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## FEATURES OF THE DESIGN OF SOFTWARE PRODUCTS FOR ONLINE MARKETING SERVICES

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## ОСОБЛИВОСТІ РОЗРОБЛЕННЯ ПРОГРАМНИХ ПРОДУКТІВ ДЛЯ ОН-ЛАЙН МАРКЕТИНГОВИХ ПОСЛУГ

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## ОСОБЕННОСТИ РАЗРАБОТКИ ПРОГРАММНЫХ ПРОДУКТОВ ДЛЯ ОНЛАЙН МАРКЕТИНГОВЫХ УСЛУГ

*The process of the gradual development of information computer system with complex architecture for providing services of online marketing is described in the paper. The peculiarities and challenges of mobile application development as part of the system are also analyzed and presented.*

**Key words:** software development, mobile application, system architecture, database.

*Fig.: 4. Bibl.: 7.*

*Представлено процес поетапного розроблення інформаційної комп'ютерної системи з комплексною архітектурою для надання послуг онлайн-маркетингу. Також проаналізовано особливості та труднощі розроблення мобільних додатків як частини системи.*

**Ключові слова:** розробка програмного забезпечення, мобільний додаток, архітектура системи, база даних.

*Рис.: 4. Бібл.: 7.*

*Представлен процесс поэтапной разработки информационной компьютерной системы с комплексной архитектурой для предоставления услуг онлайн-маркетинга. Также проанализированы особенности и трудности разработки мобильных приложений как части системы.*

**Ключевые слова:** разработка программного обеспечения, мобильное приложение, архитектура системы, база данных.

*Рис.: 4. Библ.: 7.*

**Introduction.** Due to the rapid development of information technologies and the importance of their role in daily life, development and implementation of IT systems in the various areas of human life is one of the key tasks of modern IT-technologies.

Establishments that provide people the improvement of their physical condition through regular physical exercises are not an exception from the general trend. An important role in the population of the current task takes the fact that due to the novelty of the recreational industry there are not many information computer systems that perform all the required tasks to automate the customer service process, and the functional set of the existed systems is quite limited.

Another important requirement to the modern information computer systems is the ability to operate not only in browsers, but also on mobile platforms. The implementation of mobile applications requires not only the usage of additional technologies, but also imposes additional restrictions on many aspects of the system implementation, which are usually available and customary for the standard web-clients.

**Related work.** The development of mobile application is a trend area of research of scientists in the last ten years. The usage of mobile technologies in various areas of human life is discovered and presented in a wide range of academic papers, conferences etc. [1–3]. A lot of scientific works are dedicated to the topics of usage mobile apps in academic and education establishments, libraries, laboratories etc. [4–5].

The development of information systems for industry also includes the implementation and design of the software for mobile platform. [6-7]The topic of the development of information computer system for recreation and sport industry is relevant and corresponds with the modern IT requirements.

**General features of subject area.** To implement the information computer system, which will meet all the requirements to software for the selected industry, it is necessary to consider the main features that are hallmarks of the recreational industry and not common for other areas.

The concepts of services and cards with services are used as products of the industry and commodity for the clients. The services, which performance are provided by a fitness club, are divided into several subspecies, namely: individual services, group services and services, which don't require a specialist. Based on the presented information the conceptual domain model has been developed (Fig. 1).

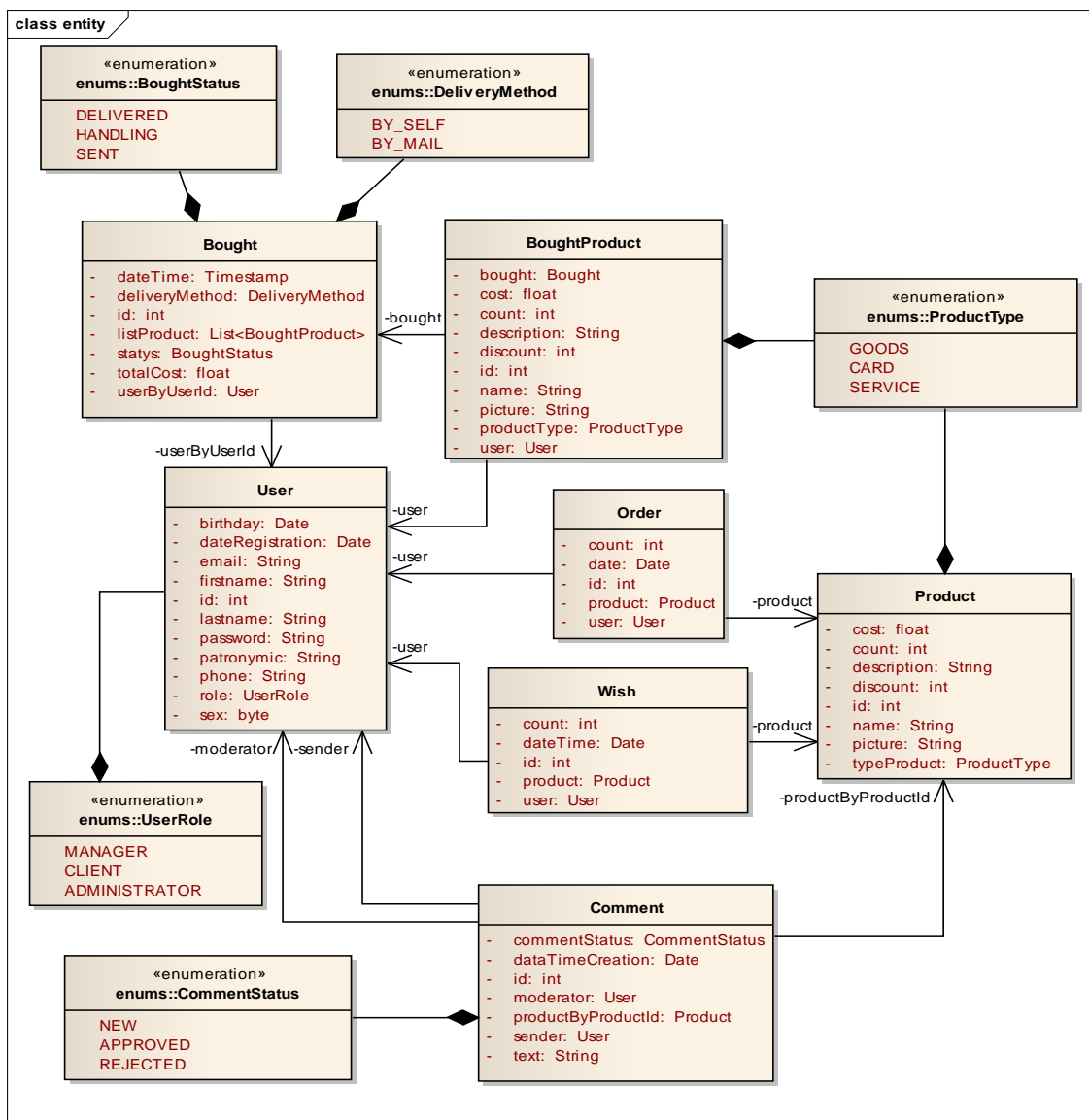


Fig. 1. The conceptual domain model

Special cards are used to account the number of services that establishment must provide to the customer. Cards can also be of two types: cards with a static set of services and client cards, which services set is selected by a client. For the cards of the first type the number and type of the services are specified by the recreation institution. Buying such card a client also gets an ability to give it to other person as a gift. Purchasing of such card can be performed by people who are not members of a sports institution. In case of the client card with a personal set of services, this feature is available only for current members of the recreation complex. To obtain the possibility of acquisition of such card the client must be registered and then can

view the list of available services. When a client has identified the required set of services, he/she is able to buy it that will be displayed in his/her personal account and card.

Another option that should be envisaged is the possible ability to sale not only services but other goods. There are such goods as sports equipment (boxing gloves, elastic bandages etc.) and healthy food (energy or protein drinks etc.).

**Development of the information and computer system.** The structure of the software subsystem is presented in Fig. 2.

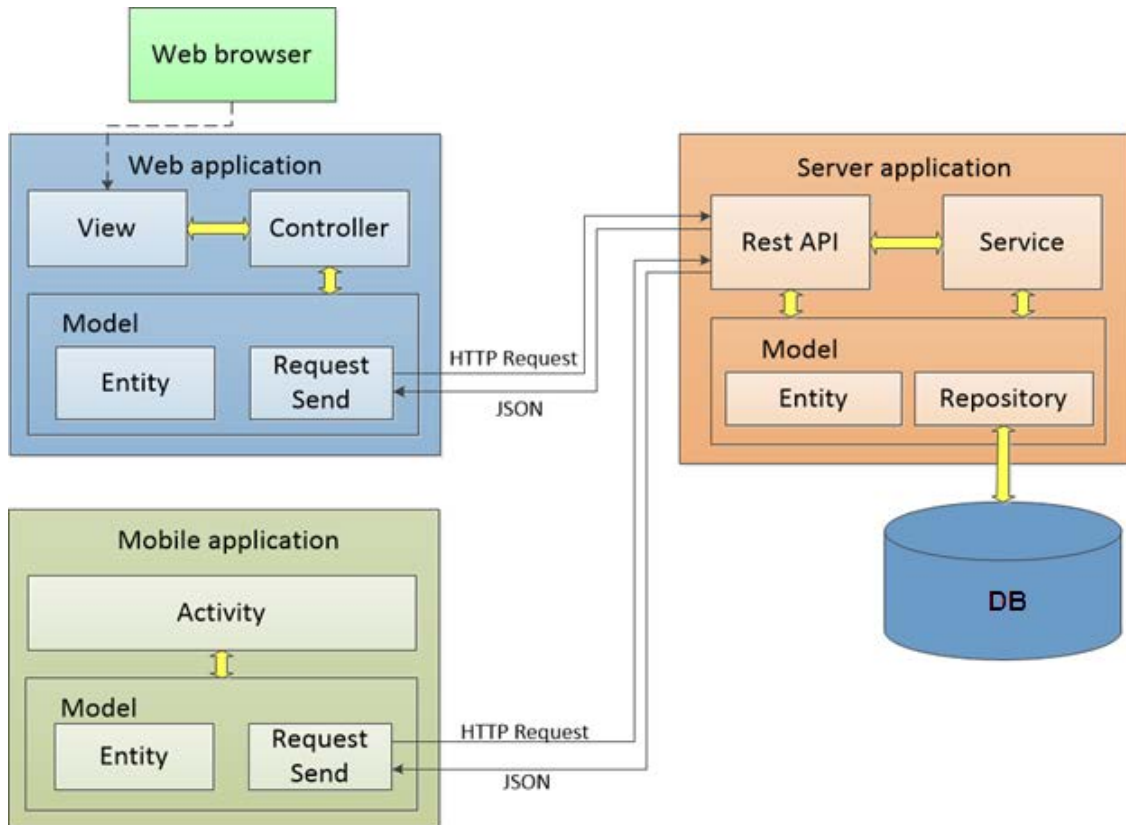


Fig. 2. The structure of the software subsystem

The server that will process the http-queries received from a client application is required to provide system operation. The client application should provide ability to work via both web-application and mobile application. To improve the reliability of information stored in the database the allocation of an additional backup server that should be optimized for the performance of the database server is required.

Server software of the developed system operates closely with the client application via http-protocol and Rest-services. Such realization requires presence of the web-server that will process all requests from the client application of developed system.

Considering presented information the conclusion can be made that the program consists of a web-application, mobile application, application server and database. The application server is designed for client actions processing, sending of the necessary data to customers, work with databases and performance of complex calculations. Rest-service module is required to provide interaction between client and server programs. The http-queries and JSON-objects are used for data transmission between client and server.

The main two roles are identified in the system usage. They are a user and an administrator.

The user is a person, who can view, select and buy any services and goods, provided by the recreation complex. The developed system also provides the ability to add goods or

services to the wish list, where they will be temporarily stored until user will buy or delete them. User also has the opportunity to send messages to the administrator of a sports complex with the aim to get some additional background information. Any user also can view the archive of orders, where the history of his latest purchases is shown. The user can comment on all of the products sold by the health complex. Other functions, available for a user are an ability to manage his/her personal account, to edit his/her personal information and to apply for the administrator to delete his/her account if it's required.

The administrator has a wide range of possible functions. The administrator performs control over the services available to customers and their purchases, so he/she can add, remove or edit services, cards with services and goods. He also sends messages using previously created list of recipients and message body. Additionally the system administrator also has a function to response to the client message with required consultation. The administrator can also get generated reports about data in a previously selected form.

**The database development.** The tables, designed for the developed system, are: «user», «product», «bought\_product», «bought», «chat», «message», «comments», «wish» and «client\_order». For all the tables in the database the fields, which contain the primary and foreign keys, have data type «int».

The table «user» stores the personal data of system users and the data, necessary for their authentication. Such fields of the table as the «email», «password», «phone», «firstname», «patronymic», «lastname» and «role» contain text information and have the type varchar (50). Field «sex» has the type tinyint(1). The fields «birthday» and «date\_registration» contain information in the form of the date, so have the type of date.

The table «product» is required for storage of data about products of recreational complex. The fields «type\_product» and «name» contain text information and have type varchar (50); fields «description» and «picture» also contain text information, but have an increased length of the variable, and are of types varchar(200) and varchar( 100) respectively. The fields «discount» and «count» are int(10)and contain integer data. The field «cost» contains float information and has a type float. However, better decision for the field, which contains the price, would be to store information as an integer number. Such approach allows avoiding the mistakes in calculations which can appear due to the binary data storage issues.

The table «bought\_product» stores the state of the purchased products. Current table is required for the correct operation of the history of buying and archive of the products. The fields of the table are similar to the fields of the table «product». The table «bought» keeps a buying event. The fields «delivery\_method» and «status» have the type varchar (45), the field of «total cost» has the type float and the field «date\_time» has the type of date time.

The table «chat» stores the details about the conversation between a client (user) and a manager (administrator). The fields «topic» and «status» contain text data and have the type varchar (50). The table «message» contains the history of communications. The fields «message» and «status» have the data type varchar(100) and varchar(50) respectively. The field «date\_time» has the data time type.

The table «wish» stores a list of customer wishes from recreational complex products. The field «datetime» is of type datetime, the «count» field type is int(10). The table «client order» stores a list of customer orders and has the same structure as the previous table.

The table «comments» contains user's comments to the products. The fields «text» and «status» have the data type varchar(50) and varchar(300) respectively. The field «date\_time\_creation» is the field of data time type.

The scheme of the database of the developed system is presented in the Fig. 3.

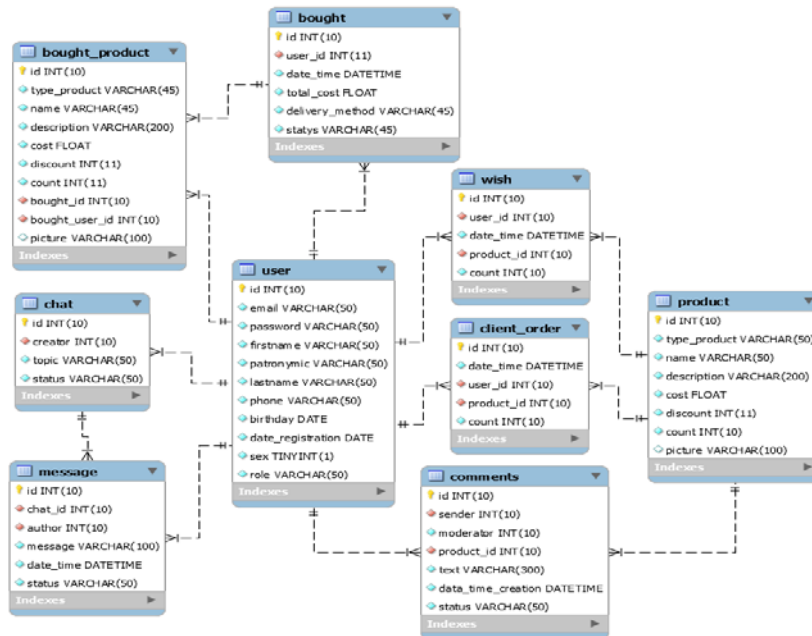


Fig. 3. The scheme of the database of the developed system

**The development of the system interface.** The design of the interface of the developed software is a complex task due to necessity of design of two interfaces – web and mobile – each has its own features. However, the development of mobile user interface contains more issues, related to a limited size of mobile devices and specifics of the mobile keyboard.

The prototype of the mobile user interface is presented in the Fig. 4.



Fig. 4. The prototype of the mobile user interface

To provide high usability of user interface, the interface has been divided into two parts: the top menu and main content. The tab with a list of the screens (menu), which is used for navigation, is placed in the top menu. There is a transition to another screen by clicking on the items from main menu dropdown list.

**Conclusion.** The development of the modern information computer system requires the realization of all modern trends of the nowadays software. One of the main trend in IT industry is the usage of mobile devices, which is the reason to develop not only web-application at the client side, but also a mobile application.

To perform the task of implementation of information computer system for recreation complex the three parts of the system, such as server application, web-application and mobile application for Android OS, have been developed. The interaction between Web-applications

and server software is performed via RestAPI technology. Such approach allows creating an improved client application without changing the server program. The interaction between the mobile application and the server software is performed using the same technology.

**Future work.** The proposed system of recreation complex has been developed to cover all the necessary functionality. However it can be improved by introduction of the modern technologies of online operation with magnetic cards. Other required modifications will be discovered during the support process and the operation of the developed system in the real conditions.

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