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ANALYSIS AND DESIGN EXPERT SYSTEM TO IDENTIFY INJURIES BECAUSE OF SPORTS

Handy Noviyarto[1], Yunita Sartika Sari[2]

ABSTRACT

A mobile-based expert system is a software program that is equipped with an inference engine and knowledge base and can solve problems as the expert. The expert system is discussed about sports injuries. The method used in making this expert system is the forward chaining method and the search technique used is Best First Search. As designed in this expert system includes a knowledge base that is used to store rules, a user interface that is used to interact with users or users, an inference engine used for goal tracking, and a development engine which is used to update the knowledge base.. The ability of expert system program includes a dynamic facility identification process, along with the ease to update the knowledge base and also easily accessible or run using mobile phones. The purpose of making this expert system is to help nurses, athletes and sports people, to be able identify injuries because of sports to be faster, more precise and efficient.

KEYWORDS: Expert System, Injury, Sport, Best First Search

1. INTRODUCTION

Business development and technology is moving very rapidly, knowledge becomes one of the primary requirements for a company to increase the effectiveness of business processes. At the beginning of creation, the computer functioned as calculators or process the data to produce information in decision making. Along with the development of computers, the role and usefulness of computers getting bigger even dominate the life of humanity today.

The technique for making computers capable of processing knowledge is called artificial intelligence technique. With this approach, humans try to make computers think like the way humans use problems to solve. The fields of artificial intelligence techniques are one of them is the Expert System.

Expert systems are one way to achieve results faster and easier. The expert system here contains knowledge that first comes from real life experiences and not from textbooks. This is knowledge that comes directly from experienced experts who have worked for years in a scientific discipline. The system here is knowledge that comes from "learning from experience".

In realizing this expert system, the author also conducted research and took the theme of sports injuries. Research conducted by hashtags users can find out about injuries and treat injuries according to existing health standards.

2. PLATFORM THEORY

2.1 Definition of Artificial Intelligence

Artificial intelligence is a sub-field of computer knowledge specifically intended to create software and hardware that is fully able to mimic human intelligence, so that computers can help in solving a complex problem, so the computer is really a useful tool, especially in speed and in facilitating some aspects of human thought, in other words, the human mind is poured on a media that is known as a computer, so the computer can mimic human intelligence is based on knowledge that is introduced into the computer's memory by an expert.

2.2 Definition of Expert Systems

An expert system is a computer program that contains the knowledge of one or more human experts on a specific field. This type of program was first developed by artificial intelligence researchers in the 1960s and 1970s and applied commercially during the 1980s. The general form of expert systems is a program created by a set of rules that analyze information (usually provided by the system) about a specific class of problems and mathematical analyst of the problem.

There are two techniques of reasoning (inference):

1. Tracking forward (forward chaining) start from a set of facts (data) to look for rules that match the guesses / hypothesis that there towards the conclusion.

[1,2] Faculty of Computer Science, Mercu Buana University, Indonesia

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Research Paper

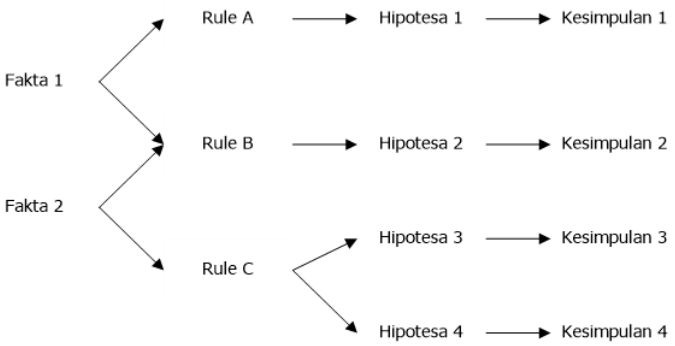

Figure 1 Tracking Technique Forward Chaining

2. Tracking backward (backward chaining), which started reasoning from the conclusion (goal), to search for a set of hypotheses that support to the facts that support the set of hypotheses.

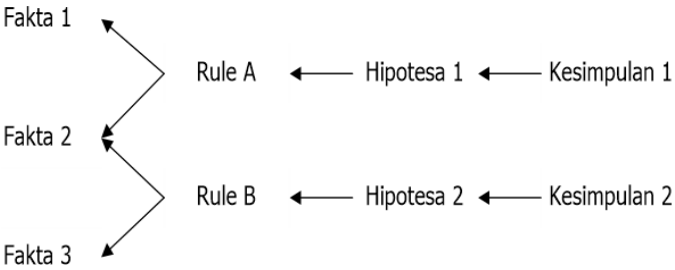

Figure 2 Tracking Technique Backward Chaining

Both techniques of reasoning is influenced by three kinds of search techniques (searching):

1. **Depth-First Search**
   Depth-First Searchis a data retrieval technique on nodes vertically and is already defined. Search starts from the initial node, then the node to the left into the deepest node, and then there is the process of backtracking to the parent node, if not found his goal in the deepest node, the search is continued until the knot is achieved its goal. Search advantage to this technique is that searches can be dug deeply until the discovery of the certainty of an optimal solution. Disadvantages of this search technique is takes very long for a large scope of the problem.

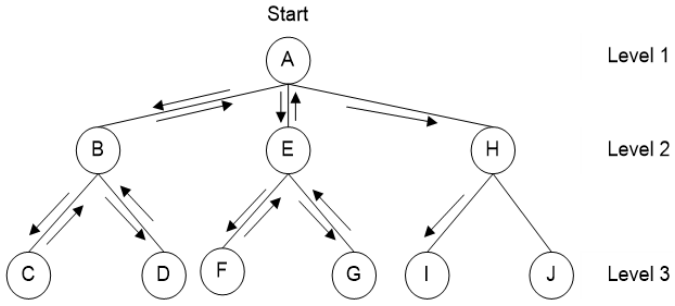

Figure 3: Search Method Technique Depth-First Search

2. **Breadth-First Search**
   Breadth-First Searchis a data retrieval technique on all nodes in one level or the level prior to the level or levels below it. Search starts from the root node and then move to the node far left, and the search continued to the vertices of the same level, if not found knot goal of his, the search continues at node leftmost level, then the search is continued until it was discovered knot goal of his ,

   The advantage with this technique is the same search with depth-first search, only search with this technique have added value, where all the nodes will be checked thoroughly at every level of the node.

   Disadvantages of this search technique lies in the time it takes a very long time if the solution is in the position of the last node to become inefficient.

   Shortcomings in the implementation should also be considered, such as search techniques become interactive between the user and the system causes a lack of relationship between a topic with another topic or to jump from topic to another before it is finalized searched topic.

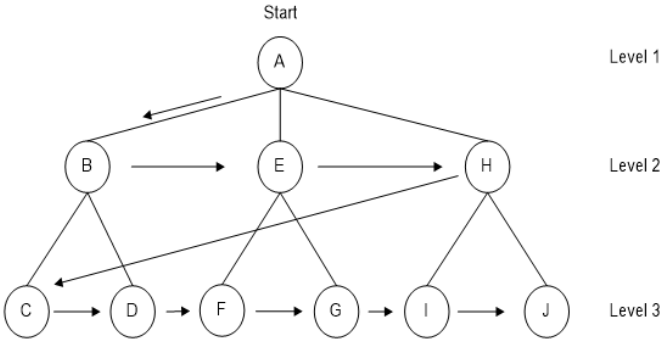

Figure 4: Search Method Technique Breadth-First Search

3. **Best-First Search**
   Search Best-First Search is a search that works based on a combination of more than methods of depth-first search and breadth-first search. This kind of search is also known as heuristics. The approach taken is to find the best solution based on knowledge so that searches can be determined to be started from where and how to use the best process to find a solution.

   The advantage of this type of search is to reduce the computational burden because the only solution that gives any hope of being tested and will stop only when the solution is approaching the best. This is a model that resembles the way people take a solution, it's just taken a solution could be wrong and there is no guarantee that the resulting solution is a solution that is absolutely true.

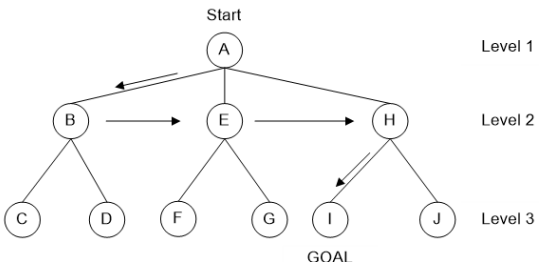

Figure 5: Engineering Search Method Best-First Search

3. RESEARCH METHODS AND STEPS RESEARCH

The process in making an expert system program involves several interacting elements, namely engineering knowledge (knowledge engineer), experts in the field of expertise (domain expert), and end users or users of expert systems that are desired to be made (end user). Of course by going through the process and also the steps of the expert system itself. In making this expert system must do several steps, such as :

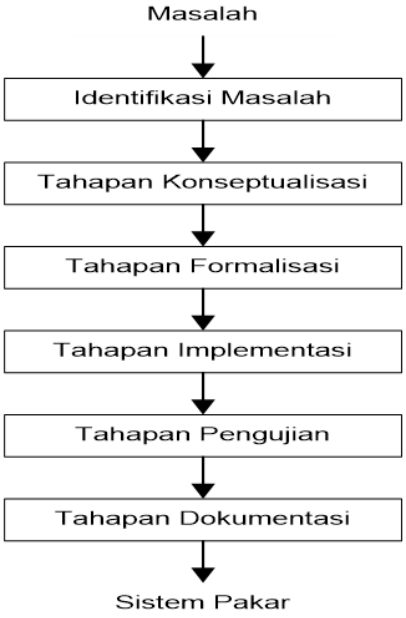

Figure 6 Framework

4. RESULT AND DISCUSSION

All required tables are stored in the database named db_cedera. This database serves to accommodate the questions needed. This identification process in expert systems can be modified such as adding, reducing or changing according to needs.

1. ERD (Entity Relationship Diagram)

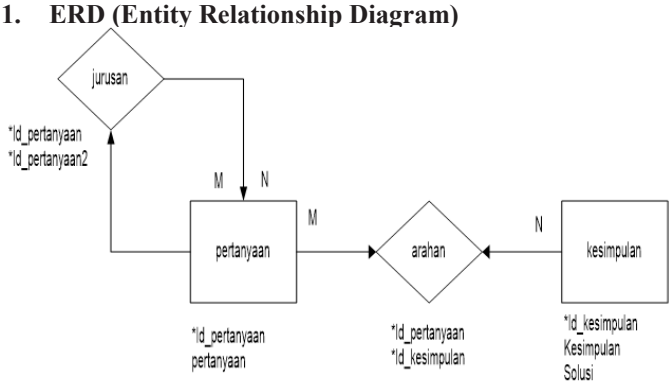

Figure 7: ERD (Entity Relationship Diagram)

2. Logical Record Structure

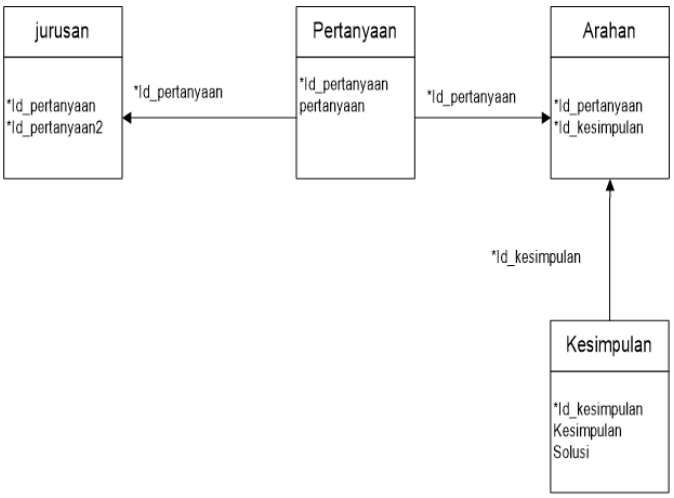

Figure 8: Logical Record Structure

3. User Interface

In order for a system easy to use, then diperlukasn user interface that can be easily understood by the user. To generate the user interface is easy to understand and be understood by the user, is required before the screen design is implemented in the form of programs.

Splashscreen Design

This is the first time to see this application is run. This view shows a logo or image.

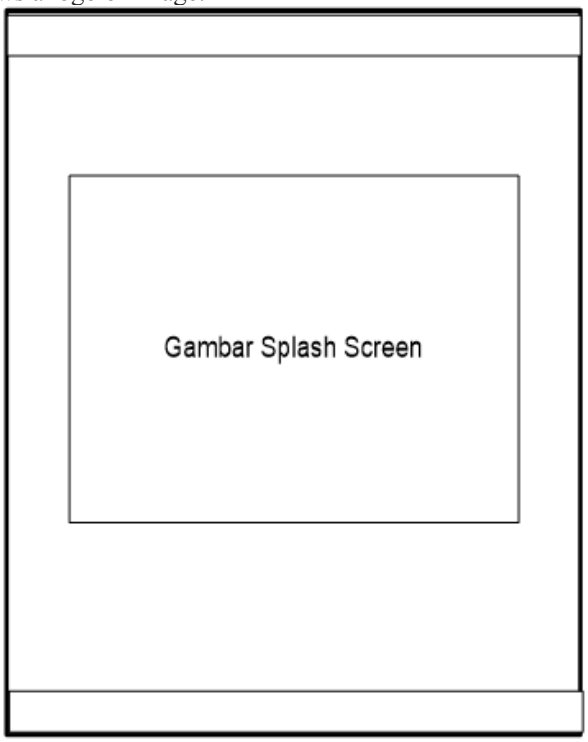

Figure 9: Splashscreen Design

Main Menu

On this screen there is some choice radio buttons, namely: identification, dictionary, Admin and About Me. Identification Button to go to the page identification, Dictionary button to go to the page dictionary, Admin button to get to the admin pages, and About Me button to get to the page about the program

makers.

Figure 10: Main Menu

Questions Screen Design

On this screen displays the questions in the determination process. Users can choose the "Yes" or "No" option to answer the question.

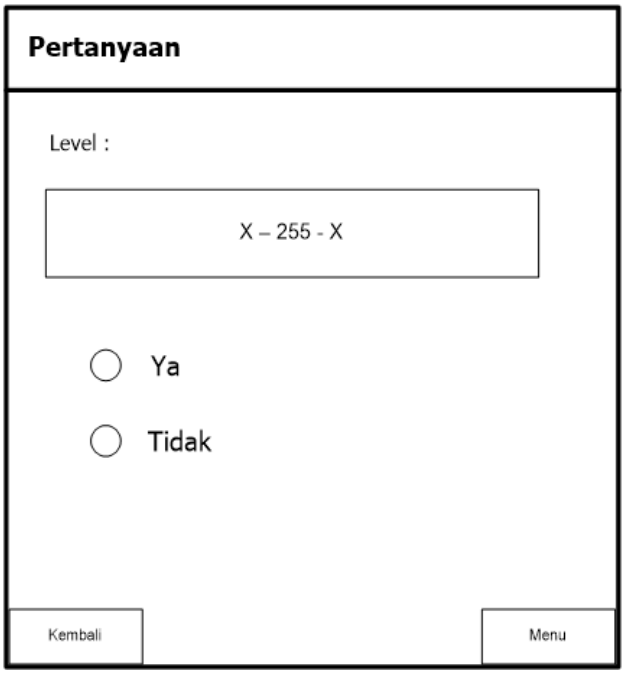

Figure 11: Questions Screen Design

Conclusions Screen Design

In this screen displays a conclusion is the result of identification which is the end of the determination process after the user selects a few questions.

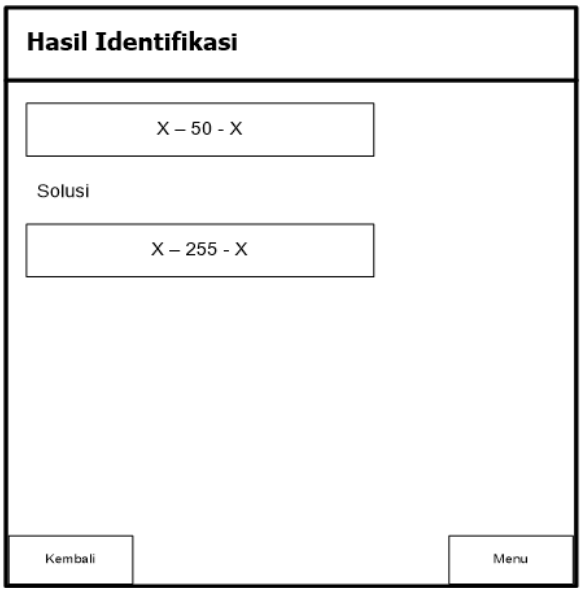

Figure 12: Conclusion Screen Design

Dictionary Screen Design

In this screen displays the dictionary says about sports injuries names contained in the database.

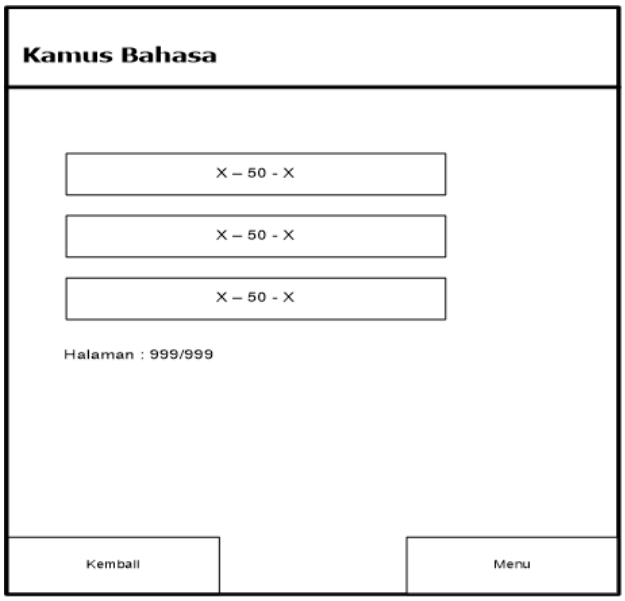

Figure 13: Dictionary Screen Design

Admin Login Screen Design

In this screen displays the login page and there is a login button to login to the admin main page form.

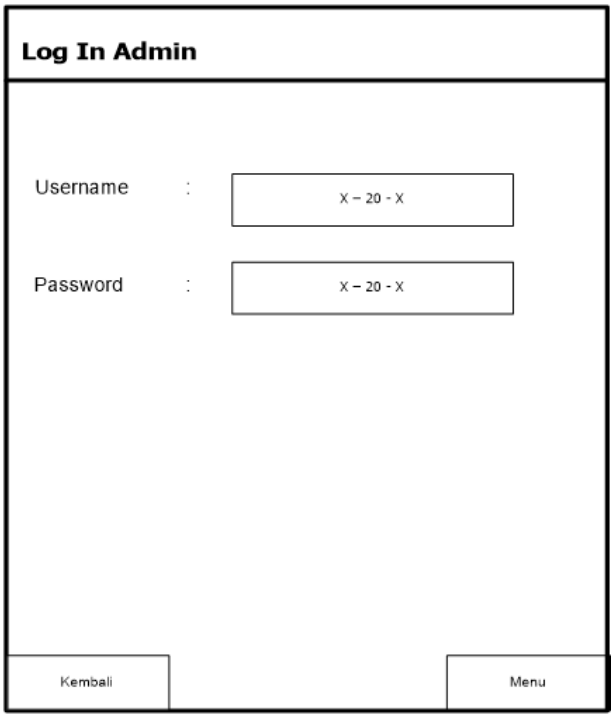

Figure 14: Admin Login Screen Design

Main Menu for Admin

In this screen displays the main menu and there is a link Admin admin question, Admin conclusion, Admin Manager, Admin Department, Admin Dictionary for entry, Admin Update to get into form Admin Update and exit to exit the Main Menu form Admin

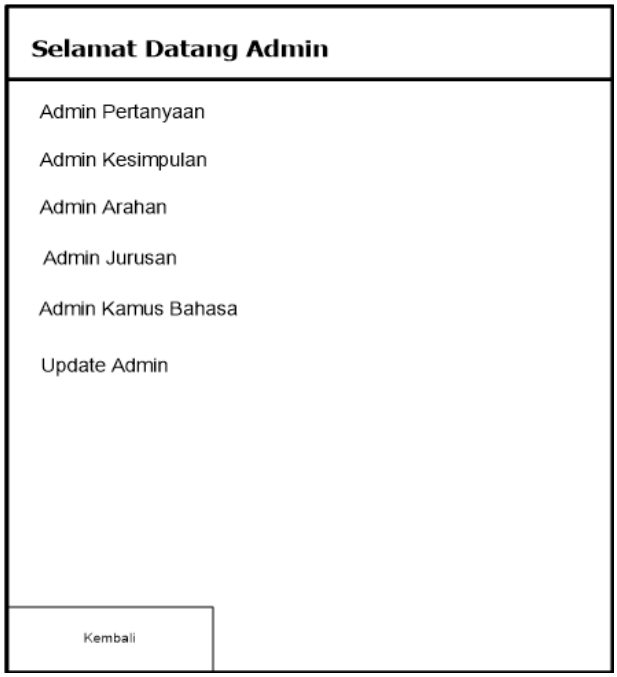

Figure 15: Main Menu for Admin

Screen Design for Admin Conclusions

In this screen displays data contained conclusions and form to add, delete and alter the conclusions.

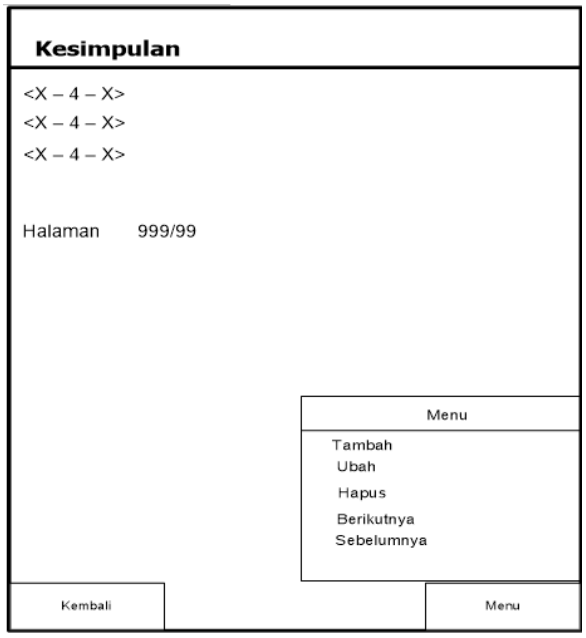

Figure 16: Admin Conclusion

Admin Manager

This screen displays data on the direction and there is a form to add, remove and change the direction.

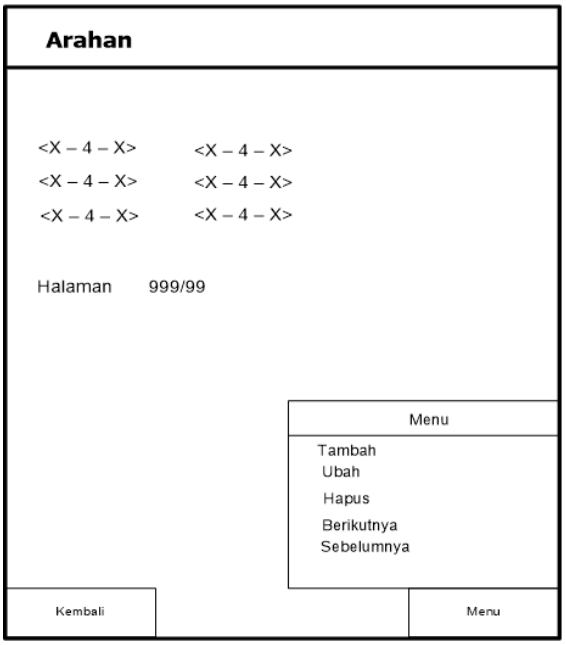

Figure 17: Admin Tutorial

Admin Programs

In this screen displays the data subject and there is a form to add, remove and change the subject.

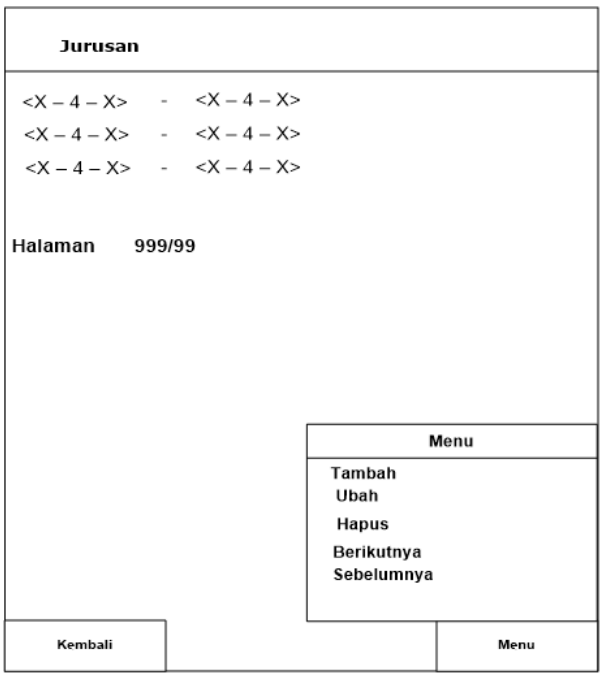

Figure 18: Admin Programs

Admin Language Dictionary

In this screen displays the data dictionary and there is a form to add, delete and modify the dictionary.

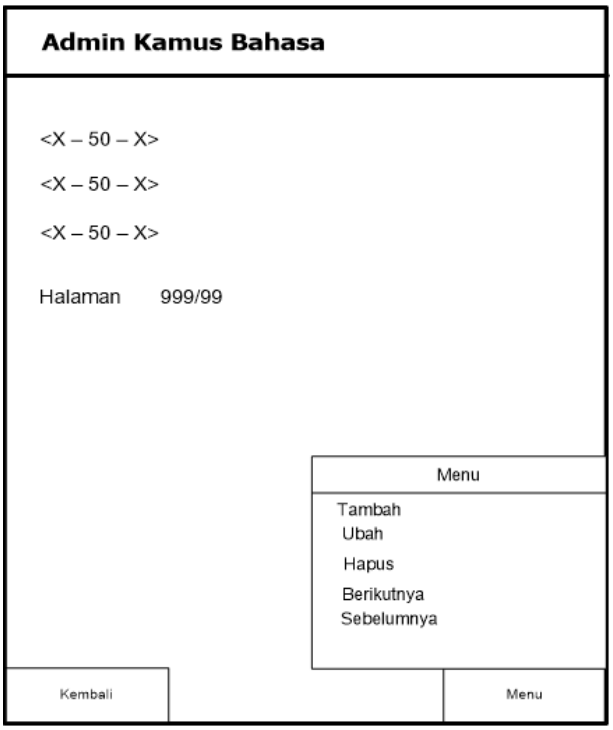

Figure 19: Admin Language Dictionary

5. CONCLUSION

From the discussion on expert systems to identify sports injuries, some conclusions can be produced as follows:

1. It is hoped that the existence of an expert system to identify sports injuries created can help users diagnose injuries and provide medical assistance immediately.
2. This expert system can also be used by anyone who needs it, not only for nurses and athletes, but also for sports lovers or sports people, as a guide for injury. But it is not recommended to be used as a determinant of absolute injury diagnosis / final conclusion.

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