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TÍTULO: Modelado y automatización de procesos de negocio de una pequeña empresa en el ejemplo de un restaurante.

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RESUMEN: El artículo considera la aplicación práctica del enfoque basado en procesos en la descripción y modelado de procesos comerciales y la aplicación de estándares en la descripción de procesos comerciales en una pequeña empresa – un restaurant. El artículo presenta el modelo de actividad del restaurante, muestra la descomposición de la tarea, los flujos de datos de la actividad del restaurante, la implementación de la aplicación móvil y las etapas de implementación de una aplicación móvil para un restaurant. La implementación de la aplicación móvil permitió automatizar los procesos comerciales.

PALABRAS CLAVES: modelado, automatización, proceso de negocio, aplicación móvil, notación o formato de una descripción de proceso de negocio.

TITLE: Modeling and automation of business processes of a small business on the example of a restaurant.

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ABSTRACT: The article considers the process approach in description and modeling of business processes and the application of standards in the description of business processes. The paper shows the practical application of the process approach and business process modeling on the example of a small business object - a restaurant. The article presents the restaurant's activity model, shows the task decomposition, the restaurant activity data flows, the implementation of the mobile application and the stages of implementing a mobile application for a restaurant based on a process approach and modeling business processes as well as the use of standards for describing business processes. The implementation of the mobile application allowed automating business processes.

KEY WORDS: modeling, automation, business process, mobile application, notation or format of a business process description.

INTRODUCTION.

Modeling and automation of business processes are the keys to the successful functioning of the enterprise. The success of an enterprise depends on professional modeling of business processes. Automation of business processes optimizes the work of all segments of the enterprise, eliminating internal interference and the human factor.

In the market conditions, each enterprise to improve its competitiveness increases the efficiency of business processes using methods of process automation enterprises. Qualitative performance indicators of the company consist of customer loyalty, professional qualifications, brand image, and automation of management processes (Zubarev & Shamardin, 2012).

The most striking sign of the time was the development of electronic business. This segment of the business has proven its viability and effectiveness; therefore, almost any enterprise in both the manufacturing and non-manufacturing sectors builds its business processes using elements of electronic business.

Using the capabilities of e-business allows traditional companies to effectively solve marketing and managerial tasks (“Wikipedia,” n.d.; Golubeva, 2017).

All the same, statistics say that a third of modern customers are more willing to work with individual applications than with a web page, so it’s recommended to use applications to bring customers to the site.

Description of business processes (BP) is one of the stages of enterprise BP management (Kintonova, Kutebayev, & Mustafina, 2016; Kintonova & Kutebayev, 2018; Kintonova, 2018).

For the convenience of using the BP description and for the correct reading of the BP description, it is necessary to use generally accepted methods and standards for describing the BP. There are many techniques for describing BP; for example, the IDEF-notation that is used to describe the goals of a BP and to describe the workflow of a BP. The disadvantage of IDEF is the high degree of abstraction in describing the activity. This complicates the perception of such BP description models.

The classic DFD and WFD standards contain a set of characters or designations that describe a business process. These designations are usually called the language or methodology for describing processes. In this case, this language or methodology is classic.

A notation or format for describing a business process is a combination of graphical objects used in models and modeling rules.

Modern methodologies for describing business processes. One of the most famous and widely used methodologies in the field of business process modeling is the IDEF family methodologies. Methodologies for describing activities. IDEF, the ICAM Integrated Computer-Aided Manufacturing, is a methodology for the US Air Force program that develops tools, methods, and processes to support production integration.

The IDEF methodology is used to solve the problems of modeling complex systems, which allows you to display and analyze the activity models of a wide range of complex systems in various sections. The breadth and depth of the inspection of business processes in the system are determined by the developer himself, which helps to not overload the created model with redundant data (Kintonova & Oralbekova, 2017; Kintonova, Oralbekova, & Oralbekov, 2017; Adilbekuly, n.d. a).

Today, perhaps one of the most popular functional modeling methodologies is IDEF0.

Modeling of the enterprise, as a rule, begins with the formation of a functional model. However, such models are “static”, they are not intended, for example, to describe the step-by-step

implementation of any working procedure. They are intended mainly to display the overall picture, the concept of work.

Models of workflows (workflow-models) allow you to describe the process as an ordered sequence of various actions, occurring events, as well as objects involved in the implementation of this process (Golubeva, 2017).

Consider the automation of a small business on the example of a restaurant. To attract customers and for business development, “The Shoreditch” restaurant has developed a mobile application.

DEVELOPMENT.

The process approach aims at representing the enterprise as interconnected processes. Since the objective of the enterprise is to bring its products to the market, and products are the result of business processes, to improve product quality and payback for products, it is necessary to improve business processes.

The process approach allows you to calculate the cost of a business product: this is the sum of the cost of maintaining a business process, the cost of output business products and other resources.

In practice, it is necessary to describe business processes, reflect information flows, data flows and document exchange between business processes, processes must be digitized, the use of technologies (tools) for the calculation by collecting data, processing, and storage.

Process management is the most approach that provides enterprise flexibility, stable results, and continuous business improvement. Regulating the business processes of an enterprise, it is easier to scale or replicate its activities (Golubeva, 2017).

The IDEF0 methodology is slightly different from the classic DFD business process description scheme. In IDEF0, in contrast to DFD, analytics was added, it shows not only the inputs and outputs but also suggests introducing three types of inputs: the same input as in DFD and two other

inputs - controls and mechanisms. In the IDEF0 standard, using input, objects such as information flows and material flows are shown. With the help of mechanisms, they began to show the mechanisms by which a business process is implemented: hardware, people, information systems, etc. The output of the business process described in the IDEF0 standard fully corresponds in meaning to the output of the process described using the DFD scheme.

The four types of objects used to describe the inputs and outputs in the IDEF0 standard form the abbreviation ICOM in the English version and are placed in strictly designated places on the IDEF0 diagram concerning jobs called function blocks.

The practice has shown that the IDEF0 standard is appropriate to use in projects for the description and optimization of local business processes (Golubeva, 2017).

The traditional type of restaurant, family-style, luxury restaurants, fast food restaurants or fast food.

The mobile app designed for the restaurant business implies the following functions for the client:

– Ordering through the electronic menu.
– Table reservation (with a choice of dishes or choose upon arrival at the restaurant).
– Home delivery order.
– Implementation of the online transaction.

The designed mobile application for the restaurant business involves the following functions for restaurant staff:

– Viewing current customer orders.
– Regulation of the receipt of products at the warehouse depending on order.
– Viewing and editing the recipe cost calculator.
– Editing orders and their status, confirmation of reservation of table.
– Acceptance of orders and customer addresses, and home delivery.

– Editing user profiles.

– Administration of access to data for employees.

Modeling mobile application «The Shoreditch».

Analyzing the activities of public catering, it is necessary to distinguish three main works that are part of the enterprise, as shown (Figure 1).

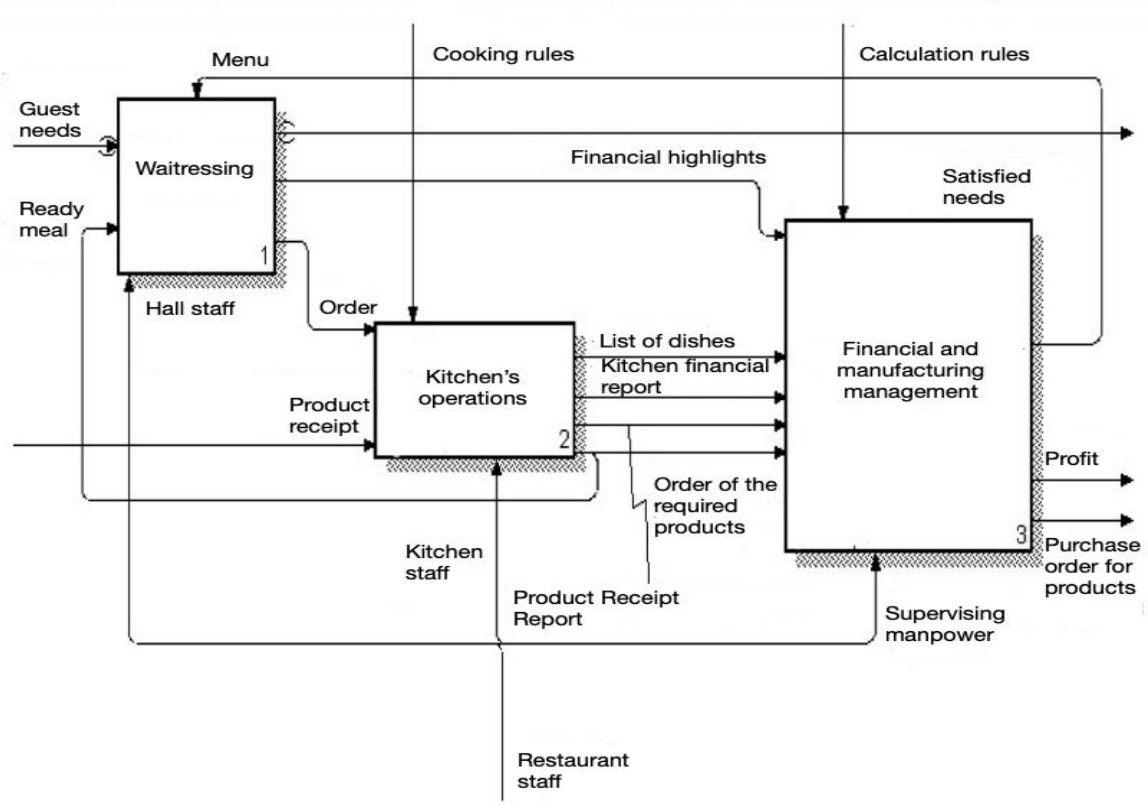

Figure 1. Restaurant activity model.

The restaurant provides:

– Enterprise customer service.

– The work of the kitchen, which is responsible for cooking.

– Financial management and production, responsible for managing the finances in the restaurant, creating a daily menu and managing the procurement of products.

The subject of studying the activities of the restaurant is the process of serving visitors. To better understand the logic of such a process, it is necessary to decompose the restaurant's customer service activities into two work fronts, as indicated in Figure 2):

– Table service.

– Customer settlement.

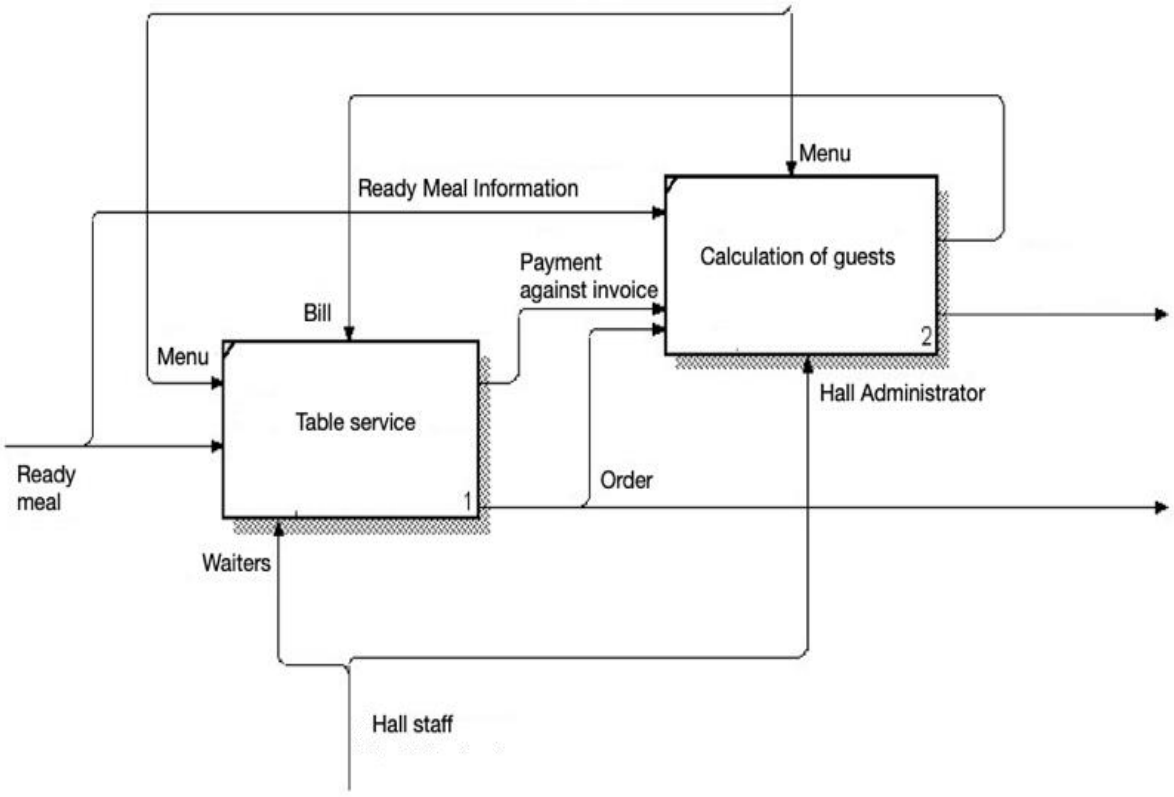

Figure 2. Decomposition of the "Customer Service" task.

The diagram presented in Figure 2 shows that the work of the waiter consists of serving the table, including:

– Table cleaning after the client.

– Serving the menu to a new client.

– Receiving an order.

– Transfer of the order to the kitchen to begin execution of the order and the administrator of the hall to create an account.

– Serving of the ready order to the client and, if necessary, acceptance of a new order.

– Providing an invoice to a client and receiving payment.

The work of the hall manager includes:

– Formation of an invoice for payment.

– Control of the correctness of the order by the waiter.

– Table reservation confirmation.

– Delivery order confirmation.

Data streams can be reflected in the DFD diagram. Figure 3 shows a diagram showing two external entities - guests (1) and suppliers (5).

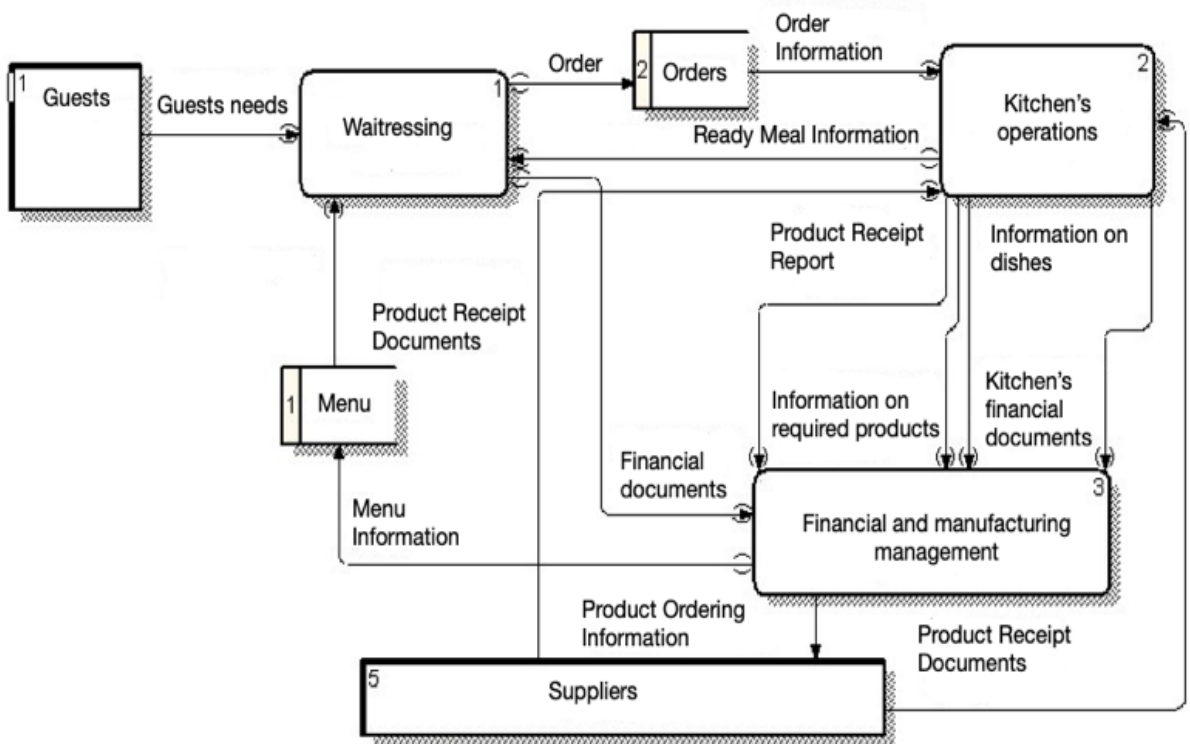

Figure 3. Restaurant activity data streams.

The company is active and carries out daily contact with visitors and suppliers. Orders are received daily from customers, and documentation on orders and goods receipts is exchanged with suppliers. Information is exchanged with visitors in the process of servicing visitors when orders for dishes are received from them. Suppliers, on the other hand, have direct contact with the production and financial management department, as well as with the kitchen in the process of product delivery.

In Figure 4, a DFD diagram is displayed, which reflects the service to visitors of outgoing and incoming information in the process of serving visitors.

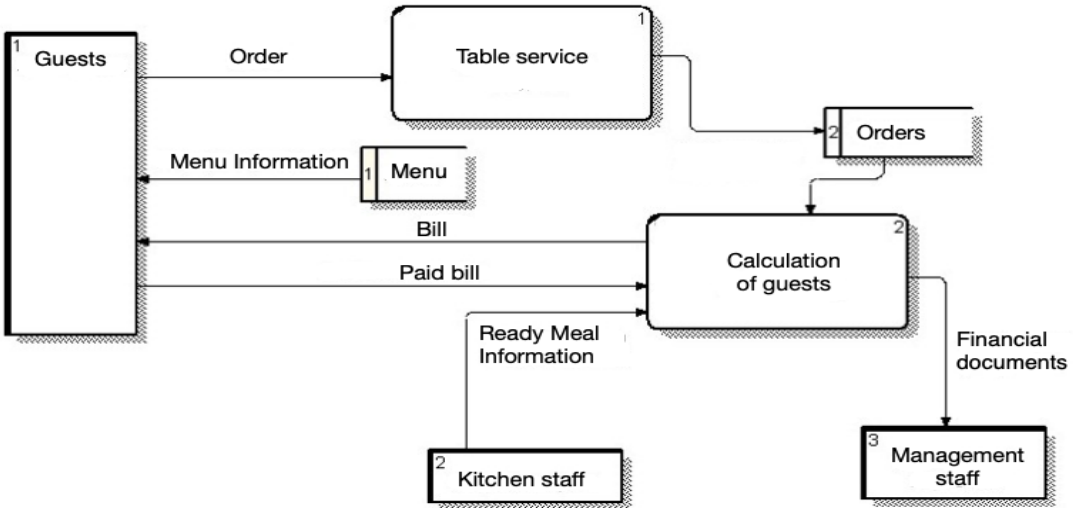

Figure 4. Client service.

Application Design of «The Shoreditch».

The mobile application increases the restaurant's revenue generation speed by creating a new sales channel and reducing the cost of external advertising and promotion. For a mobile app to be truly profitable for a restaurateur, you need to minimize the cost of creating and maintaining.

In the simplest case, you can use a web application for these purposes, where:

- The client is a browser.
- The server is a web server.
- HTTP protocol is used for data exchange.

The advantage of such an application is ease of development since all the details of exchanging data with the server are already “packed” in the browser. Disadvantages: low speed, limited functionality.

Therefore, we will consider here how to develop a mobile client using “native” Java. The remaining system components will remain the same.

As with several other examples, this application was developed to simplify the work of personnel and automate business processes. As shown below, Figure 5 illustrates how client requests are processed. It also perfectly demonstrates all data processing flows and their entire cycle.

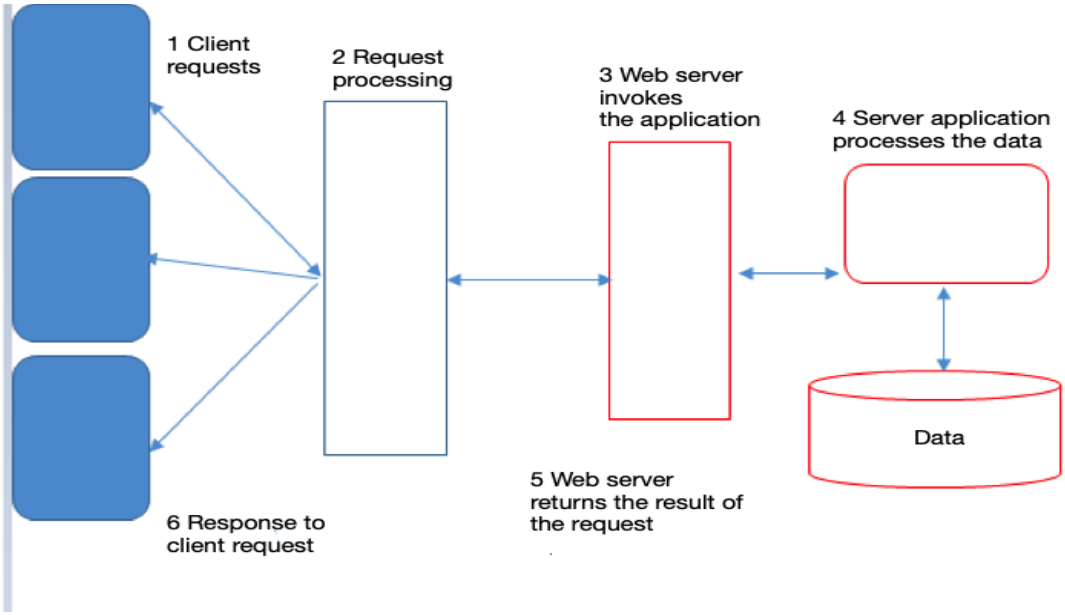

Figure 5. The architecture of data exchange in a client-server system.

Thus, the system includes the following components:

– Client method that controls the processing of the user interface - data input, button presses, etc. (onCreate).

– Client method for exchanging information with a web server (GetText>).

– Server script to receive data from the client and return a response (httppost.php).

– Client method for displaying received data (showData).

Depending on the selected technologies on the client and server, all components can be implemented in completely different ways (Kintonova & Kutebayev, 2018).

Implementation of «The Shoreditch» Mobile app.

Implementation of the application was carried out according to the Restaurant Business Model shown in Figure 2, according to the application model for the restaurant business, according to the data exchange architecture in the client-server system.

Figure 6 shows a code fragment of mobile application implementation, implementation of four authorization access levels:

– Developer.

– Administrator.

– Employee.

– Client.

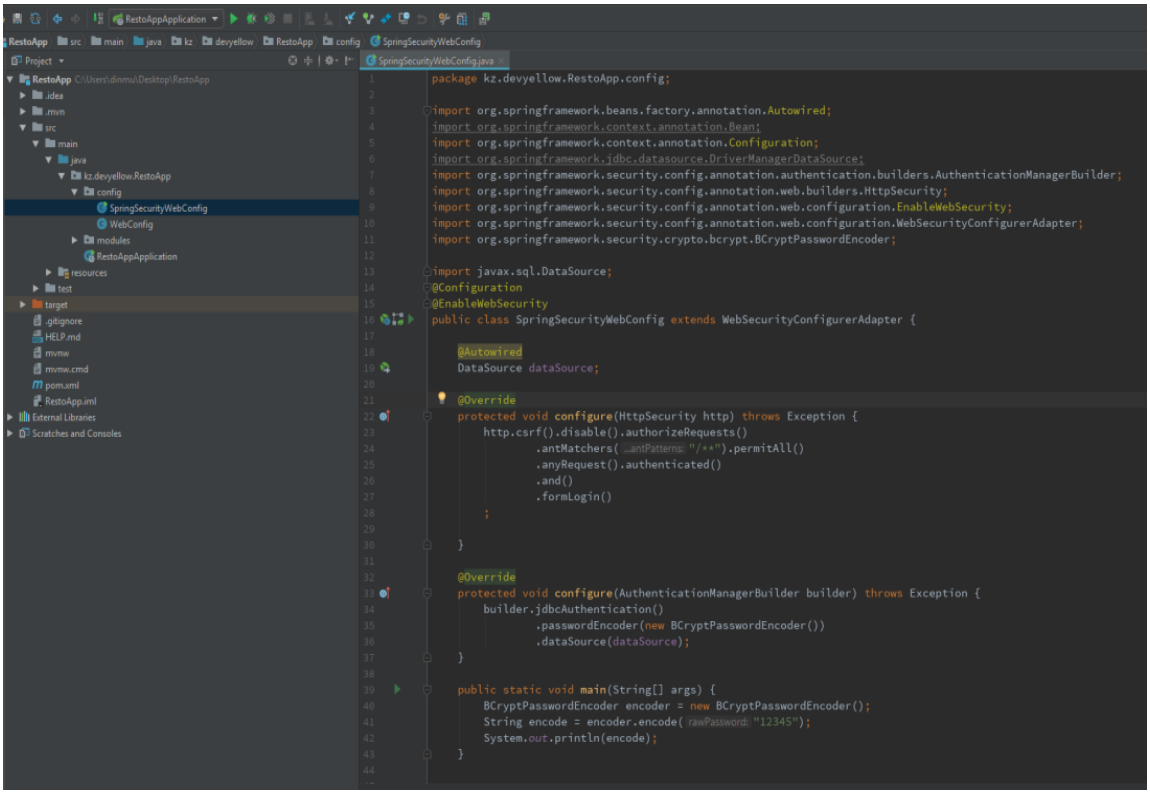

Figure 6. Authorization Access Level Settings.

The developer has the right to enable and disable some functions, add and adjust the application program code. The administrator, in turn, sees the orders, can book tables. Employees, on the other hand, receive tasks directly from administrators and can also accept payments from clients and write a report on the status of the table or the order. The client, in turn, can familiarize himself with the menu, order a meal or drink from the menu list, book a table and will also receive notifications about promotions, discounts, bonuses and various events of this institution (Adilbekuly, n.d. a; n.d. b).

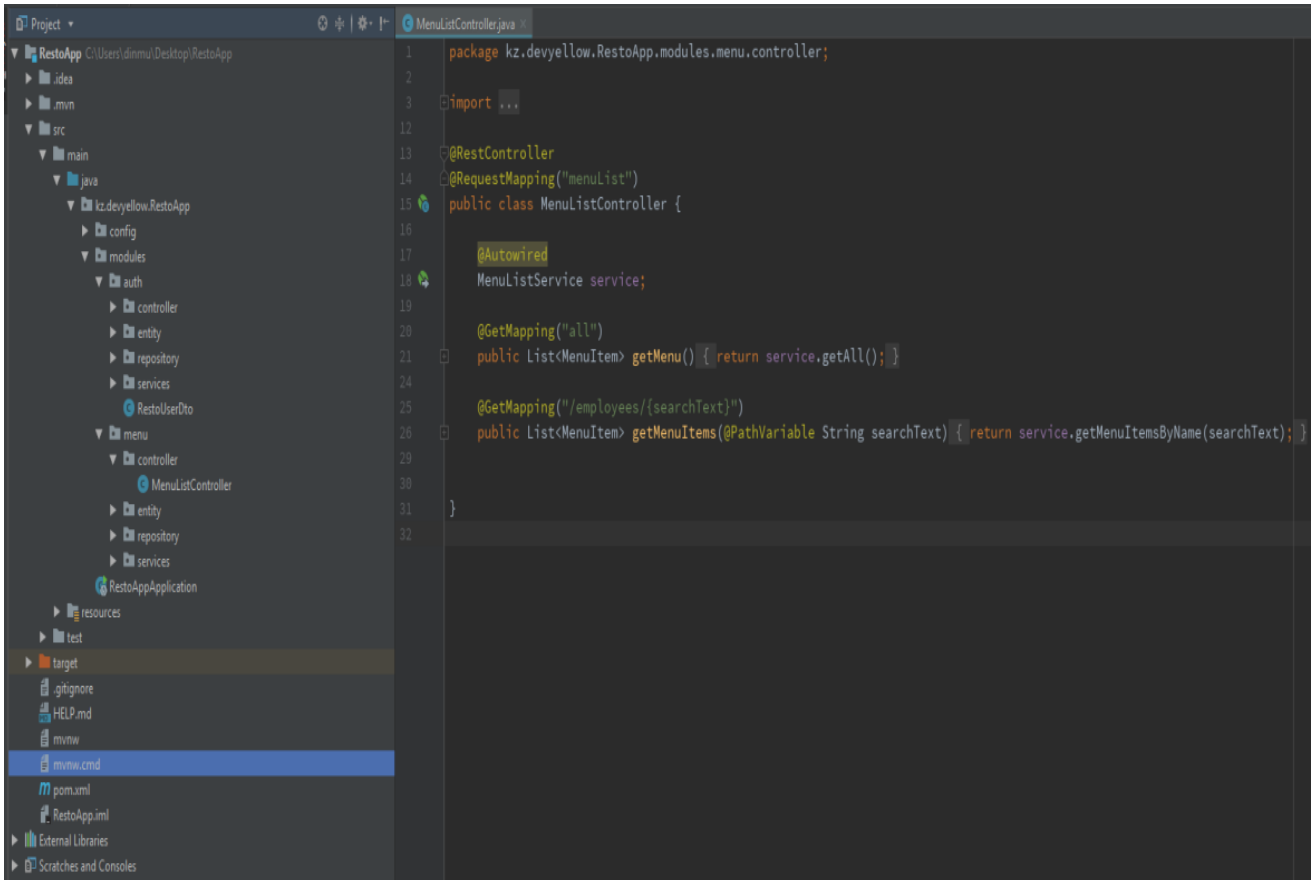

Figure 7. Restcontroller client-server architecture.

Application Interface Implementation of «The Shoreditch».

Designing an interface for the client. The interface of the mobile application for the restaurant business, assumes the availability of registration forms and the execution of transactions, ordering menus and reserving seats.

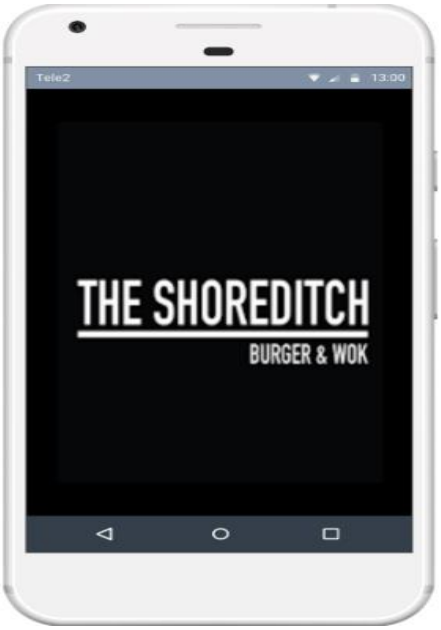

Figure 9. Main application window of «The Shoreditch».

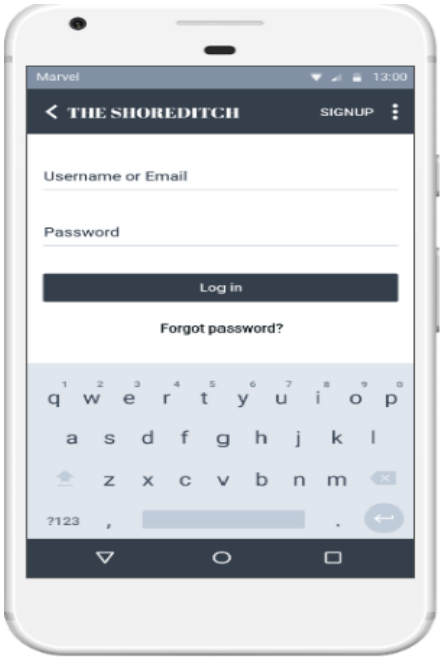

Figure 10. Application Registration Form of «The Shoreditch».

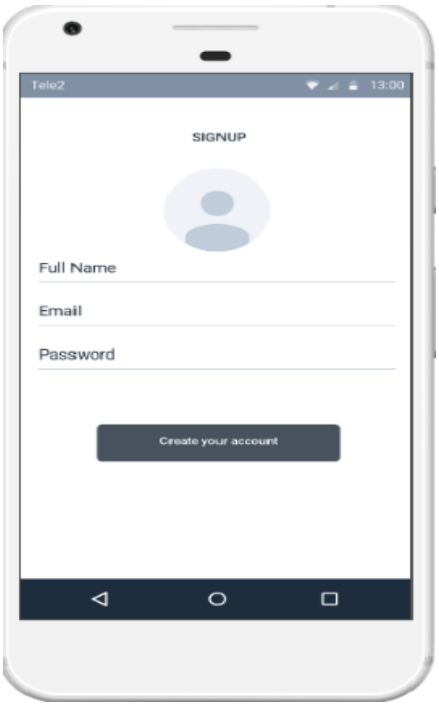

Figure 11. Application Login Form of «The Shoreditch».

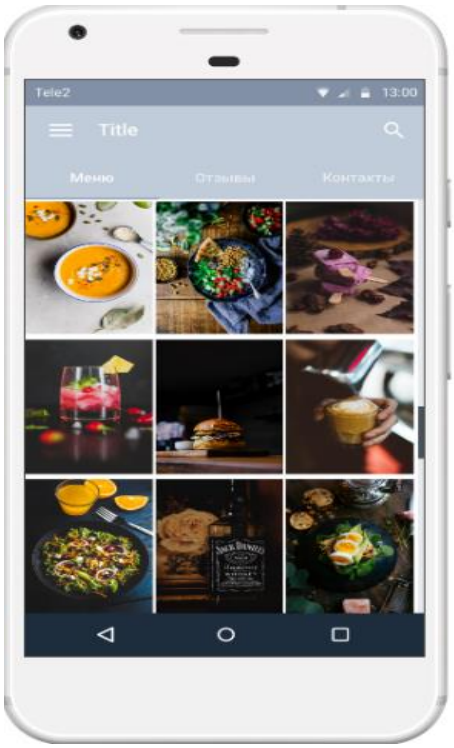

Figure 12. Application Menu of «The Shoreditch».

Designing an interface for the administrator. The interface of the mobile application for the restaurant business assumes a list of tasks for the day, order status - what stage the order is at, client registration settings, regulating transaction flows, settings support.

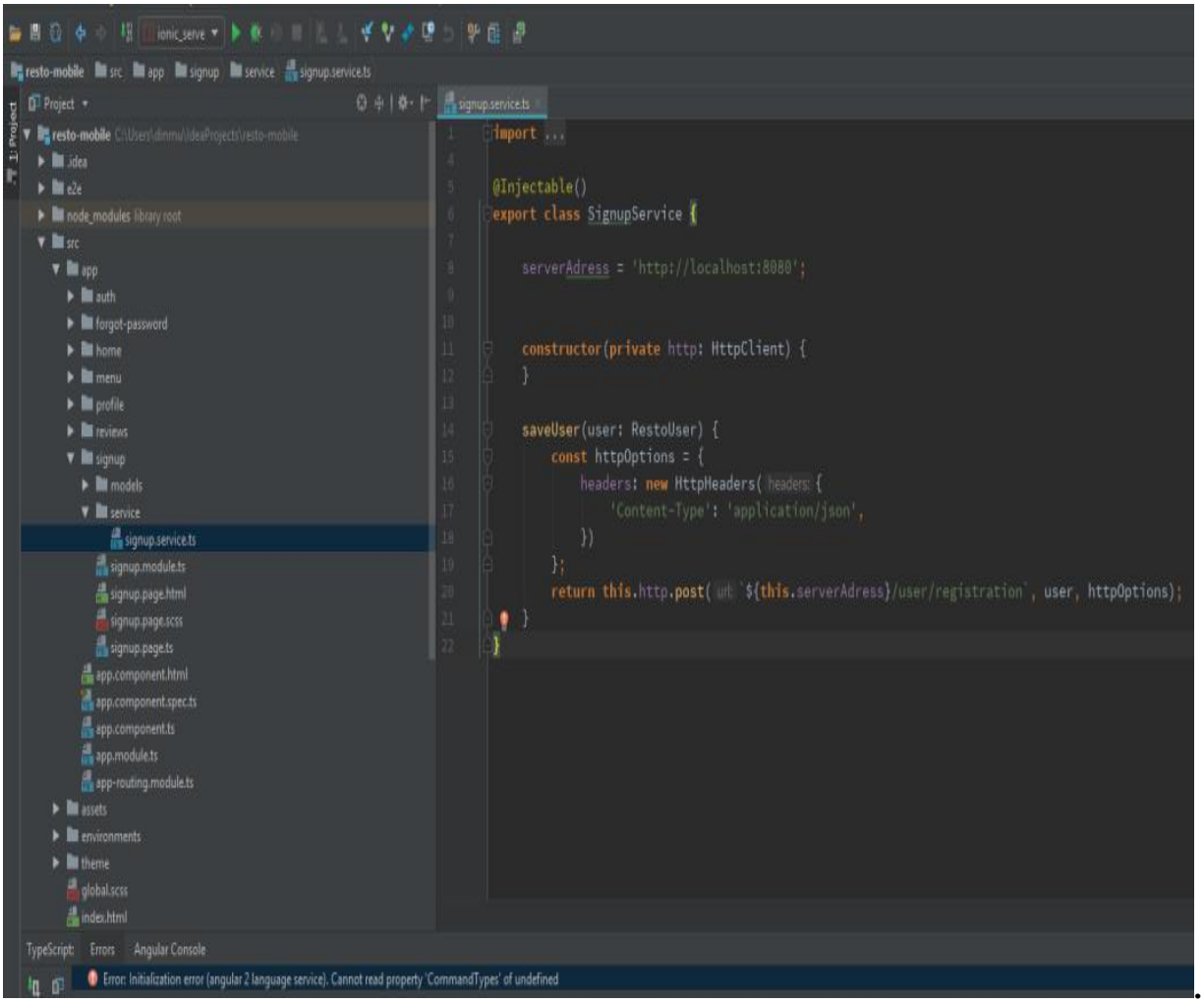

Figure 13. Implementation of the registration form.

CONCLUSIONS.

The process approach in the description and modeling of business processes, and the application of standards in the description of business processes, allows you to consider all the features of the restaurant business when designing and implementing a mobile application.

For the convenience of using the description of business processes and for the correct reading of the description of business processes, it is necessary to use generally accepted methods and standards for describing business processes.

Thus, on the example of modeling and automation of business processes of a small business object (restaurant business), in the article, we showed the implementation of a mobile application. The implementation of the mobile application allowed us to automate business processes and increase the competitiveness of the restaurant.

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