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# MANAGEMENT OF FINANCIAL AND ACCOUNTING AND ANALYTICAL SUPPORT AT SMALL AND MEDIUM-SIZED ENTERPRISES USING THE «AXIM» SYSTEM

**Problem statement and its connection with important scientific and practical tasks.** Automation of any process simplifies the work of a person, reduces the time for its execution and improves the quality and efficiency of the operation.

Automation of business processes from planning to reporting on trading activities sets new requirements for information and allows better accounting of all aspects of the small business (shop) functioning, choose a software product that would meet the store peculiarities.

**Analysis of recent publications on the problem.** Automation of economic processes is the subject of many academic publications. This is evidenced by the papers written by both foreign and domestic scientists: Ya. Kotliarevskyi, A. Melnychenko, O. Ivanytska, E. Semeniuk, S. Kniaziev, O. Melnykov, D. Acemoglu, P. Restrepo, M. Attaran, J. Woods, F. Crane, S. Tan, H. Koh etc. [1-4].

Based on the analysis of publications, we found that software development was largely carried out for large firms and enterprises, underestimating the importance of small and medium-sized businesses. The need to design and implement software for small businesses is emphasized by scientists: M. Noble, T. Clarke, F. Crane, J. Upson, K. Green, Ph. Wright, G. Geroy, B. Segal [5-7]. They note that even through its small size, resources and customer relationships, small businesses can compete, but differently than large firms.

**Allocation of previously unsolved parts of the general problem.** Modern retail trade requires the use of modern information technologies, among which cloud computing and web technologies occupy a special place, which significantly increases the efficiency of small business. The relevance of software development is a consequence of scientific and technological progress, especially in the sales market and in financial institutions.

Therefore, given the relevance of the development and implementation of software for small businesses, we examined in detail modern software products for store accounting:

– product "1C: Retail 8 for Ukraine" which is designed for trading activities automation of stores and other retail outlets;

– program "ULTRA Shop" (ULTRA Business version), feature of which we have determined the maximum simplicity for the user;

– "Accounting Online" is a service for maintaining operational, management, accounting, tax accounting and reporting in the State Fiscal Service using cloud technologies; ready solution for automation of management and accounting at enterprises via the Internet;

– "BAS Retail" is a highly functional front office for retail chains and individual stores [8-11].

Software research has shown that the creation of a new, better, high-quality system, without unnecessary memory costs, without the possibility of data loss and which is best adapted to the requirements of a small business, is becoming increasingly relevant [12-13].

**Formulation of research objectives (problem statement).** Study of the features of development and implementation of the automated accounting system "AXIM" with wide functionality for a small enterprise.

**An outline of the main results and their justification.** To achieve this goal, we used the following research methods: content analysis of literary sources of the economic direction and the programming sphere – to select indicators that affect the functioning of the store, study their relationships to develop a software product for increasing the efficiency of trading company business processes; comparative analysis – to reveal the essence and features of software products implementation to improve the efficiency of trading company business processes; analysis and synthesis techniques – to form a system of indicators for the effectiveness of the software product implementation.

To simplify the organization of retail goods accounting and sale, reduce time for document management, improve the quality and efficiency of small businesses, we have created a software product "Automated Accounting System "AXIM" [14].

Software product "Automated accounting system "AXIM" is a multifunctional tool for increasing the efficiency of enterprise business processes. The program allows to automate the tasks of operational and management accounting, analysis and planning of trading operations.

Functionality of the "AXIM" software product can be divided into three hierarchy levels:

1. Login page.
2. Main menu.
3. Main functionally.

Depending on the user logged in ("owner" or "seller"), Level 2 and Level 3 look different.

Graphically, the entire functionality of the system and some restrictions on access rights to administrative functions are represented by the hierarchical structure of Fig. 1.

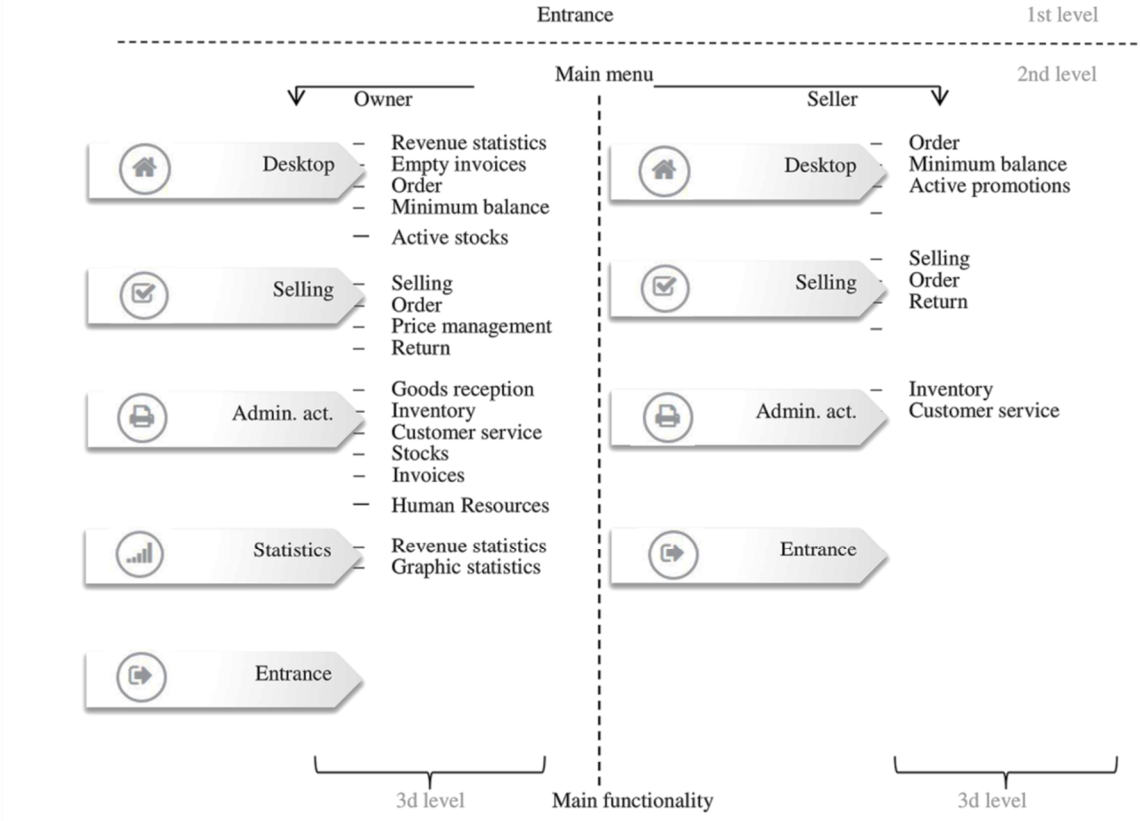


**Fig. 1. The hierarchical structure of the system functional**

The main data storage location is the AXIM database created using the MySQL relational database management system.

Consider the principle of the program using on the example of the function "Adding goods from invoices to the database", namely, the function of the data management model AddProductsToInvoice (), the algorithm of which is shown in Fig. 2.

Let's do a step-by-step analysis, using the listing of the corresponding function AddProductsToInvoice () of the db_adapter.php file. In the WHILE loop (while there is data to process), the following steps are performed:

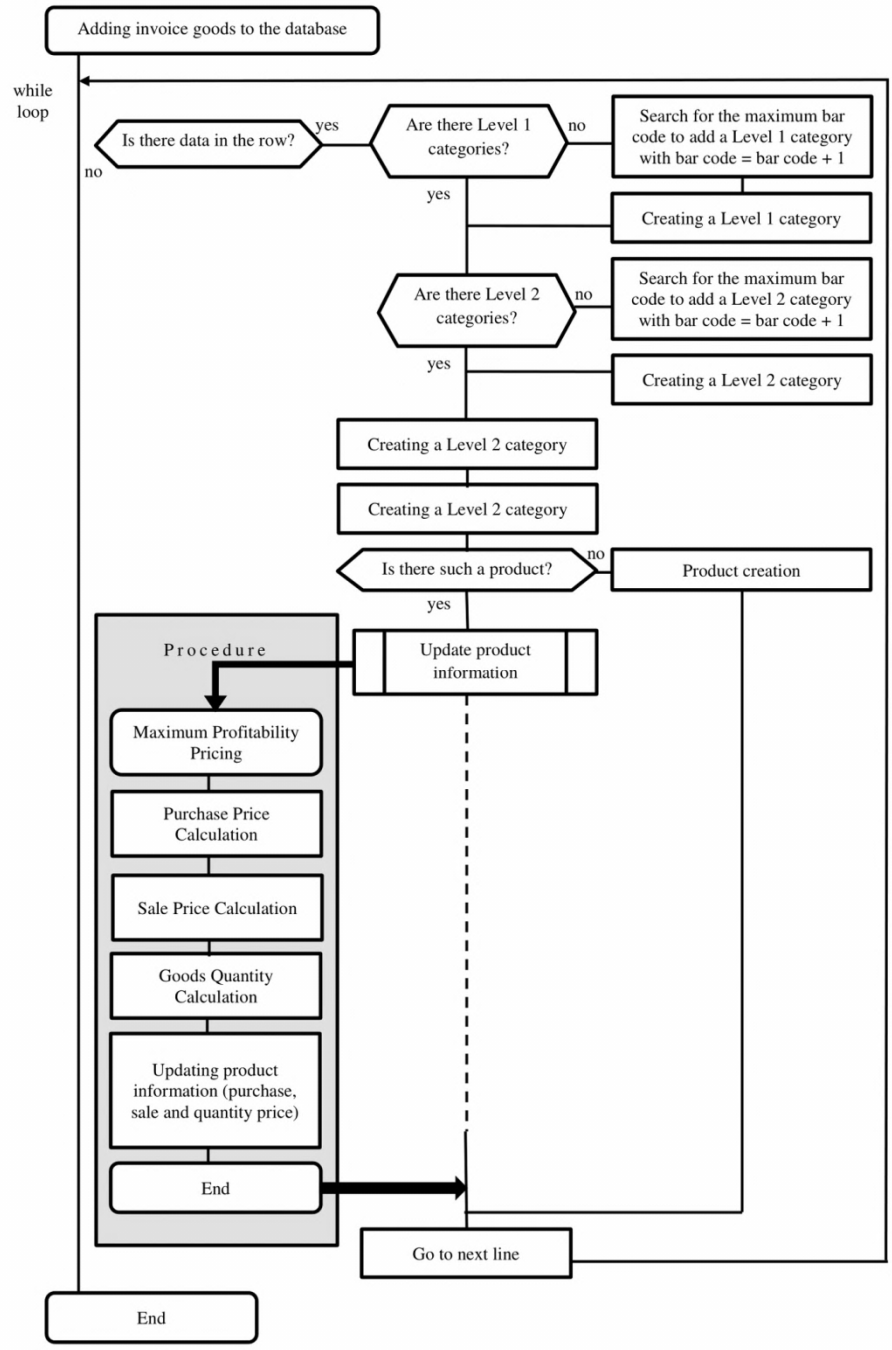


**Fig. 2. AddProductsToInvoice data management model algorithm**

Step 1. Level 1 category search:

```
$sqlQuery = ’SELECT bar_code
FROM products WHERE
bar_code_parents = 0 &&
product_name = ’ ’ ’.$category_1. ’ ’ ’ ’;
```

Depending on the result of the query, various actions are performed.

If there is no 1st level category in the database yet, then first extract the maximum bar code for the future insertion of 1st level category:

```
$sqlQuery = 'SELECT MAX(bar_code)
AS new_bar_code FROM products WHERE bar_code
< ’.$max_count_category. ’ ’; ,
```

where $max_count_category – the constant stored in the database is the maximum possible number of all categories and less than the barcode number.

Creating 1st level category:
$sqlQuery = ’INSERT INTO
products (bar_code, bar_code_parents, product_name)
VALUES (’.$temp_bar_code. ’, 0, "’.$category_1. ’")’; ,
where $temp_bar_code is new_bar_code (overridden variable).

If there is a 1st level category in the database, go to step 2, thus overriding the variable $temp_bar_code: $temp_bar_code = $row[bar_code];

Step 2. Level 2 category search:
$sqlQuery = ’SELECT bar_code
FROM products WHERE bar_code_parents = ’.$temp_bar_code. ’ &&
product_name = "’.$category_2. ’"’;

If there is no 2nd level category in the database, then it is necessary to get the maximum bar code for the future insertion of 2nd level category:
$sqlQuery = ’SELECT MAX(bar_code)
AS new_bar_code FROM products WHERE
bar_code < ’.$max_count_category.’’;
Creating 2nd level category:
$sqlQuery = ’INSERT INTO products
(bar_code, bar_code_parents, product_name)
VALUES (’.$temp_bar_code_2. ’, ’.$temp_bar_code. ’,
’ ’ ’.$category_2. ’ ’ ’) ’;

If there is a 2nd level category in the database, go to step 3.

Step 3. Changing the value of the minimum remainder (min_remainder) for the 2nd level category:
$sqlQuery = ’UPDATE products
SET count_product=’.$data[$i+5][value]. ’
WHERE bar_code=’.$temp_bar_code_2. ’ ’;

Step 4. Obtaining the value of the coefficient for increasing the price (cheat_percentage; constant stored in the database):
$sqlQuery = ’SELECT value_constant FROM value_constant
WHERE name_constant = "cheat_percentage";’;

Step 5. Product search:
$sqlQuery = ’SELECT bar_code,
count_product, price_purchase, price_selling
FROM products WHERE bar_code_parents =
’.$temp_bar_code_2. ’ && bar_code =
’.$data[$i][value]. ’ ’;

If the product is new and not yet in the database, then it is necessary to add it:
$sqlQuery = ’INSERT INTO products
(bar_code, bar_code_parents, product_name,
count_product, price_purchase, price_selling)
VALUES (’.$data[$i][value]. ’, ’.$temp_bar_code_2. ’,
’ ’ ’.$data[$i+1][value]. ’ ’, ’.$data[$i+3][value]. ’,
’.$data[$i+4][value]. ’, ’.$price_sel. ’) ’; ,
having previously calculated $price_sel.

The last query to the database inserts a new product with the following data: barcode, father’s barcode, product name, quantity, purchase and sale price.

If a product with this barcode already exists, update the data.

System users can interact with it: output some data, add new or edit old data, etc., using some functions.

Consider a sales operation – Selling. Suppose that the goods and their quantities have already been selected, it is only necessary to confirm the operation, so make some changes to the database. When selling a product, form an array of bar codes and quantities (count) of goods.

Therefore, by pressing the button “Print check” (id – print_check), form a two-dimensional array:

```
$(document).on(’click ’, ’#print_check’, function(){
var list_bar_code_and_count = [];
for (var i = 1; i <= count_prod_in_check; i++) {
list_bar_code_and_count[i] = [];
for (var j = 0; j < 4; j++) {
list_bar_code_and_count[i][j] = [];          }       }
// and fill it with data in the cycle “until all products are finished”:
```

```
        var i = 1;
        while (i <= count_prod_in_check){
    // bar code
        list_bar_code_and_count[i][0] =
        list_bar_code_in_check[i];
    // maximum goods quantity
    list_bar_code_and_count[i][1] =
    $('#6_'+list_bar_code_in_check[i]).text();
    // goods quantity
         list_bar_code_and_count[i][2] =
         $('#2_'+list_bar_code_in_check[i]).val();
    // unit price
    list_bar_code_and_count[i][3] =
    $('#3_'+list_bar_code_in_check[i]).text();  i++;  }
    // get current date
    var curdata_for_db = CurData();
    In the controller.php file, the Selling operation looks like:
    case 'selling ':
        $mas = $_POST[mas_bar_code_and_count];
        $res = $this->db->
    Selling($mas, $_POST[mas_data], $_SESSION[user]);
        $this->view->SuccesAddCountProd($res); break;
```

That is, having an array of data about the goods, their quantity, price, current date, and seller's data, pass them to class to work with DB DBAdapter in the function Selling (). The result of the execution is passed to the function SuccesAddCountProd () of the View class.

In the process of developing an "Automated accounting system "AXIM": the MySQL database management system is investigated; designed a conceptual, logical and physical database model for the "AXIM" software product (using the MySQL database management system); module for working with the database is developed; software product "Automated accounting system "AXIM" is created.

The software product "AXIM" has great functionality and successfully performs the tasks assigned to it. The software product "AXIM" was introduced and tested at the small trading company "Bonus" of individual entrepreneur L. Yakovlieva, which is located in the township Smolino of the Kirovohrad region Malovyskivskyi district.

**Conclusions and perspectives of further research.** As a result of testing the proposed software product at the investigated small trading company "Bonus" of individual entrepreneur L. Yakovlieva, its effectiveness is determined, which is expressed in simplified organization of accounting and sale of retail goods, reducing the time for document management, analysis and planning of trade operations.

Therefore, the created software product "Automated Accounting System "AXIM" is a multifunctional tool for accounting, finding information on goods, automating schemes for selling goods and controlling the balance of goods in the store and can be recommended for practical application by small business entrepreneurs.

Prospects for further research are the design and development of a software product for organizing the accounting and sale of pharmaceutical products for a laboratory workshop of specialty 226 "Pharmacy" of Donetsk National Medical University and for the pharmaceutical industry as a whole.

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**Ярошевська О., Красноступ В., Ксенофонтов Д. Управління фінансовим та обліково-аналітичним забезпеченням на підприємствах малого і середнього бізнесу з використанням системи «AXIM»**

**Актуальність.** Прагнення електронізувати щоденні рутинні процеси приходить у всі сфери людського життя: побут, освіта, розваги, бізнес тощо. Як відомо, автоматизація будь-якого процесу не тільки спрощує роботу людини, а й зменшує час на її виконання та покращує якість та ефективність цієї операції.

На сьогоднішній день все частіше механічну, монотонну роботу людей виконує автоматична чи автоматизована система. Це виправдано тим, що комп'ютерні програмні продукти виконують операції набагато швидше і якісніше, ніж людина.

**Мета та завдання.** Дослідження особливостей розробки та впровадження автоматизованої системи обліку «AXIM» з широкими функціональними можливостями для невеликого підприємства.

Проведений контент-аналіз літературних джерел економічного спрямування та сфери програмування – для відбору показників, що впливають на функціонування магазину, вивчення їх взаємозв'язків для розробки програмного продукту задля підвищення ефективності бізнес-процесів торговельного підприємства; порівняльний аналіз – для розкриття сутності та особливостей впровадження програмних продуктів для підвищення ефективності бізнес-процесів торговельного підприємства; прийоми аналізу та синтезу – для формування системи показників з ефективності впровадження програмного продукту.

**Результати.** Створено автоматизовану систему для продажу товарів роздрібної торгівлі «AXIM», яка має великий функціонал та успішно виконує поставлені перед нею задачі. Програмний продукт був впроваджений та апробований на невеликому торговому підприємстві «Бонус» ФОП Л. Яковлєва, яке знаходиться в ОТГ Смоліне Маловисківського району Кіровоградської області.

**Висновки.** Впровадження розробленого програмного продукту на досліджуваному малому підприємстві «Бонус» ФОП Л. Яковлєва показало ефективні показники використання та дозволило упорядкувати облік, полегшити пошук інформації по товарам, автоматизувати схему продажу товару та вести контроль залишку товарів в магазині.

*Ключові слова:* автоматизована система управління, документообіг, веб-програмування, автоматизована система обліку, програмний продукт, магазин, база даних, підприємства малого бізнесу.

**Yaroshevska O., Krasnostup V., Ksenofontov D. Management of Financial and Accounting and Analytical Support at Small and Medium-Sized Enterprises Using the «AXIM» System**

**Topicality.** The desire to electronize daily routine processes comes into all spheres of human life: education, entertainment, business, everyday life, etc. It is known that automation of any process not only simplifies human work, but also reduces the time for its execution and improves the quality and effectiveness of this operation.

Today, more and more mechanical, monotonous work of people is performed by an automatic or automated system. This is justified by the fact that computer software products perform operations much faster and better than humans.

**Aim and tasks.** Study of the features of development and implementation of the automated accounting system "AXIM" with wide functionality for a small enterprise.

Conducted content analysis of literary sources of the economic direction and the programming sphere – to select indicators that affect the functioning of the store, study their relationships to develop a software product for increasing the efficiency of trading company business processes; comparative analysis – to reveal the essence and features of software products implementation to improve the efficiency of trading company business processes; analysis and synthesis techniques – to form a system of indicators for the effectiveness of the software product implementation.

**Research results.** An "AXIM" automated system for selling retail goods has been created, which has great functionality and successfully fulfills its tasks. The software product was introduced and tested at the small trading company "Bonus" of individual entrepreneur L. Yakovlieva, which is located in the township Smolino of the Kirovohrad region Malovyskivskyi district.

**Conclusions.** The introduction of the created software product at the investigated small trading company "Bonus" of individual entrepreneur L. Yakovlieva showed effective usage indicators and made it possible to streamline the accounting, simplify the search for product information, automate the scheme of goods sale and control the goods balance in the store.

*Keywords:* industrial control system, document automation, web programming, automated accounting system, software product, shop, database, small businesses.

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