Design a web-based asset management information system using the straight line method for private universities

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Abstract. Universities cannot be separated from the existence of assets owned, therefore an information system is needed that functions as a tool in the asset management process. Most asset management in the private university still using Spreadsheet besides that the management of its assets is also not centralized. These problems can be solved by creating a web-based asset management information system. The purpose of this research is for design and build an asset management information system at the private university. The method used is straight line where this method is used for problems in calculating the depreciation of assets and knowing the useful life of the asset. This system can help private university administrative staff in managing assets and calculating asset value.

1. Introduction
Universities that have been established for a long time, usually have many assets, in all different conditions, so that the assets cannot be recognized, positioned or even lost. Asset management is a series of activities that are carried out by identifying what assets are needed, identifying funding needs, acquiring assets, providing logistical and maintenance support systems for assets, removing or renewing assets so that they can effectively and efficiently fulfill their objectives [1].

This asset management information system is created to be able to manage asset data easily, effectively and accurately starting from recording asset data, asset data search, asset data recapitulation and asset data deletion. In addition, this system also provides an asset valuation function, so that asset value recapitations starting from depreciation values, residual values, estimated benefits and net book values can be assessed and processed automatically [2].

Depreciation of fixed assets applied in this system is the straight line depreciation method (straight line) in accordance with the provisions of tax regulations that have been regulated in Law Number 7 of 1983. This is related to one of the objectives of making an asset value report in each company where to fulfill one of the data requirements of the taxpayer whose payment is made annually at the end of the company's accounting period [3,4].

2. Methodology
Assets are things or things (anything) that have economic value, commercial value or exchange value owned by business entities, institutions or individuals (individuals) [5]. Assets are usually in the form of physical goods such as land letters, apartments, and others, sometimes also not shaped like stocks, copyrights and trademarks [6].

The process of developing the Prototype method is:
• Communication, developers, clients meet and determine general objectives, desired needs for description of the parts that will be needed.
• Quick Plan, the design is done quickly and represents all known aspects of the software, and this design is the basis for making prototypes.
• Modeling Quick Design, focuses on the representation of software aspects that can be seen by the user. Modeling quick design tends to make prototypes.
• Construction of Prototype, build a framework or design prototype of software that will be built.
• Deployment Delivery and Feedback, the prototype that has been made by the developer will be distributed to the user, to be evaluated, then the user will provide feedback that will be used to revise the software requirements to be built. Repetition of this process continues [7,8].

The advantages of the prototype include:

• Users can consider a few changes during the prototype form;
• Provide results that are more accurate than previously estimated, because the desired function and complexity can be well known;
• Users feel satisfied. First, the user about the computer and the application that will be made for him. Second, the user is directly involved from the start and motivates enthusiasm to support analysis during the project [8].

Data Flow Diagram is a diagram that is used to describe an existing system or a new system that will be developed logically, structured, and clear and explain the flow of data from start to output [9,10]. On the straight line method has three processes for calculating the value of different assets, namely the calculation of depreciation per year, depreciation of the first year, and depreciation of the last year [11].

In the first year, asset depreciation is calculated based on how long (in months) the asset is used starting from usage until the end of the first accounting period. In the last year of the asset's life, the depreciation value is the book value of assets, which means that the asset value is fully depreciated in the final year of use [12].

3. Results and discussion

The design of this asset management information system aims to illustrate before making an application. In this section we will explain the system design that will be developed and the steps outlined. The design used in the application to be built is structured based design using Context Diagrams in figure 1.

Context Diagram in asset management information system there are two external entities, namely staff, and leader. Level 1 DFD describes the data flow activities that occur in asset management information systems. In this diagram there are two entities and four processes which are login and logout processes,
reports, asset management, and master data. There are six data stores, namely *susutaset_user, susutaset_asset, susutaset_ruangan, susutaset_gedung, susutaset_perawatan, susutaset penyusutan* in figure 2.

3.1. **Construction of prototype**
The home page is the start page after login, on this page there is information about the total number of assets, the total number of rooms, the total building, and the total value of assets can be seen in Figure 3.
Interface design is one of the important parts in software development, because the user's evaluation is seen from the interface or the appearance of a software. Following is the interface design that will be built in figure 4. Is an asset data page, where on this page can add asset data, edit, and delete asset data. 

![Asset Data Page](image)

**Figure 4.** Page data asset.

Interface for a room data page, this page contains data on the rooms or space in the university in figure 5.

![Room Data Page](image)

**Figure 5.** Page data room.

The following is a maintenance data page, this page serves to record the assets that have been taken care of and to determine the next treatment in figure 6.
Page the result of print out reports containing data on assets in a form that has been changed into pdf in figure 7.

**ASSET DATA REPORT**

| No. | Asset Id | Asset Name | Class | Source Fund | Room Id | Mark | Purchase Date | Validity period | Price |
|-----|----------|------------|-------|-------------|---------|------|---------------|----------------|-------|
| 1   | 43104041.01 | test | 1     | FT-UNSUR    | PH-01   | Office | 2017-02-13   | 2022-02-13   | 1000000 |
| 2   | 43104041.02 | Computer Server | 1     | FT-UNSUR    | FT-01   | -     | 2011-02-09   | 2016-02-09   | 1000000 |
| 3   | 43104041.03 | Air Conditioner | 1     | FT-UNSUR    | FT-01   | Sharp M4 PC | 2016-04-04 | 2022-04-04 | 1000000 |
| 4   | 43104041.04 | Air Conditioner | 1     | FT-UNSUR    | FT-01   | Ahlum L2 PC | 2017-07-11 | 2021-07-11 | 2000000 |
| 5   | 43104041.05 | All Conditioner | 1     | FT-UNSUR    | FT-01   | Ahlum L2 PC | 2015-05-11 | 2025-05-11 | 5000000 |
| 6   | 43104041.06 | Laptop WD 1 | 1     | FT-UNSUR    | FT-01   | ACER Aspire | 2017-02-13 | 2022-02-13 | 4000000 |
| 7   | 43104041.07 | Laptop WD 2 | 1     | FT-UNSUR    | FT-01   | ACER Aspire | 2013-03-07 | 2019-03-07 | 5000000 |
| 8   | 43104041.08 | Meal Ring | 2     | FT-UNSUR    | FT-01   | Rokin | 2013-04-03 | 2016-04-03 | 7500000 |
| 9   | 43104041.09 | Meal Ring | 2     | FT-UNSUR    | FT-01   | Rokin | 2013-04-03 | 2016-04-03 | 7500000 |
| 10  | 43104041.10 | Kuro Ring | 2     | FT-UNSUR    | FT-01   | Chime | 2013-04-03 | 2014-04-03 | 2750000 |
| 11  | 43104041.11 | Kuro Ring | 2     | FT-UNSUR    | FT-01   | Chime | 2013-04-03 | 2014-04-03 | 2750000 |
| 12  | 43104041.12 | Kuro Ring | 2     | FT-UNSUR    | FT-01   | Chime | 2013-04-03 | 2014-04-03 | 2750000 |
| 13  | 43104041.13 | Kuro Ring | 2     | FT-UNSUR    | FT-01   | Chime | 2013-04-03 | 2014-04-03 | 2750000 |
| 14  | 43104041.14 | Kuro Ring | 2     | FT-UNSUR    | FT-01   | Chime | 2013-04-03 | 2014-04-03 | 2750000 |
| 15  | 43104041.15 | Kuro Ring | 2     | FT-UNSUR    | FT-01   | Chime | 2013-04-03 | 2014-04-03 | 2750000 |

**3.2. Testing**

The testing using black box testing, black box testing is a test that focuses on the function of the software system without knowing the structure of the coding program.

| No. | Testing Scenario          | Outcome                  | Result     | Conclusion |
|-----|----------------------------|--------------------------|------------|------------|
| 1   | Fill all units form       | Data saved to database   | Data saved | Done       |
| 2   | Fill in several units form| Data cannot be saved to database | failed    | Failed     |
| 3   | Empty units form          | Cannot saved data to database | failed    | Failed     |
Testing has conducted to find out the final result in the form of asset depreciation. Testing of system and manual depreciation calculations is done with 117 data.

4. Conclusion

Apply the straight line method to this system there are three different calculation categories, namely annual depreciation calculation, calculation of depreciation for assets whose usage period is first, and calculation of depreciation of value for assets whose usage period is in the last year. In addition, based on the results of tests conducted on 117 data, this system produces an accuracy rate of 88.03%, with this level of accuracy indicating that the system is functioning properly.

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