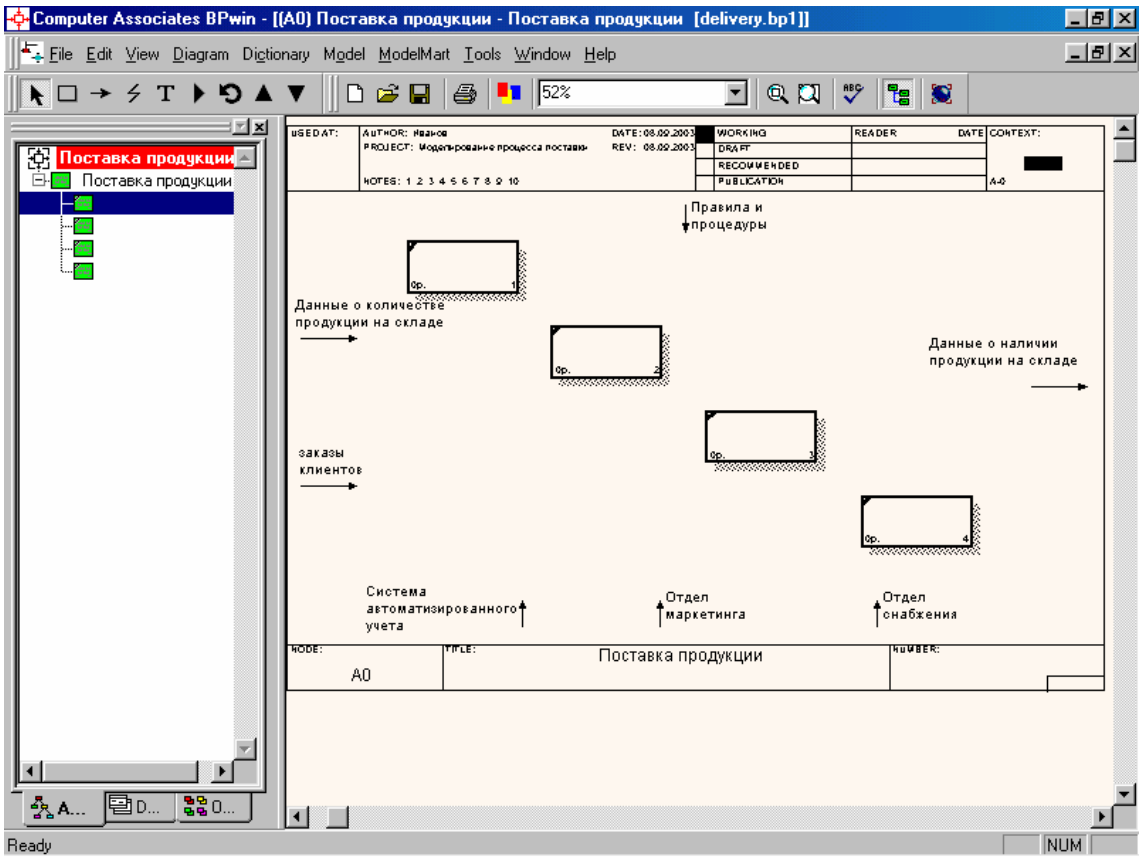

Figure 1.8

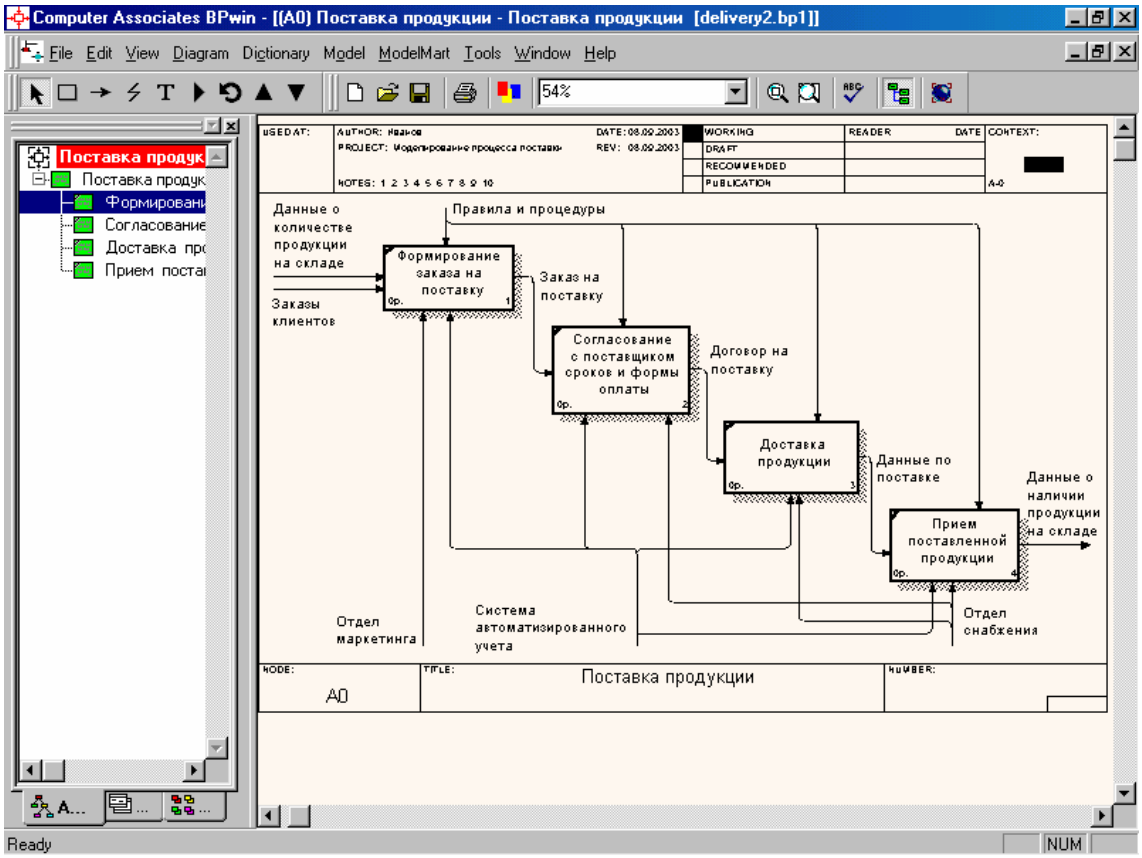

Figure 1.9

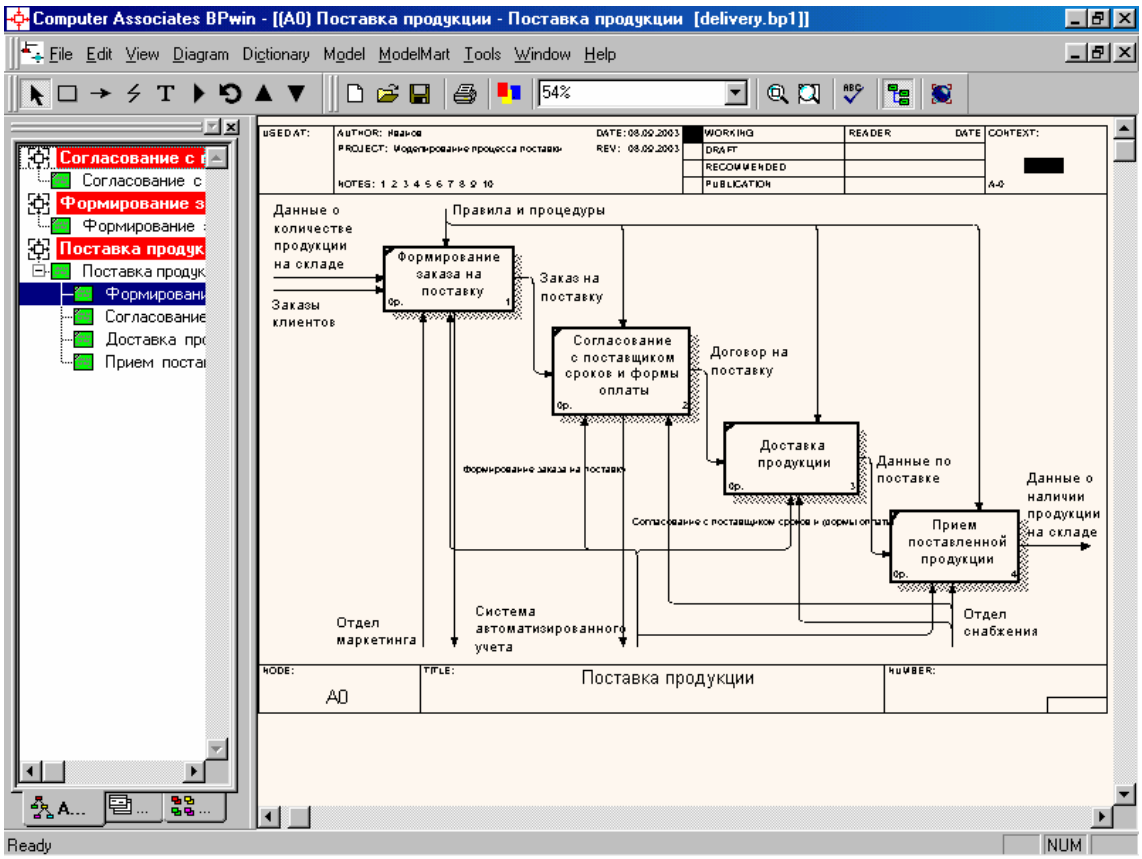

Figure 1.10

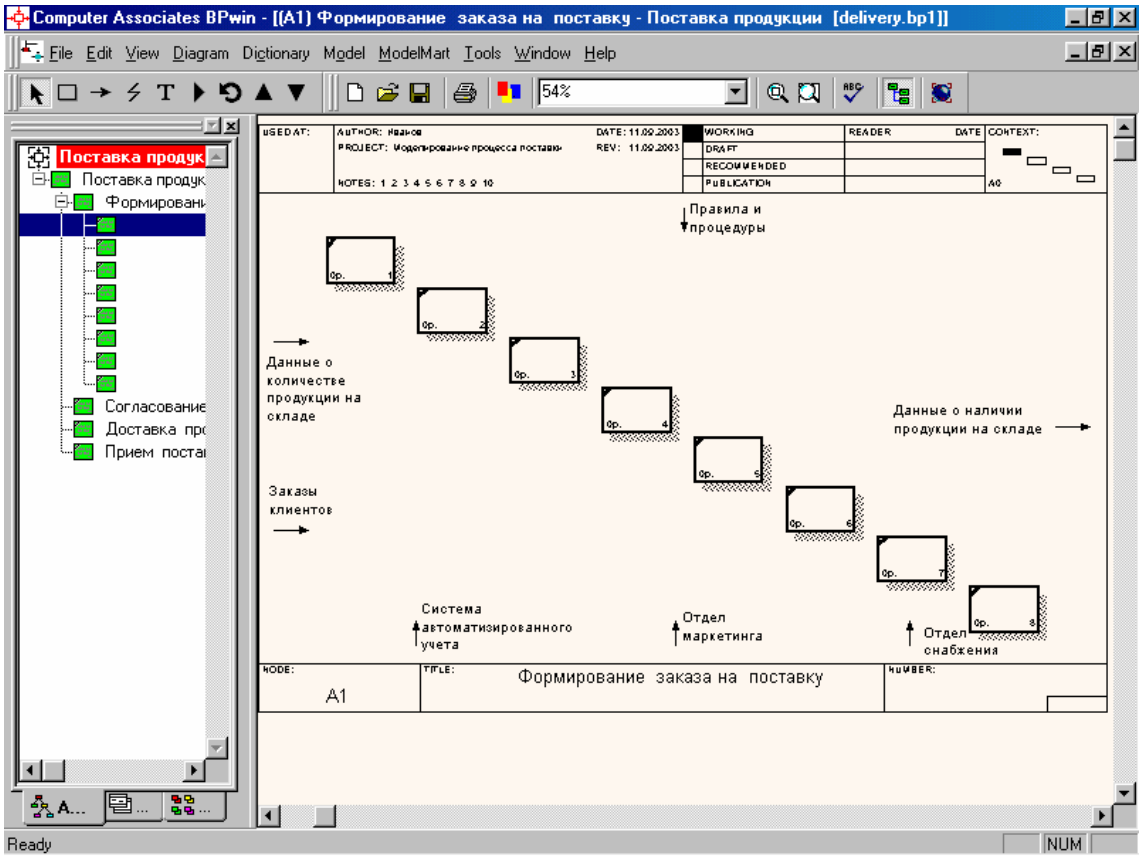

Figure 1.11

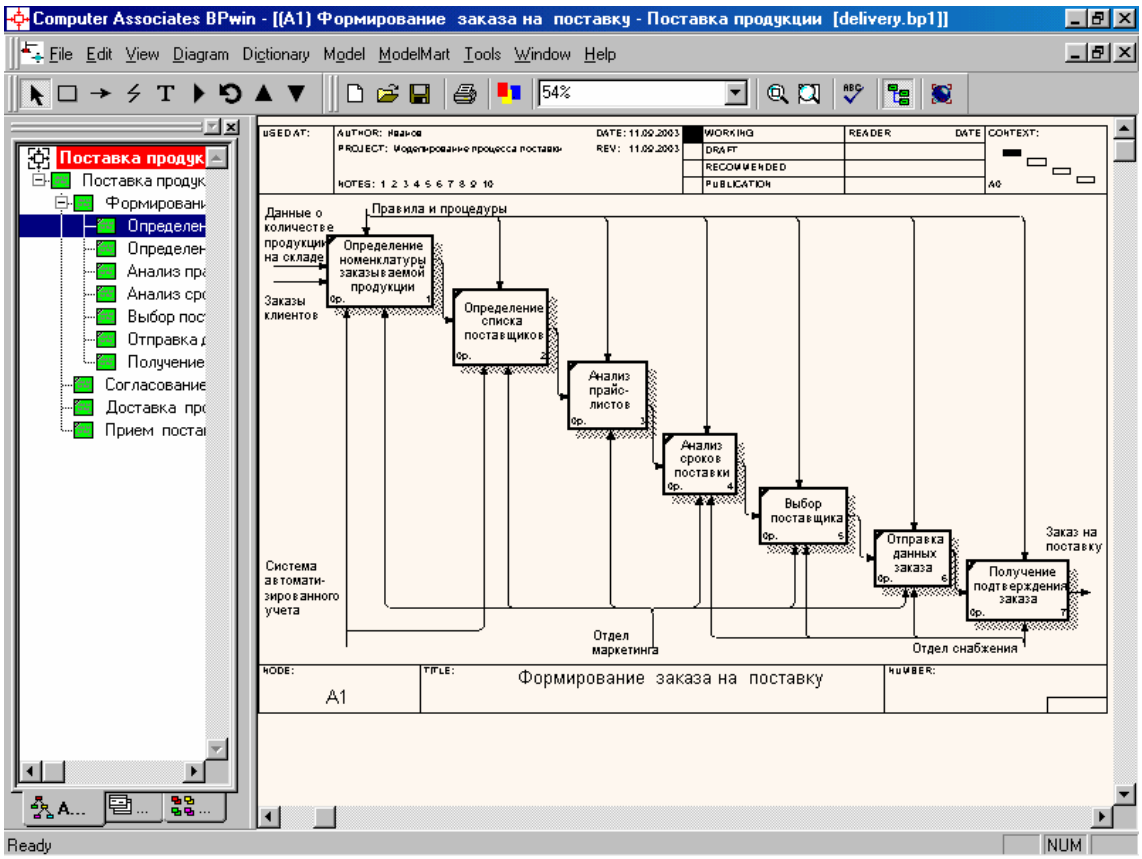

Figure 1.12

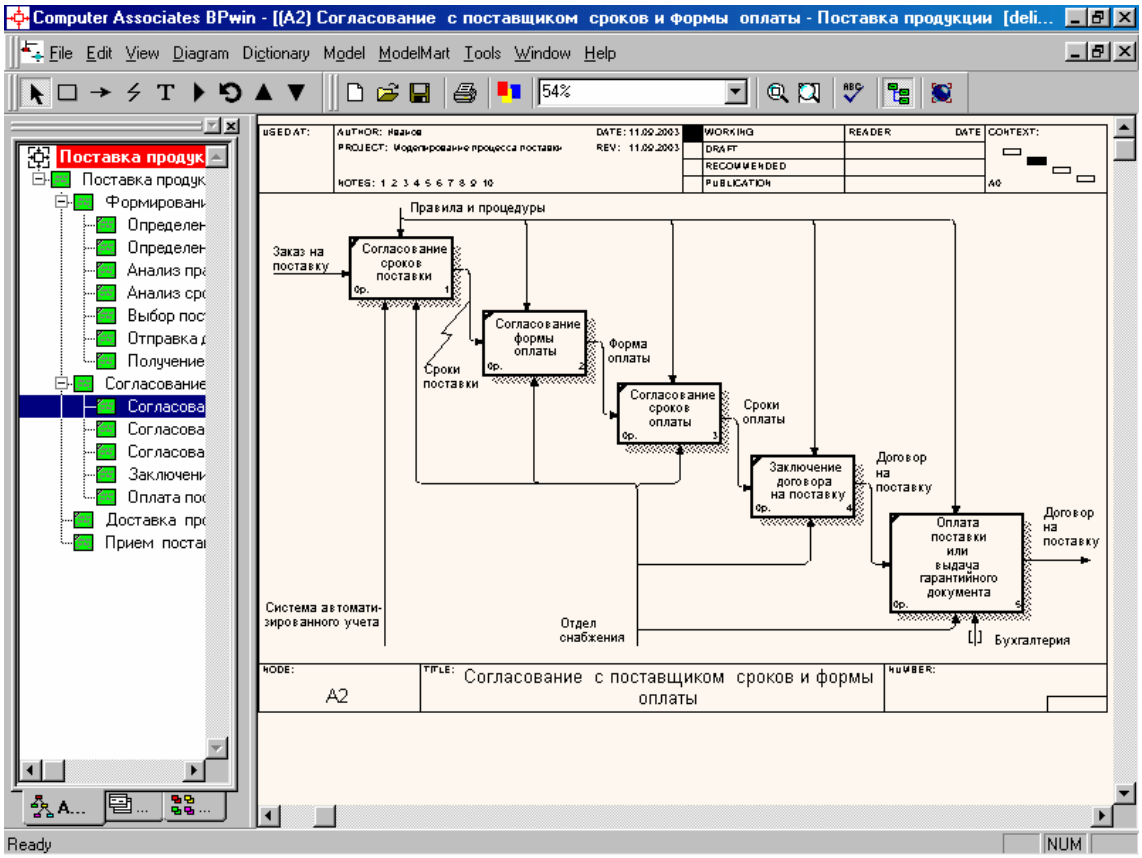

Figure 1.13

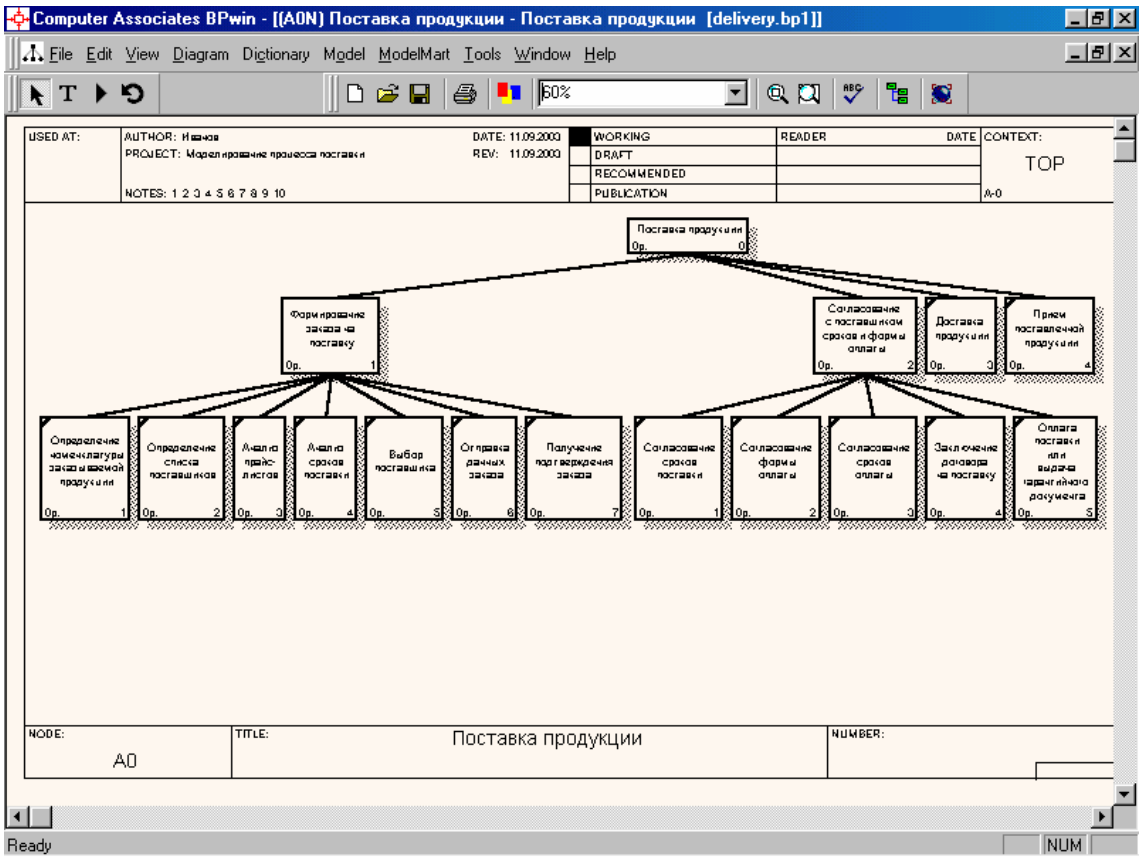

Figure 1.14

1.3. Workflow modeling

1.3.1. Split the original model

Open the model created by splitting the original model and saved in the file "Dlvr_idef3.bp1". The appearance of the model is shown in Figure 1.15.

1.3.2. Decompose the model

Perform the decomposition of the model, indicating the type of model – IDEF3 and the number of works in the decomposed diagram – 5. The appearance of the decomposed diagram is shown in Figure 1.16.

1.3.3. Diagram formation

1. For works on the diagram enter the following names: "Coordination of terms of delivery", "Coordination of the form of payment", "Coordination of terms of payment", "Conclusion of the contract for delivery", "Full payment of delivery" (without quotation marks).

2. Add two new works – "Partial payment for delivery" and "Issuance of a guarantee document for further payment" (without quotation marks). To add a new job, click on the "Activity Box Tool" button, and then click on the place in the chart where you want to place the new job.

3. Place the works on the diagram as shown in Figure 1.17.

4. Create an intersection on the diagram. To add an intersection, click the Junction Tool, and then click where you want to place the intersection. Types of intersections and their location in the diagram are shown in Figure 1.17. the choice of types of intersections was determined by the following considerations:

1) it is possible to conclude the contract for delivery only after the form of payment and terms of payment will be coordinated (and simultaneous completion of coordination is not obligatory);

2) payment for delivery is made only after the end of the contract, and, depending on the terms of the contract, any one payment option can be selected.

5. Place the inner and boundary arrows on the diagram, as shown in Figure 1.17.

6. Save the chart.

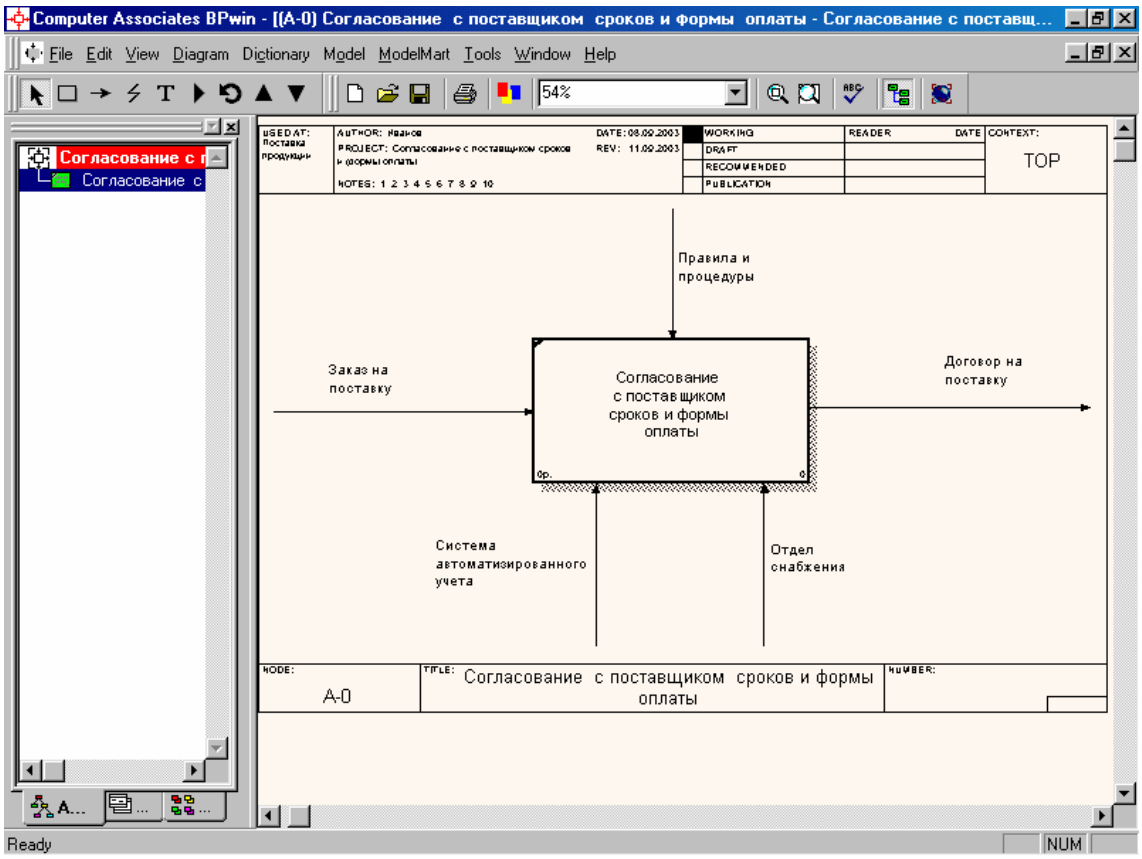

Figure 1.15

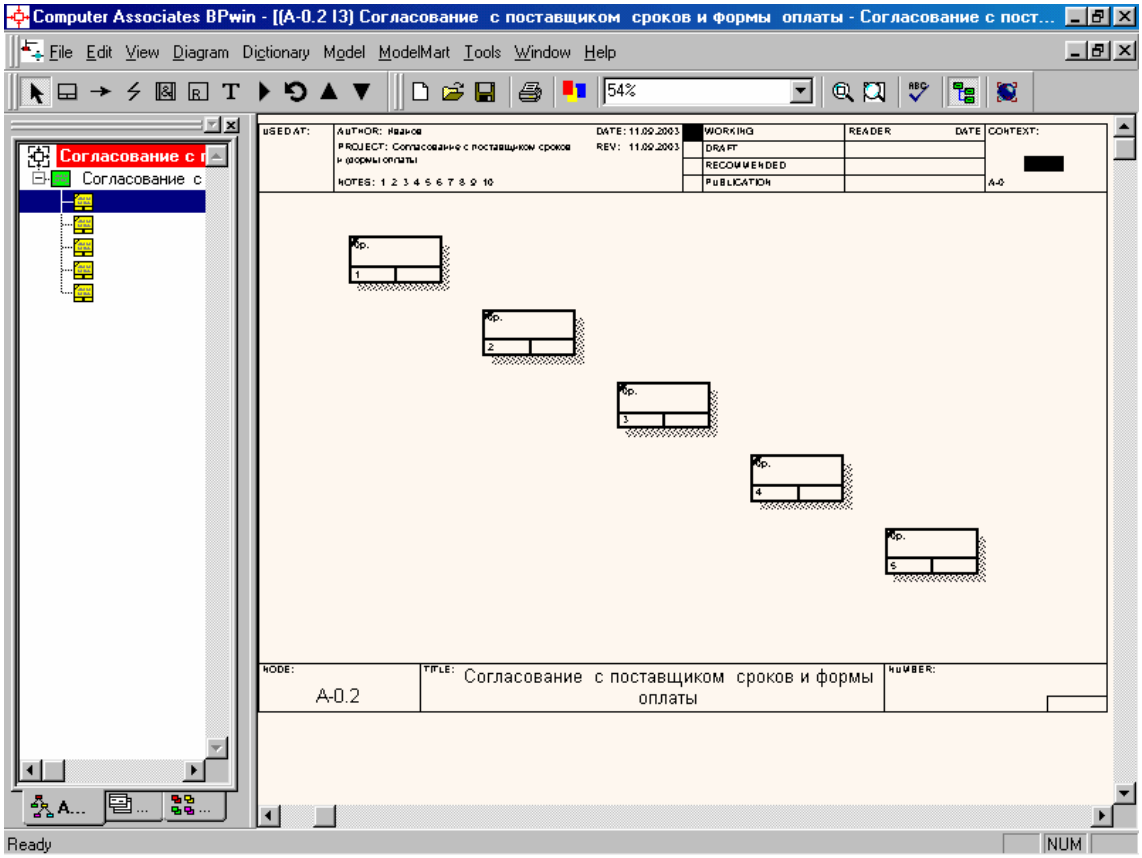

Figure 1.16

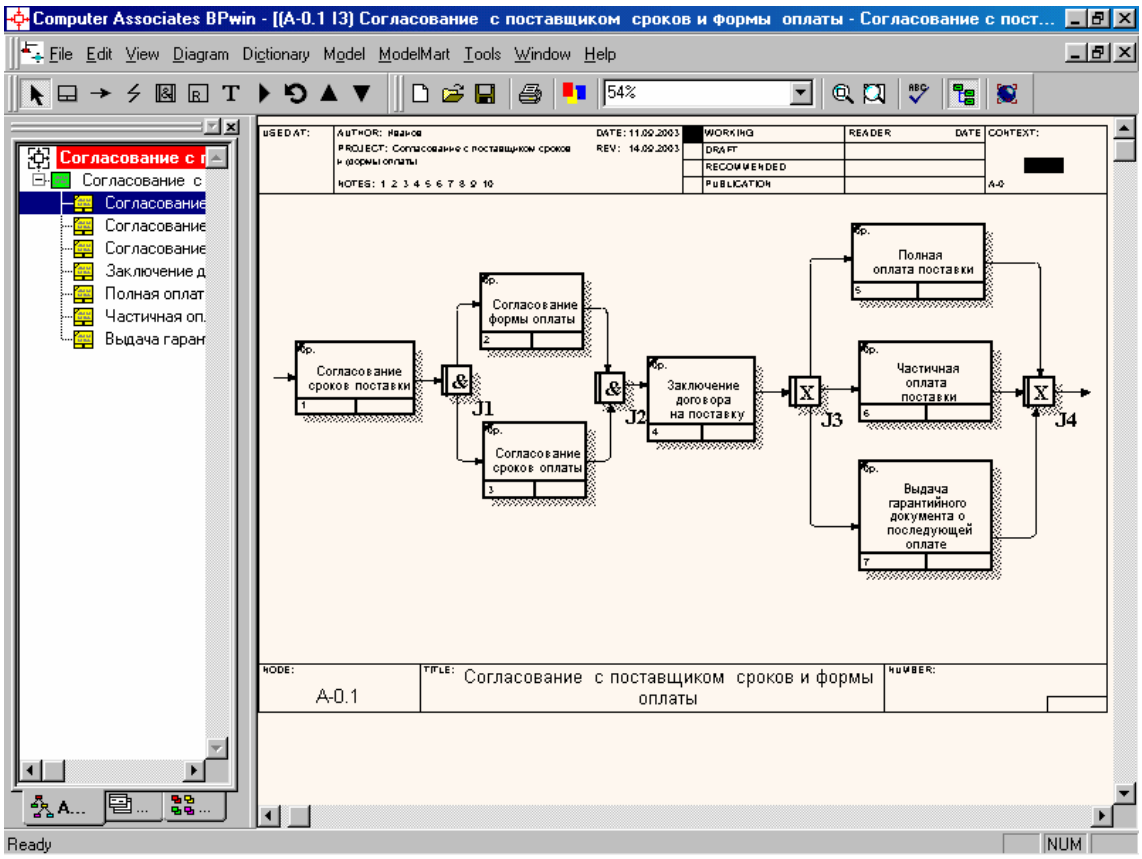

Figure 1.17

1.4. Data flows modeling

1.4.1. Split the original model

Open the model created by splitting the original model and saved in the file "Dlvr_dfd3.bp1". The appearance of the model is shown in Figure 1.18.

1.4.2. Decompose the model

Perform the decomposition of the model, indicating the type of model – DFD and the number of works in the decomposed diagram – 7. The appearance of the decomposed diagram is shown in Figure 1.19.

1.4.3. Diagram formation

1. Remove all boundary arrows.

2. For works on the diagram enter the following names: "Defining the range of products ordered", "Defining the list of suppliers", "Analysis of price lists",

"Analysis of delivery times", "Selection of supplier", "Transfer of order data", " Receive order confirmation "(without quotes).

3. Add an external link "Customer Order" to the chart. To make an external link, click the "External Reference Tool" button on the toolbar, and then click on the place in the chart where you want to place the external link (Figure 1.20)

4. Place the data warehouse on the diagram. To do this, click on the "Data store Tool" button on the toolbar, and then click on the place in the chart where you want to place the data warehouse. Create data warehouses with the names "Products", "Suppliers", "Customer Orders", "Market Status", "Stock Status", "Product Sales" (without quotes) (Figure 1.20)

5. Create internal arrows. Use the arrows to link the objects in the diagram as shown in Figure 1.20. Note that some arrows are bidirectional. In order to set the bi-directionality of the arrow, you must click on the arrow with the right mouse button, select "Style" in the menu and in the "Arrow Properties", in the "Type" section, set the switch to "Bidirectional".

6. Save the chart.

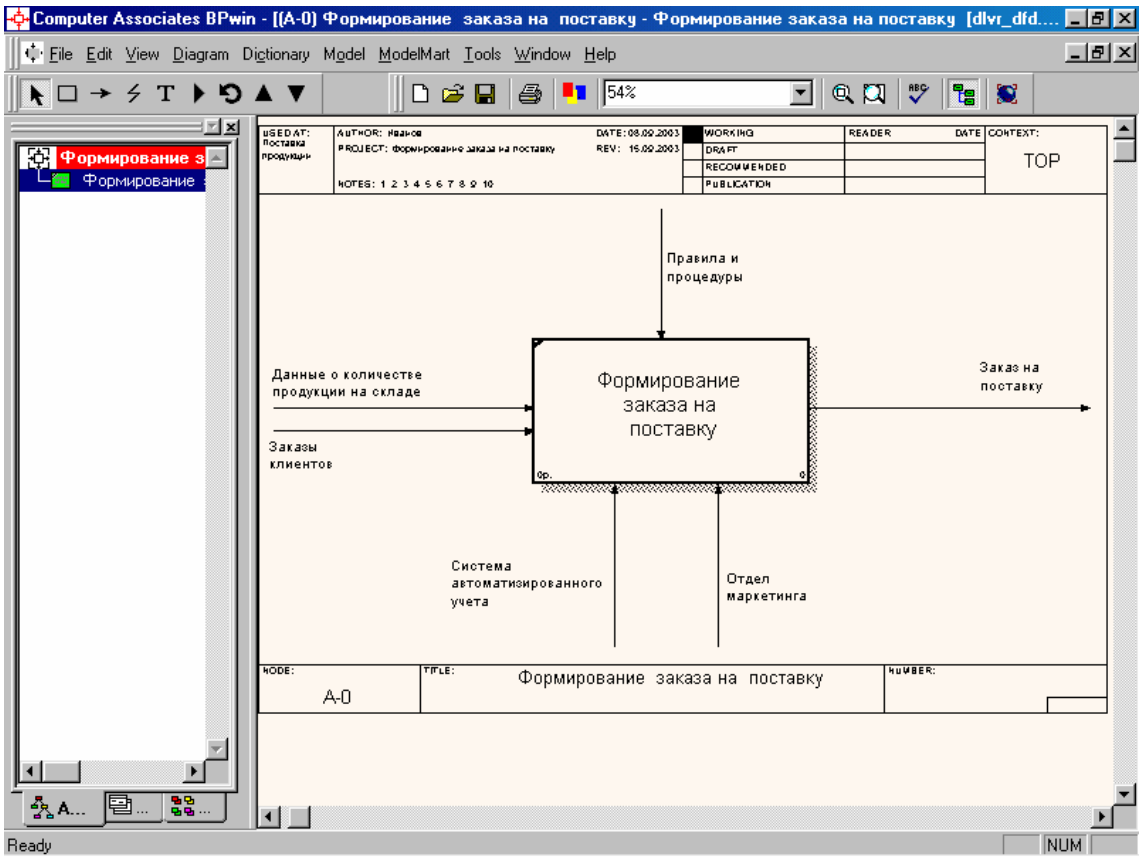

Figure 1.18

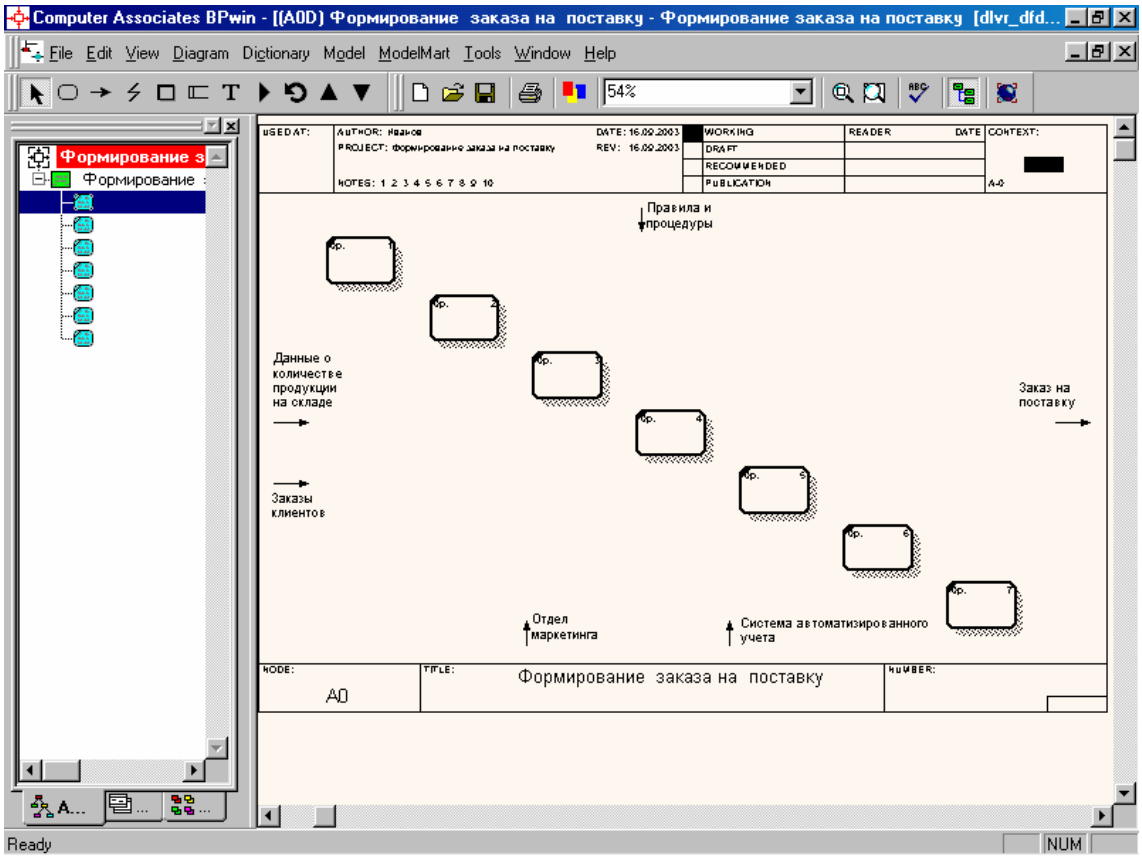

Figure 1.19

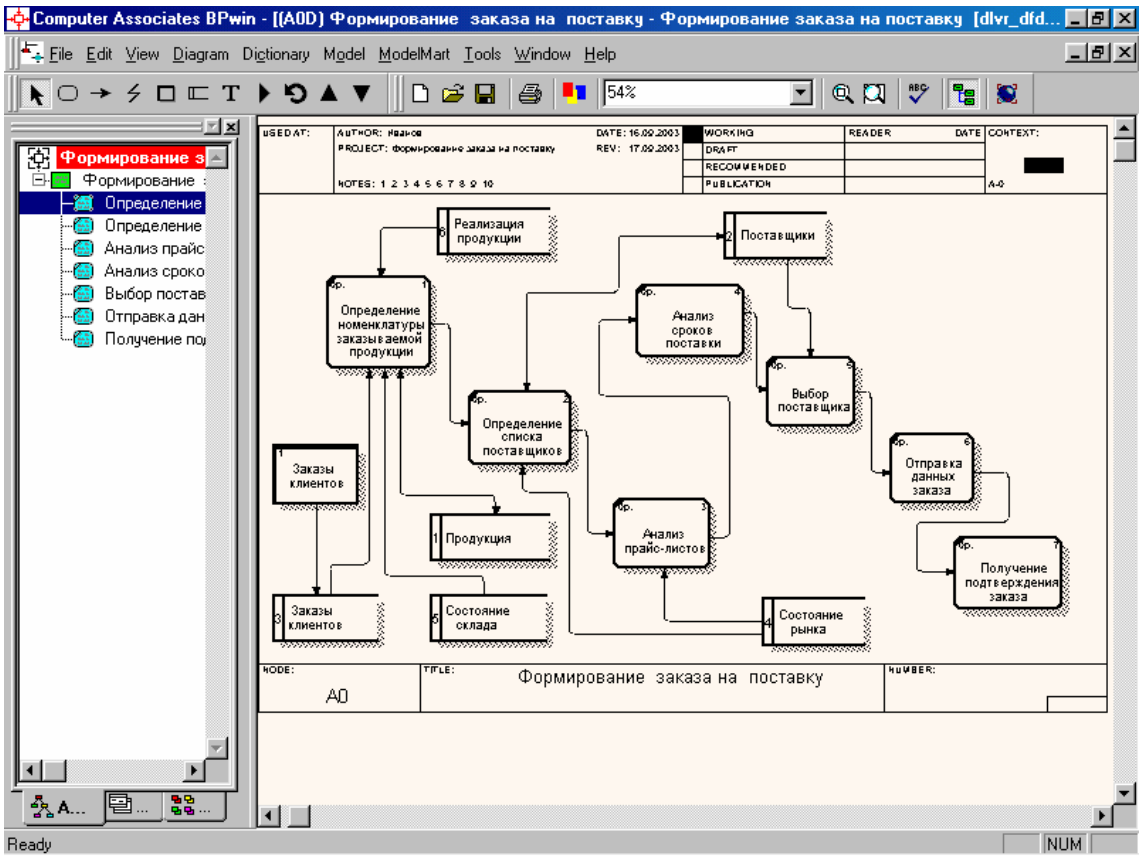

Figure 1.20

1.5. Questions

1. Briefly describe the main stages of this work.
2. Give the diagrams created during the work.