

Design of an Application to Calculate Student Grades in Learning Logic Informatics Propositional Calculus Material

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A B S T R A C T

Propositional calculus is a method used to calculate the truth value of a proposition. Propositional calculus is commonly studied by various students, from high school to college. Propositional calculus studies the truth value (True/False) of a proposition. The proposition is then processed into the steps of working on the proposition according to the order of operator priority, which is packaged into truth tables and logical expressions. The proposition work done is not easy, but consumes a lot of time and writing media if done manually. Errors in doing proposition work result in inaccurate truth values obtained. Therefore, the author is interested in making an application to calculate student grades using the propositional calculus method that can be used to overcome the problem of working on propositions manually, so that it can produce accurate truth values, which can also be used as a learning medium and media for students to calculate and see the results of their grades manually.

INTRODUCTION

Logic is the study of reasoning, in the large Indonesian dictionary the definition of reasoning is mentioned, which is a way of thinking by developing something based on reason and not by feeling or experience.

Logic was first developed by the Greek philosopher, Aristotle, about 2300 years ago. Today, logic has wide applications in computer science, for example in the field of programming, logarithmic truth analysis, computer design and so on.

Informatics logic is a method used to calculate the truth value of propositions, while a proposition is a statement that can have its truth value determined (true or false). Only sentences that are true or false are used in reasoning. The sentence is called a proposition.

A proposition consists of operands:

1. Operands that are usually represented by letters
2. Letters in the alphabet and operators that have their own truth value rules. The truth value of a proposition depends on the operators contained in the proposition and the value of each operand. The more the number of operands and operators in a proposition, the more complicated the process of finding the truth value of the proposition will be. Informatics logic can be used to determine whether a sentence is valid or contradictory, and whether two sentences are sentences.
3. Sentences that are equivalent to each other.

Propositional calculus is a method used to calculate the truth value of a proposition. Propositional calculus is commonly studied by various students, from high school to college. Propositional calculus studies the truth value (True/False) of a proposition. The proposition is then processed into the steps of working on the proposition according to the order of operator priority, which is packaged into truth tables and logical expressions. The proposition work done is not easy, but consumes a lot of time and writing media if done manually. Errors in doing proposition work result in inaccurate truth values obtained. Therefore, the author is interested in making an application to calculate student grades using the propositional calculus method that can be used to overcome the problem of working on propositions manually, so that it can produce accurate truth values, which can also be used as a learning medium and media for students to calculate and see the results of their grades manually.

METHOD

Data

Data can be defined as a reality that describes events and real entities. The data from this study includes student objects (student names, UTS scores, TM scores, UAS scores, average scores, grades, results) which are realized in the form of numbers, letters, image text symbols and combined into one.

The data collection technique used by the author is to look for references from written sources both from course modules and from other literature sources related to learning Informatics Logic on Propositional Calculus material.

System Design

The system is a set of interrelated or integrated elements that are intended to achieve goals. The system in this study is in the form of how the application works and combined with the numbers entered in the Proposition Calculus material.

The system design technique used by the author in this research is using Java programming and NetBeans IDE 8.2 to design applications to calculate student grades.

System design is a phase of system development that defines how the system in the application will do what must be done to get results and solutions to the research.

Input Design

Input design is one of the most important parts in making applications because through this input form the user will interact with the computer. Input design includes data that needs to be entered in the system.

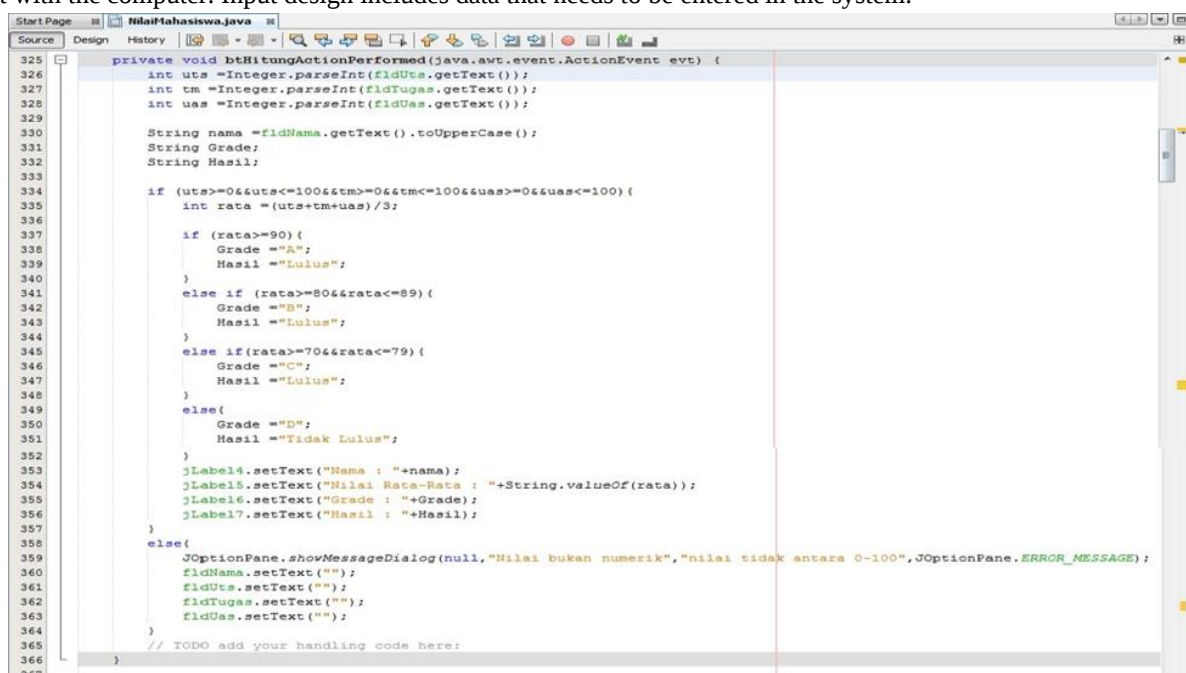


Figure 1. Input Display

Output Design

Output design is the process of designing the output of information that has been processed to students who will use and see the information results. This design is very important in making this application because the output will answer the needs of students to display the desired forms of application.



```
*SimpanNilai - Notepad
File Edit Format View Help
Nama : Nama : RANGGA MAHARA MIKO
Nilai Rata-Rata : Nilai Rata-Rata : 90
Grade : Grade : A
Hasil : Hasil : Lulus

Nama : Nama : Muhammad Habib
Nilai Rata-Rata : Nilai Rata-Rata : 66
Grade : Grade : D
Hasil : Hasil : Tidak Lulus
```

Figure 2. Output display on saved file

RESULTS AND DISCUSSION

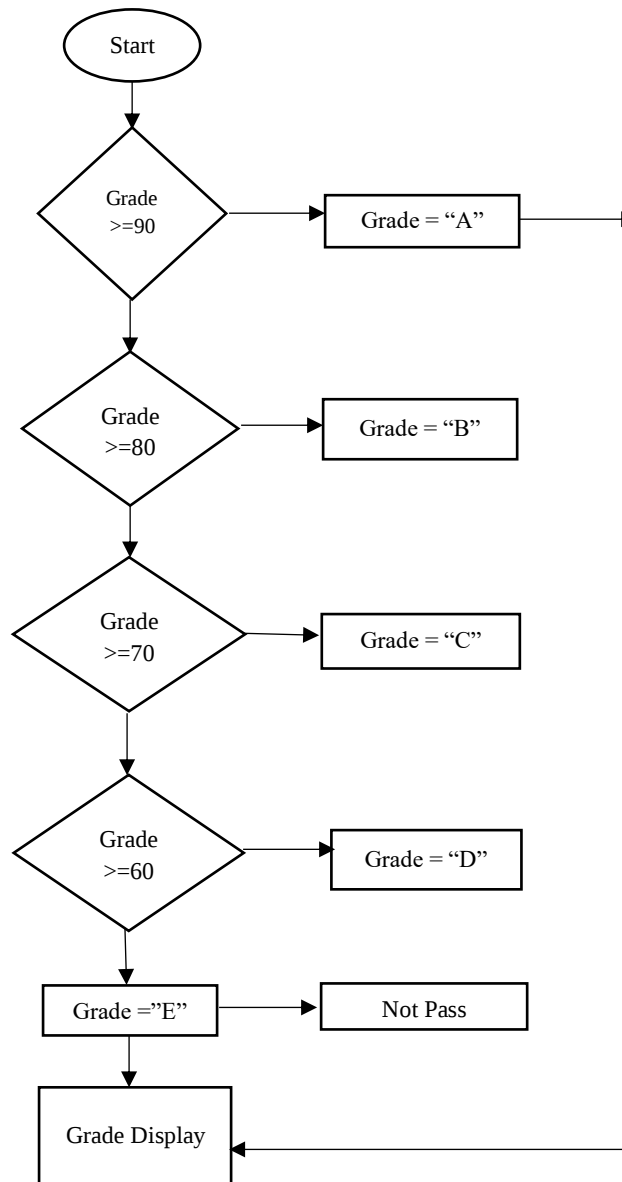


Figure 3. Flowchart Display

Figure 4. Application for Calculating Student Grades

For how this application works, we enter the name, uts value, assignment value and uas, the results of the value will appear, the provisions for this application are:

1. For an average score > 90 , the score obtained is A
2. For an average score > 80 and a score < 89 then get a grade B
3. Average score < 79 and score > 70 then get a C grade
4. And in addition to the above grades get Grade E

The menu above is part of the main menu of the Student Grade Calculator software, which contains a series of menus that will function to run the software. Each component of the main menu will be explained as follows:

Full Name

This menu is a menu that can be used by users to enter the names of students who will have their average scores calculated.

UTS

This menu is a menu that must be entered by the user to fill in the student UTS score table form.

TM (Independent Assignment)

This menu is a menu that must be entered by users to fill in the TM student value table form.

UAS

This menu is a menu that must be entered by users to fill in the student UAS score table form.

Count

This menu is a menu for calculating the average score of UTS, TM and UAS.

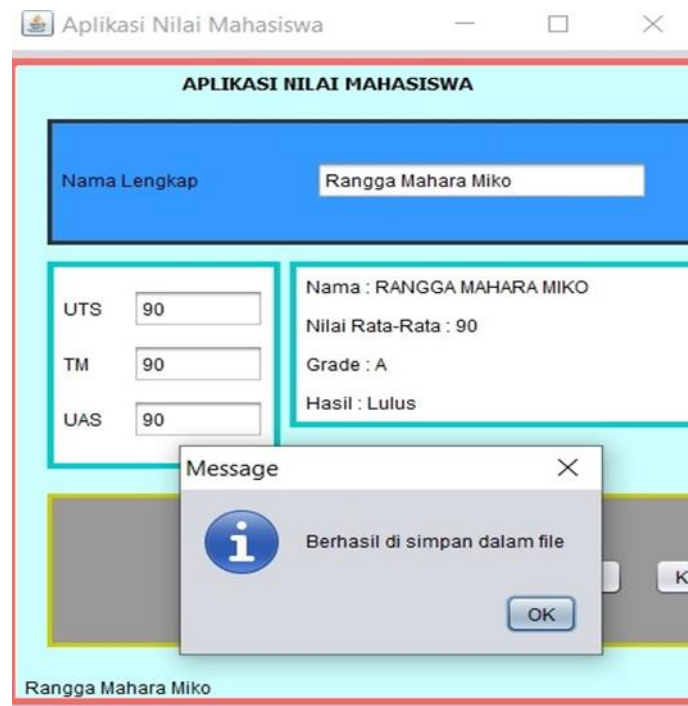


Figure 5. Storage View

Here is an example of User data input and the user saves the data content to the application folder.

This is a view of the contents of the folder of the Student Grade Counter :

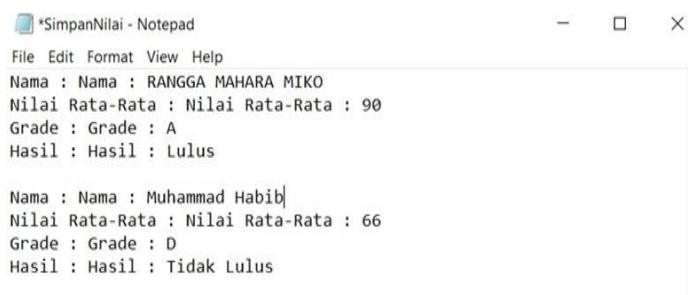


Figure 6. Display of Data stored in the Save Value File

Program Implementation to Propositional Calculus

Implication $p \rightarrow q$ states that p implies q

1. p is called antecedent and q is called consequent.
2. If p is true then q is true, but if p is not true, then q may or may not be true.

Entering the question we are asked to determine the value of :

p = if Rangga Mahara Miko's uts tm uas scores are 90,90,90 with an average score of 90 Q = then Rangga Mahara Miko gets an A and graduates.

$p \rightarrow Q$ = If Rangga Mahara Miko's uts tm uas scores are 90,90,90 with an average score of 90 then Rangga Mahara Miko gets an A and graduates.

Table 1. The Truth Table

P	Q	$P \rightarrow q$
F	F	T
F	T	T
T	F	F
T	T	T

p1 : If Muhammad Habib's average score is 90, then Habib Passes

p2 : If Muhammad Habib's average score is not 90 but 66, then Habib did not pass p3: It turns out that Habib did not pass

q : Means Habib's average score is not 90 but 66

Show with a truth table whether the conclusion is valid.

P = Muhammad Habib's average score 90

Muhammad Habib's average score is not 90 but 66 Q= Habib Passed

$\sim q$ = Habib No Pass

R = average score is not 90 but 66

CONCLUSION

Based on the implementation of the propositional calculus learning software design and the discussions that have been carried out in the previous chapters, the author can draw several conclusions, among others: Propositional calculus is one of the materials in informatics logic that is difficult when compiling a truth table if it uses the number of operands, so it takes a long time and is inefficient when done manually. In addition, working on propositional calculus problems must be checked repeatedly to get an accurate truth value. The design of application software for calculating student grades will make it easier for users to understand the process of working on propositional calculus by entering the same value in the application.

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