Visual Basic.Net Based Library Information System

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ABSTRACT

Libraries are important institutions in the world of education as a place to develop knowledge through various book references. In a library, there is generally a very large stock of books. In addition, the number of book loan and return transactions continues to increase over time. Library data processing that still uses conventional methods, namely with notebooks and pens often causes problems, such as the use of a lot of time, data redundancy, and data loss. This research aims to develop a library data management system from a conventional system to a computerized one. The system that the author offers in this study is a visual basic net-based library information system equipped with a MySQL database as the right data storage and Crystal Report as a medium for attaching to print data processing reports that have been done. The system development method used in this research is the Waterfall method. The results of this research are in the form of a library information system that can be used on computer devices with the windows operating system.

Keywords: Information System, Library, Visual Basic.Net, MySQL, Crystal Report

1. INTRODUCTION

Libraries are part of educational institutions that play an important role in increasing students' insight and knowledge. In a library in general, there is a large collection of books that can be borrowed by students in accordance with applicable regulations (Ridhawati et al., 2023).

Library information system is a computer-based information system that can be used to facilitate library staff in processing library book data, namely processing book list data, book availability, book borrowing, and book returns. Currently, library information systems have been widely used to facilitate activities in processing library data in various educational institutions (Putri et al., 2022).

SMK Negeri 10 Medan has provided supporting facilities in the form of a library with a very large stock of books to improve the reading literacy of all students. However, until now the library data processing process at SMK Negeri 10 Medan still uses conventional manual methods, namely still using notebooks and pens. The conventional method used in the library data processing process at SMK Negeri 10 Medan is considered ineffective, because over time the loan and return book transactions will continue to increase, so that it can cause difficulties for library officers at SMK Negeri 10 Medan in processing data and finding important data needed in a fast time.

As an effort to overcome the above problems, in this study researchers designed and built a computerized library information system to facilitate the work of SMK Negeri 10 Medan library staff in processing data and providing maximum service to library members. The programming language that researchers use to build a library information system at SMK Negeri 10 Medan in this study is visual basic .net. Visual basic .net is an object-oriented programming language that can be used to build desktop-based information systems to operate on computer devices supported by the Windows operating system (Sunara & Candra, 2019).

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2. LITERATURE REVIEW

In previous research, Visual Basic .net has been widely used in building desktop-based library information systems for educational institutions. In the results of research conducted by Muhammad Fahri and Yoke Lucia (2019) on library information systems applied to child-friendly integrated public spaces in Lenteng Agung, South Jakarta, it was concluded that the information system offered can make it easier for library staff to process library data computerized with good data storage security (Fahri & Lucia, 2019).

In further research by Hendriyanto, Dkk (2022) on a visual basic net-based library information system applied to SD Negeri Kalibaru 1 Bekasi visual basic net, it was concluded that the library information system implemented could meet the needs of officers and students effectively and efficiently. In addition, the system can also minimize errors in the process of processing data on borrowing and returning books (Hendriyanto et al., 2022).

In other research results by Irfan Zidnir Rokhim (2022) on library information systems based on Microsoft Visual Basic Net 2010, it can be concluded that the library information system offered can facilitate library staff in inputting book data, member data, officer data, and loan transaction data and book return transaction data. In addition, the library information system offered can also minimize the risk of data loss caused by document damage because the storage of all transaction data in the system is in the form of soft copy files (Rokhim, 2022).

3. METHOD

Information System

An information system is a collection of elements that are interconnected to compile a unified data to integrate, distribute and process and store information (Nduru et al., 2022). Information systems can facilitate the reporting process and data search by using the system (Listiyono et al., 2022). Information systems form a unity of valuable information for recipients that comes from data that has been processed then grouped and collected (Putri et al., 2022).

Library

Libraries are part of the learning resources that every school, college and university must have (Raharto et al., 2021). The library is used as a place where there are management activities with all kinds of information, both printed and recorded in various media (Listiyono et al., 2022). The library is an important part of education because it is a repository of information needed by the institution to support the development of science (Endarti, 2022).

Visual Basic .Net

Visual basic .net is an object-based programming language used in the creation of graphical user interface-based windows applications (Afrianto & Jaenudin, 2020). Visual basic .net can be used to develop and build applications based on the .net framework system, using the BASIC language (Yulisa geni et al., 2022). Visual basic .net is re-engineered for use on the .net platform so that applications created with visual basic .net can run on computer systems (Rozikin & Achlison, 2022).

MySQL

MySQL is one type of database server that is very well known and widely used to build web applications that have a database as a source and management of data (Nadiavalen Faradhomas et al., 2022). MySQL is a database management system software that uses standard SQL (Structured Query Language) commands. MySQL is capable of executing multiple query commands in a single request, both receiving and sending data (Tukino, 2020).

Crystal Report

Crystal Report is a visual-based application developed by software that is useful for creating report formats (Nadiavalen Faradhomas et al., 2022). Crystal Report uses specialized software that is used to create reports (Zuhri, 2017). The Crystal Report program can be used to create, analyze, and translate information contained in a database or program into various types of highly flexible reports (Nurdianto, 2021).

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Waterfall

Waterfall is a model that takes a systematic and sequential approach starting from the system requirement level and then moving to the design, implementation, verification, and maintenance stages. Each stage in waterfall must be completed one by one and executed sequentially.
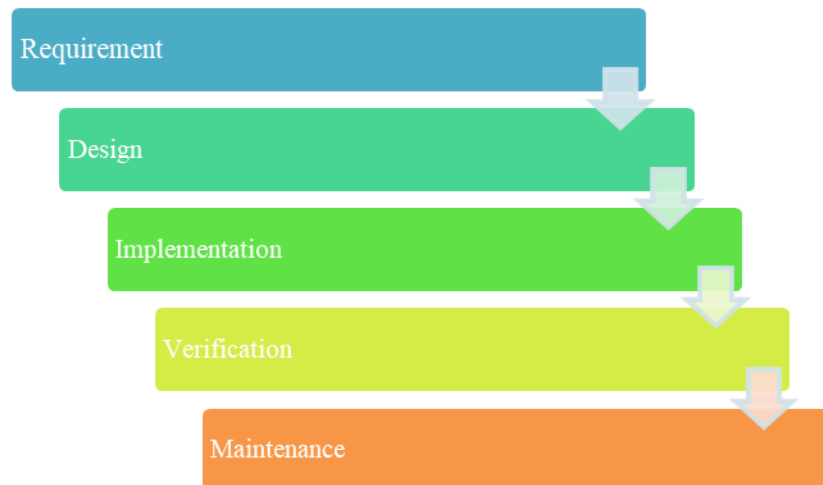

Fig.1 Waterfall

Figure 1 above shows the waterfall method. Where system or software development is carried out in stages that are clearly defined and interrelated. The explanation of the stages of the waterfall method above, namely:

Requirement

At this stage begins with the process of analyzing and understanding the purpose of the information system to be developed to suit user needs. In this case, the author first collects data using observation techniques, interviews, literature studies.

Design

At this stage, the information system design process is carried out in accordance with user needs. In this case, the author designs the information system using data flow diagrams, program flowcharts, and use case diagrams.

Implementation

At this stage, the process of creating program code using a specific programming language is carried out. In this case, the author coded the program using Visual Basic .Net.

Verification

At this stage, the process of testing the information system that has been built is carried out to determine whether the features in it can function properly or not. In this case, the author tests the system using black box testing.

Maintenance

This stage is a new maintenance process that is carried out on the system if further development is needed in the future to adapt to more flexible user needs.

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4. RESULT

The results of the research that has been carried out based on the waterfal method in this study can be seen in the description below:

Requirement Results

The library data processing information system developed in this study is expected to meet user needs. User needs that can be met in the information system built are, user can login, users can add book data, member data, book borrowing data, and book return data, users can change book data, member data, book borrowing data, and book return data, users can delete book data, member data, book loan data, and book return data, users can view and print reports on book data, member data, book loan data, and book return data, and user can log out.

Design Result

The results of the system design for the Visual Basic .net-based library information system in this study can be seen in the description below:

a. Context Diagram

The design of the context diagram can show the data flow that occurs in the library data processing process. The results of the design of the context diagram in this study can be seen in Figure 2 below:
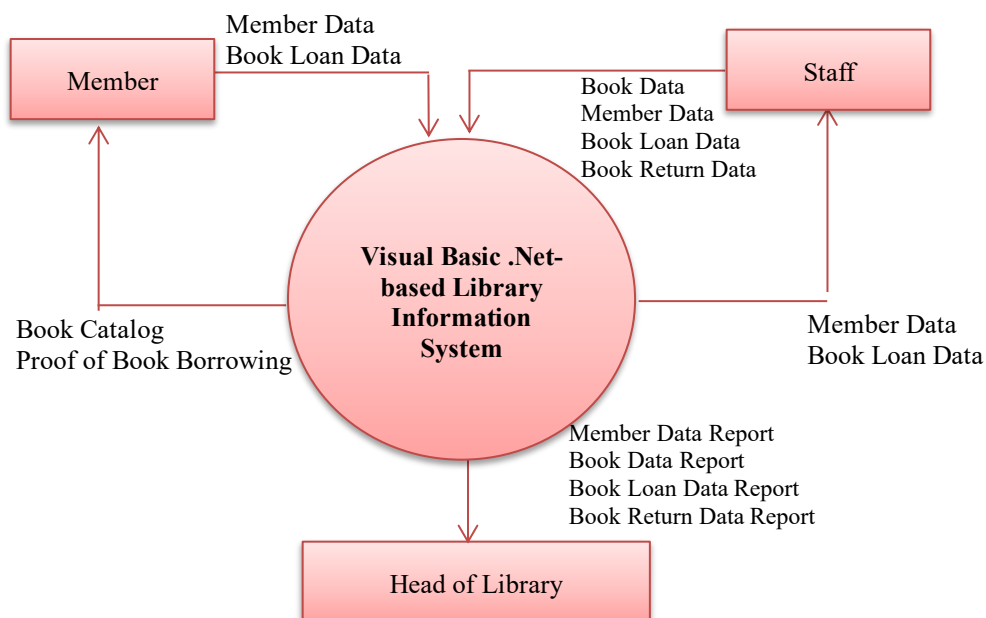

Fig.2 Context Diagram

b. Program Flowchart

The program flowchart design can describe the logical flow of the program when the information system built is used by users to process data. The results of the program flowchart design produced in this study can be seen in Figure 3 below:
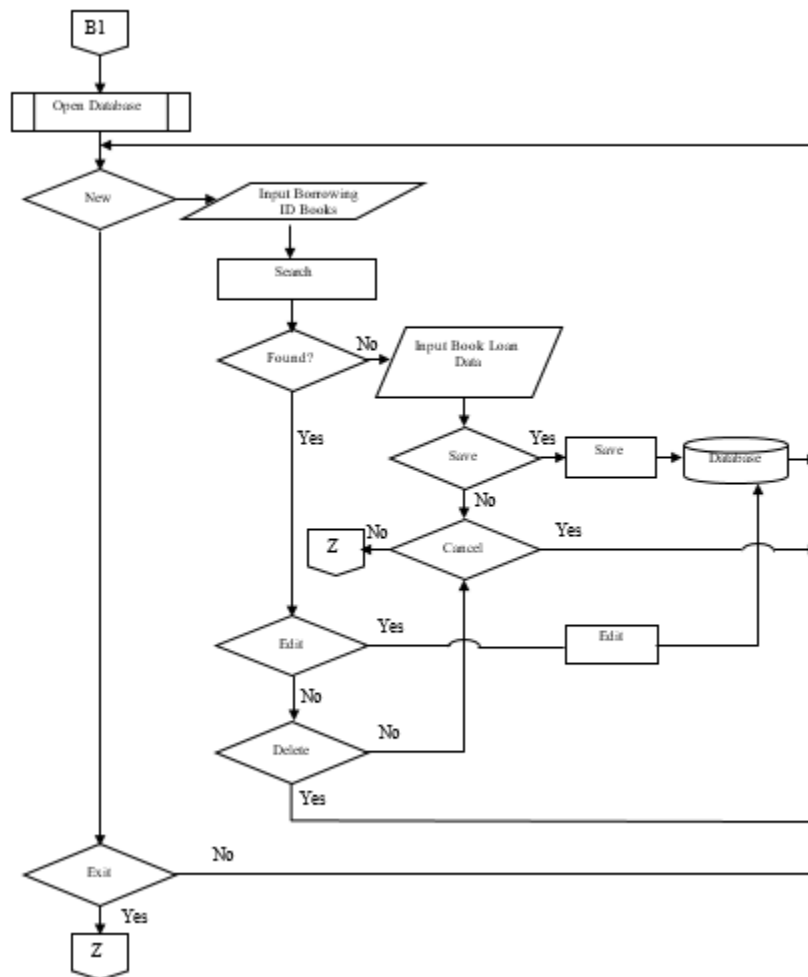
Fig.3 Program Flowchart

c. Use Case Diagram
Use case diagrams can provide an overview of user behavior when using information systems in processing data. The results of the use case diagram design for the information system can be seen in Figure 4 below:
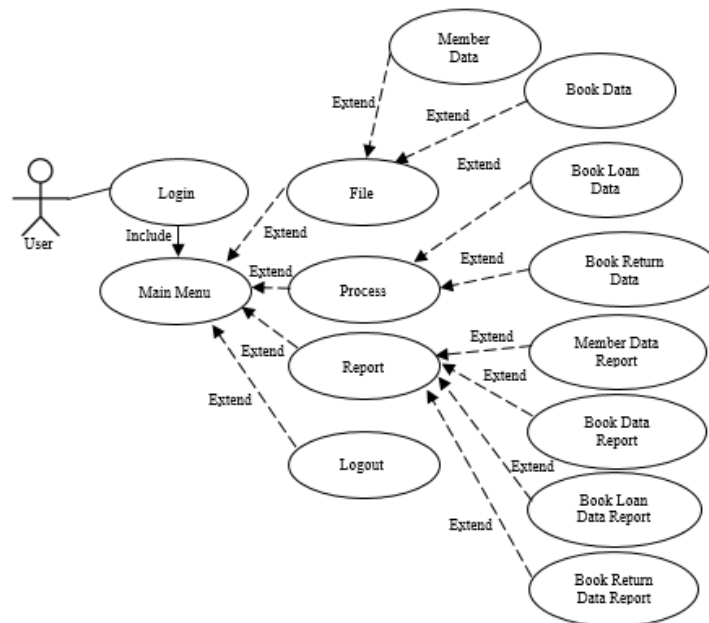
* Corresponding author

Fig.4 Use Case Diagram

Use case diagram is a description of the functional system when used by users to process data. The picture above shows that users can process data starting with the login process. After the user has successfully logged in, it will enter the main menu page. On the main menu page, users can have access to the file menu, process menu, report menu, or exit the system through the exit menu. On the file menu, users can access the member data sub menu to process member data or access the book data sub menu to process book data. On the process menu, users can access the book loan data sub menu to process book loan data or access the book return data sub menu to process book return data. On the report menu, users can access the member data report sub menu to view or print member data reports, book data report sub menu to view or print book data reports, book loan report sub menu to view or print book loan data reports, or book return report sub menu to view or print book return data reports.

Implementation Result

Implementation is a program coding process carried out using the Visual Basic .net programming language based on the results of the system design that has been made previously. The results of the library information system implementation can be seen in Figure 5 below:

Fig.5 Implementation Results

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Verification Result

Verification is a process carried out to find out whether the features of the library information system can be used properly or not by users when processing data. The results of verification or against the information system developed in this study can be seen in Table 1 below:

Table 1
Verification Result

No	Verification Name	Verification Result
1	User logs in.	√
2	User adds member data	√
3	User changes member data	√
4	User deletes member data	√
5	Users view and print member data reports	√
6	User adds book data	√
7	User changes book data	√
8	User deletes book data	√
9	Users view and print book data reports	√
10	User adds book loan data	√
11	User changes book loan data	√
12	User deletes book loan data	√
13	Users view and print book loan data reports	√
14	User adds book return data	√
15	User changes book return data	√
16	User deletes book return data	√
17	Users view and print book return data reports	√
18	User logs out	√

Table 1 above shows that the verification process has been carried out 18 times for each feature of the library system. Based on the verification results, it can be seen that all features in the library system can be accessed properly by users.

5. DISCUSSIONS

This research has developed a library information system using Visual Basic .net programming language that requires a verification process to ensure its functionality. The verification process aims to determine whether each feature in the system can function properly or not. Based on the results of research that has been carried out for the development of library information systems, it is hoped that further development in the future can be developed again for the addition of more complete features.

6. CONCLUSION

This research produces a library information system that can be used on computer devices with the Windows operating system. The resulting library information system can be used to facilitate staff in processing library data, starting from processing member data, processing book data, processing book borrowing data, to processing book return data with a fast time duration. Book data processing using the library information system produced in this study is safe from the risk of data redundancy and data loss.

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