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Source Code Library (SCL): Application Support Learning Software Development

Muhammad Wali[1] Lukman Ahmad[2]

Program Studi Manajemen Informatika,
AMIK Indonesia, JL. Teuku Nyak Arif, Simpang Mesra, Jeulingke, Syiah Kuala, Banda Aceh City, Aceh

Email: muhammadwali@amikindonesia.ac.id

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ABSTRACT

Learning for software developers enthusiasts both students and faculty has its own problems in learning a programming language. During this practical learning has been widely used by online media. However, problems and obstacles at the time of writing the program code and error code appear an obstacle in developing software for students. This study developed a learning support applications software development so that it becomes a learning solution in software development. In a study using the stages are divided into three tahapyaitu; data collection of pre-development, development and implementation, data collection and post-development, sedangkantahap software development using linear sequential model is often called the waterfall model.

1. Introduction

The massive use of applications used in everyday life [1] and can be utilized for the development of computer-based learning [2]. Learning applications must be developed in an innovative and creative manner [3] so that the interests and abilities of students can be increased through interactive learning media [4]. Learning for software developers, both students, and faculty, has its own problems in learning programming languages [5]. During this time, much learning has been done through online books [6], YouTube [7], blogs [8], and online forums [9]. However, problems and obstacles when writing code [10] and error codes appear to be obstacles in developing software for students [11].

In various universities and institutions in the world, various applications have been developed that support students in learning computer programming languages so they can become professional programmers. Rodegheroet *et al* (2015) developed Summarization Source Code, a technology that automatically generates short descriptions of computer program code that can explore programmer methods for using specific keywords [12]. Open-HEC (Open Framework for Computing with High Efficiency) proposed by [13] provides a framework for software programmers to use FPGA-based platforms to create applications.

From the various studies that have been carried out, their development and efforts to improve the ability of students and students to understand concepts and practices in learning software development. However, alternative and alternative media are still needed to be used by prospective programmers in developing software [14, 15, 16].

Based on the above problems, researchers try to develop applications to support the development of learning software to be a solution in the development of library learning tools that are developed. Source Code can be used for students and prospective programmers to learn various computer programming languages, where applications provide content and frameworks for programming code so that they can be recommendations for creating desktop, web and mobile applications.

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2. Literature Review

2.1. Application Source Code Library

In programming languages, developers and programmers are familiar with source code. In computer science, source code is a sequence of statements from a computer programming language. Source code allows programmers to communicate with computers using a number of predetermined commands. The source code library is software that supports programming language codes and has a default code line library [10]. The program also features a powerful clipboard and helps manage program code [17].

2.2. Software Programming Languages

A programming language instructions or orders consisting of several or many lines that could be understood by a computer. Programming languages become mandatory for software developers in order to build an application or software, programming language needs are also adjusted to the results of the application built. The criteria for a good programming language tailored according to the needs. Some of the criteria are:

a. *abstraction*,
b. *modularity*,
c. *orthogonality*,
d. *exception handling*,
e. *user friendliness*,
f. *readability*,
g. *ease of comprehension and maintenance*,
h. *overall simplicity*, and
i. *portability* [18].

Computers have been applied to different things, of controlling the nuclear power plants to provide video games on mobile phones. Due to the diversity, programming languages have different goals according to its development. The development of computer applications programming language is divided into five sections:

a. *Scientific Applications*
Digital computers first appeared in the late 1940s and early 1950s, created and used for scientific applications. Typically, scientific applications used because it has a data structure that is relatively simple, first example for scientific applications are Fortran.
b. *Business Applications*
The use of computers for business applications began in the 1950s. Most computer developed with special language. Examples Business Applications is COBOL.
c. *artificial Intelligence*
Artificial Intelligence or the so-called Artificial Intelligence (AI) is defined as a scientific entity intelligence. Intelligence was created and put into a machine (computer) that can do the job as do humans. Some kinds of fields that use artificial intelligence including expert systems, computer games (games), fuzzy logic, neural networks and robotics.
d. *Systems Programming*
The operating system or programming support tool of the computer system are collectively known as system software. Examples of UNIX, Windows, and so forth.
e. *web Software*
Web Software has a collective language like HTML, but there are several programming languages that are used for different purposes such as the JAVA programming language. The complexity and purpose in web development has a variety of programming languages of HTML, CSS, PHP, JAVA and so on [19].

With a variety of complex and different purposes, the most common programming languages used are; Java, C, C ++, C #, Python, PHP, Java Script, Ruby, Perl, Visual Basic.NET, Delphi, Assembly, Visual Basic, Objective-C, Swift, R, Groovy, Matlab, SQL and D.

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3. Research Methodology

In studies using stages divided into three stages and is inspired by the design of the proposed framework by [20], namely; data collection of pre-development, development and implementation, and post-development data collection. In the software development process using the linear sequential model is often called the waterfall model. Researchers propose a systematic approach and secondary to the development of software that starts at system level and progress throughout the analysis, design, code, test, and maintenance has ever done before [21]. Linear Sequential Model to follow the stages consisting of; 1). System / Information Engineering and Modeling, 2). Software Requirements Analysis, 3). Design, 4). Recoding, 5). Testing, and 6).

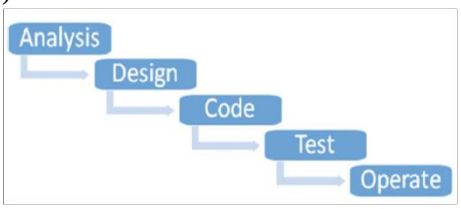

Fig 1. Waterfall Model

4. Results and Discussion

This research has successfully developed the development of learning support application software, called Source Code Library (SCL). As for designing the system architecture, database, and view it is discussed below,

a. System Architecture Design

The design of the system architecture as part of an effort to ensure the availability of communication between SCL (online) web-based applications and SCL in the windows operating system. In addition, this application has two databases that are embedded on any device or device on a PC and can then be synchronized to a database on a database server hosted through a web service, to design the system architecture can be seen in Figure 1 below.

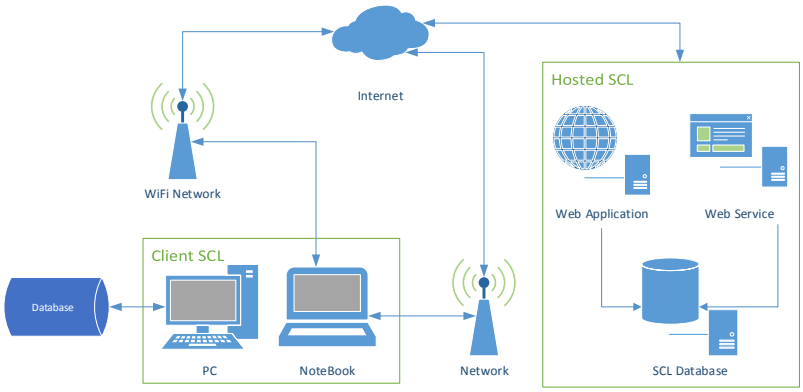

Fig 2. The design of System Architecture

In Figure 2, the client or user side has a local database (client database) installed and for the flow of information on the hosting server, any data that is synchronized or connected will have the same content as the client, which aims to enable users to get content and the latest content in real-time. If access is interrupted or not connected to the internet, the client can still use the latest data (offline local database) when updating content.

b. Database Design

In designing a database on a local database (client database) that is used to store data in a server database. However, because the data stored on PC devices is only partial, the tables used are only partial. Further details of the database schema used in the user's PC peripherals (client database) are shown in Figure 3.

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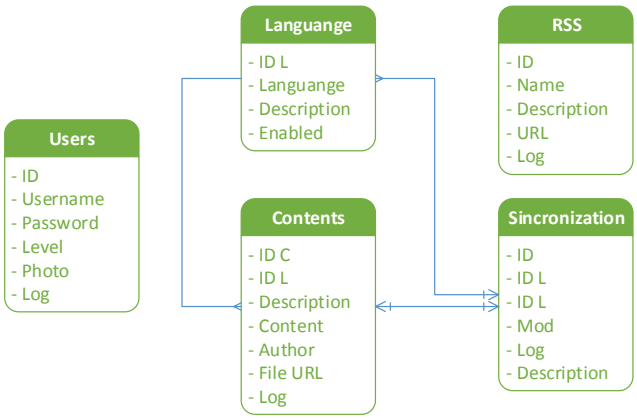

Fig 3. Database schema on the Client side

Of the five tables that were built, only three (3) tables had relationships, namely the language, content, and synchronization tables. Whereas the RSS table and the user do not have a relationship between the other tables. However, on the server-side, it is used to retrieve data stored in databases and synchronized locations. RSS table that contains news from the server and temporary or partial time.

c. Display Interface

At the initial appearance of the application displays the login page, login page to make sure that the user has been registered on the website and further application users enter a username and password as shown in Figure 4.

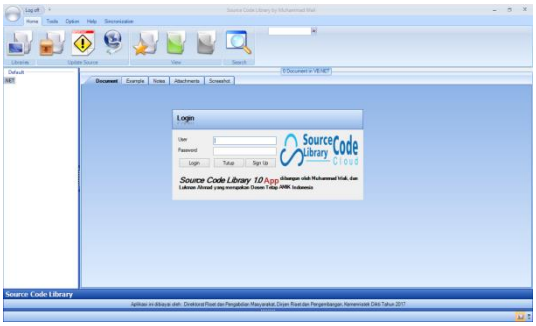

Fig 4. Display Application Login SCL

After successfully filling your username and password will lead to further applications form the main view or the app's main menu. The main page consists of the home menu, tools, options, help, and synchronization. In the home, the menu consists of sub-menus libraries, update source, view, and search. On the main page can be seen in Figure 5 below.

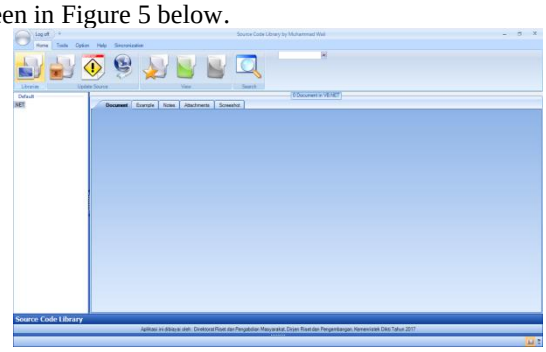

Fig 5. Display Home SCL

In the submenu displayed content libraries source code (Figure 6) that can be selected by the user to learn the basic syntax to professionally presented how to build applications starting from basic coding steps.

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See the source code can be copied to software and application tools or editors to develop appropriate software to learn.

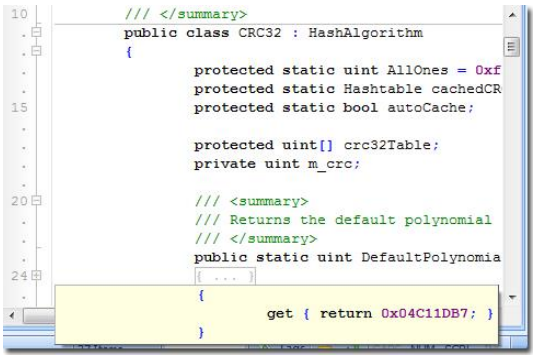

Fig 6. Display Content

To update the data in accordance with a variety of vendors and community information software, users can synchronize the sub menu synchronization so that later users can choose the content as well as information about the vendor as shown in Figure 7 below.

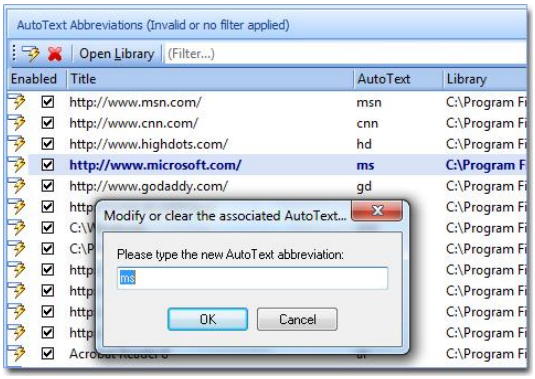

Fig 7. Language Library

To get the latest information from the application and sends SCL are like bugs and error information can submit applications through New Feedback form provided on the help menu as shown in Figure 8 below.

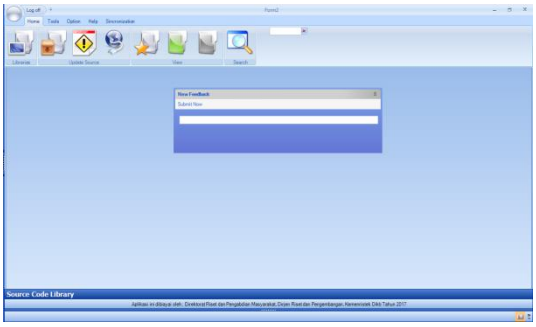

Fig 8. Display RSS and Feedback

5. Conclusion

From the research and development of SCL applications are summarized into two, namely the development of application software on the desktop, and the manipulation of SCL services which then become a note for further research to complete the services provided:

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a. In this study, Full Synchronization has not been used in synchronization between client and server applications. So it can cause a slow synchronization process. To avoid that use the SyncML synchronization protocol to limit synchronization far ahead of schedule and communication between data.
b. The SCL application is currently developed using Microsoft Visual Studio 2017 VB.NET and has been operated properly on the Windows platform.
c. The SCL application already has 29 programming language data available for fans of software developers, but the content is still in CRUD discussion (creating, reading, updating, deleting) so the content needs to be more complex in future studies and implemented continuously to students.
d. SCL does not choose an intelligence system that automatically displays the syntax or pieces of code desired by the user, this is an obstacle for researchers because there are so many resources to completely change the core of SCL and conduct a feasibility study of integration with existing learning systems.

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