Data Flow Diagram Design For Multimedia Laboratory Management Information Systems At Universitas Negeri Medan

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Abstract. Data Flow Diagram (DFD) is a diagram used to graphically depict the flow of data in a business information system. They are used to indicate the scope and boundaries of the system as a whole and to communicate between a systems analyst and everyone involved in the system. DFDs are built using standard symbols and notation to describe various entities and their relationships. They are easy to understand for both technical and non-technical people, making them a useful tool for system documentation. A DFD consists of four main components: data input, data output, data storage, and processes that move data between them. In this case, a case study of the use of DFD for multimedia laboratory management information systems at Universitas Negeri Medan.

Keywords: Data Flow Diagram, Information Systems.

1 Introduction

Data flow diagram (DFD) is an illustration of the flow of a system. Usually, DFD is widely used by someone who works in the field of information systems. This diagram was popularized by Ed Yourdon and Larry Constantine in the late 1970s in their book entitled Structured Design. Until now, DFD is widely used in the development of various systems, including software development. Many analysts prefer DFDs to other types of charts. Analysts can use DFD to create a picture of a system, then provide it to programmers. Next, the programmer will create coding based on the analyst's directions contained in the DFD. Many processes in a system are difficult to explain in words. Therefore, to simplify it, you can use a DFD that is arranged visually. There are various symbols used in DFD, namely rectangles, circles and arrows. Each symbol has a different meaning and will be labeled to explain all the steps.

The first function of DFD is to describe the system. You can use DFD to describe the system as a functional network. In this network, there are various components that are connected to each other using data flows. Apart from describing the system, you can also use DFD to create a new model. DFD can also describe data flow more easily through a visual approach.

Therefore, you can describe the system design using DFD and convey it to programmers, system builders, clients, and anyone else who needs to know.

2 Method

To describe a system design using Data Flow Diagrams requires or requires symbols. Where these symbols have meanings that will direct where the system flow will flow. Data Flow Diagram symbols also have several types. The following symbols below are symbols from Data Flow Diagram.

a. Symbol Entity

Fig. 1. Symbol Entity

An External Entity or also commonly called a terminator is a symbol that can be an organization, person, group of people, or the same company but which is outside the control of the system being modeled. This termonator can also be a department, division or system outside the system that will communicate with a system that is being developed.

b. Process Symbol
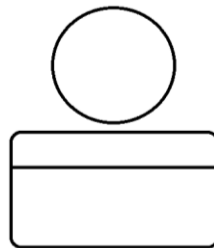
Fig. 2. Process Symbol

Above is a symbol of the process. A process is an activity or work that will be carried out by machines, computers or people and will later produce a flow of data that will enter a process so that the flow of data that will come out of the process can be carried out. The process can also be shown with a circle symbol or with a rectangular symbol which has a perpendicular line inside as in the picture above.
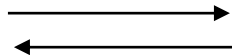
c. Data Store Symbol
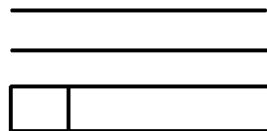
Fig. 3. Data Store Symbol

The symbol above is the symbol for the Data Store. Data Stores are generally closely related to storage, for example databases and files related to computerized storage. And Data Stores are also often given names that match the name of the storage file, for example lecturers, students, courses and so on.

d. Data Flow Symbol

Fig. 4. Data Flow Symbol

The symbol above is a symbol of Data Flow. Data Flow is also often referred to as data flow, which is often symbolized by an arrow. The data flow also flows between a process, data store, and terminator. The use of data flow is also to show a data flow which can be input to a system or the result of a system process.

e. Input and Output Symbol

Fig. 5. Input and Output Symbol

Above are the symbols for input and output. The symbol is in the form of a parallelogram as in the picture above. This symbol is also a representation of the input and output contained in the Data Flow Diagram. This is an article that discusses the meaning of DFD (Data Flow Diagram) along with its functions and symbols. Hopefully with this article you can find out more about the functions and symbols contained in Data Flow Diagrams.

3. Research Results and Discussions

The way to create a DFD is to identify external entities. Then, identify the inputs and outputs involved. The following is the explanation.

a.Identify External Entities

Identifying an external entity, namely an entity in the environment outside the system which will later provide input and receive output from the system.

b.Start Identifying Input and Output

After identifying the external entity, the next process of creating a DFD is to identify the input and output involved. Then, you start drawing diagrams, including context diagrams, tiered diagrams or also known as hierarchy charts, and drawing DFD sketches

4. Discussions

The laboratory information system is an application used to manage the laboratory.
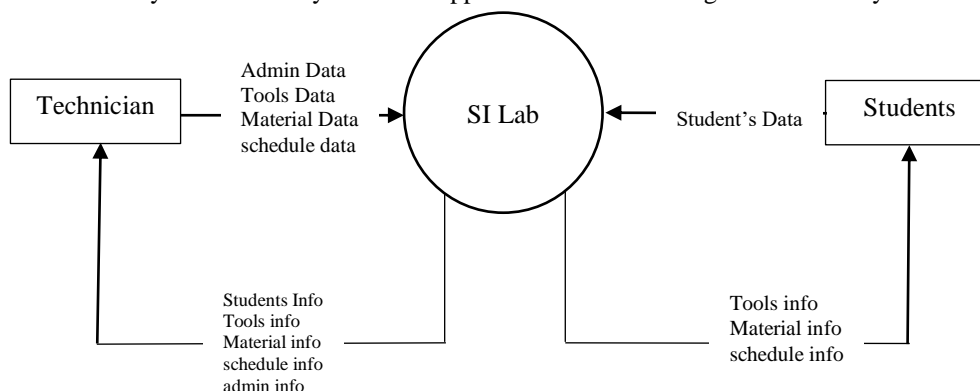
Fig. 6. DFD Level 0

In the image above is the context of the data flow diagram at the first level. There are 2 users related to the application or system, namely Admin and students. The two users will later be separated into 2 levels.

For the existing levels, this is the difference between authentication entering the application. The data entered and received from the system are:

a.   Admin data, is the labor application admin login account data. In this case, it can be the manager or person in charge of the laboratory.

b.   Student data, is account data for laboratory students who use laboratory equipment

c.   Equipment data, is equipment data in the laboratory that can be used for testing

d.   Group data, is group data from students who practice. For individual or individual practice, you can practice in groups or collectively

e.   Schedule data, is data on scheduling laboratory use, both the use of equipment and materials

In the context above, there is no visible reporting process. The report will be formed at the next level diagram, namely level 1.

5.Conclusion

This study concludes that Interactive Multimedia assisted by an Articulate Storyline shows very feasible criteria for use according to media experts and material experts. Student responses to interactive multimedia show results in each category, namely very effective, very practical, very safe, and very satisfied. The resulting test results show that interactive multimedia obtained an N-gain of 0.8 for the high category and an N-gain (%) of 80% for high category.
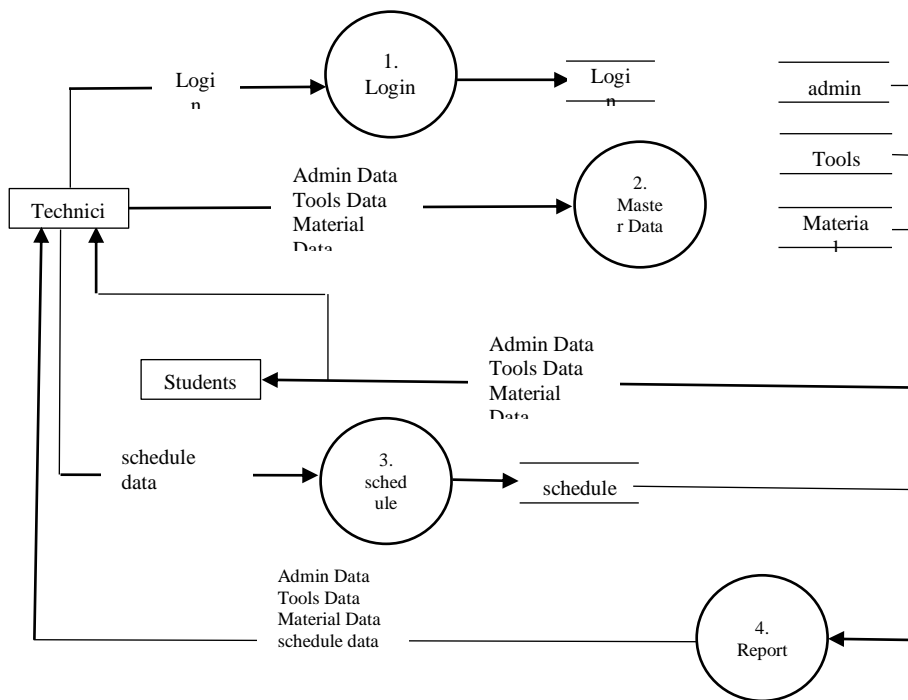
Fig. 7. DFD Level 1

Above is a DFD or data flow diagram for level 1. The circle in this diagram is formed into several circles.

The circle is an identification of the processes in the system. If you look at the most important process to the last, it is described as follows:

a. Login, is the process of entering the application

b. Master data is the process of managing the main data in the system. This data is the data that will be withdrawn for the next process. Important data in this master data which influences other processes is equipment data, material data, member data. And group data is complementary data related to members. And its implementation in laboratory use can be individual or collective as explained above.

c. Scheduling, is scheduling data or management of laboratory use. This schedule management aims to ensure that members' use and usage of the laboratory does not clash or the hours clash.

d. Reports, now for reports this is the purpose of this application. Report data is data that is pulled from master data and also scheduling data

5. Conclusion

Based on the description of the previous stages, it can be concluded that: Data Flow Diagrams can be used to describe laboratory management information systems so that you can see the flow of data used for input, process and output needs. This makes it easier to communicate the designed system to other users. The DFD in this laboratory management information system also shows that the system consists of interconnected subsystems.

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