The Application of Informatics Logic in The Importation of Goods From Outside to Indonesia

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ABSTRACT

Logic is a method or technique that was created to examine the accuracy of reasoning and study the principles of correct reasoning and conclusion. Logic is also called "the calculus of computer science" because logic plays an important role in the field of computer science. Not only that, the role of calculus. (mathematics) is equally important for the sciences in the fields of science, economics and also in everyday life. In this study is to provide rules for making decisions on the problem of the number of imported goods entering Indonesia. The method used by the author to complete the research This is using the truth table of the problems to be solved, calculus of propositions, problems to be solved, Studying things from research in general and various methods of solving, the writer also looks for written sources. The definition of a proposition or statement is a declarative sentence that has exactly one truth value. namely: "True" (T) or u "False" (F). Proposition calculus is a method for calculating using propositions / sentences. In proposition calculus reviewed is the value of a declarative sentence (TRUE / FALSE). Logical operations contain a collection of operations that include negation, conjunction disjunction, implication, and bi implication.

Keywords: Informatics Logic, Proposition Calculus.

1.   INTRODUCTION

Logic is also called "the calculus of computer science" because logic plays an important role in the field of computer science. Not only that, the role of calculus (mathematics) is equally important for the sciences, economics and also in everyday life. The general understanding of logic is a method or technique that was created to examine the accuracy of reasoning and to study the principles of correct reasoning and to draw accurate conclusions. The science of logic deals with sentences (arguments) and the relationships that exist between these sentences. The aim is to provide rules so that the person can determine whether the sentence is true. The words learned in logic are tumum, therefore the rules that apply in them are also tumum. Logic in everyday life we can apply to the many imported goods that enter Indonesia, thus affecting local products and the economy in Indonesia. The purpose of this research is to provide rules for making decisions on many problems. imported goods entering Indonesia. As well as the accuracy of reasoning in studying the principles of correct reasoning and drawing conclusions.

2.   MATERIAL AND METHOD

The method used by the author to complete this research is as follows:
1. Using truth tables Problem to be solved: Can limiting the entry of goods from outside increase local products?
2. Calculus of propositions. Problems to be solved:
Learn things from research in general and various methods of completion. The author also searches for written sources, sources can be found from books, the internet, learning modules and other sources. The solution is to use informatics logic (calculus), which is done by inputting problem data from the problem of the large number of foreign goods entering Indonesia. Consists of problem analysis using logical operations, creating truth tables, designing truth tables, and analyzing a truth. Then, the authors test whether everything goes as expected. Testing is done by comparing several problems to get evidence whether in this way the writer can solve a problem.

3. RESULTS AND DISCUSSION

The definition of a proposition or statement is a declarative sentence that has exactly one truth value, namely: "True" (T) or "False" (F). Proposition calculus is a method for calculating using propositions / sentences. In proposition calculus reviewed is the value of declarative sentences (true / false), the method of combining sentences and drawing conclusions based on these sentences. A proposition is a logical variable p, q, r, ... or an expression that is constructed from these variables and is related to logic. Proposition calculus is also a process of determining the truth value of compound propositions, there are several types of compound propositions, namely:

1. Konjungtion 5. Tautology
2. Disjungtion 6. Kontradiction
3. Implication 7. Negation
4. Biimplikation

A. Logical Operations in propositions

Logical operations contain a collection of operations which include, negation, conjunction, disjunction, implication, and bi implication.

A.1 negation (⌐)

      Negation is a statement that is formed from the original statement, which will be true if the first statement is false, and will be false if the first statement is true. There are p statements and other statements called negation p. the negation p is denoted by the symbol ⌐p. This statement states that a decision is contrary to other decisions (p). Its application in the form of a sentence can be written in the form of "not true .." which is put into an arrangement of statements. It can be placed before the p statement, and it can also be placed after the p statement. from here, several informatics logic statements can be made that contain negations. The following is the problem model made by the negation:

p   : The entry of imported goods into Indonesia must be limited.
⌐p   : it is not true that the entry of imported goods into Indonesia must be limited.
q   : Exports of goods from Indonesia are further increased.

A.2 Conjunctions (∧)

A conjunction is a combination of two statements using the word "and". The writing symbol of this operation is denoted (∧). Conjunction writing format, that is, if the statement notation is p and q, it can be written as "p ∧ q".

The determination of the truth value p ∧ q in conjunction is:

- If p is true and q is true, then p ∧ q is true.
- If p is true and q is false or vice versa, then p ^ q is false.

So, if statement is true if both statements are true, but statement will be false if either statement is false. The following is a problem model that has been made with conjunctions:

p   : The entry of imported goods into Indonesia must be limited

q   : the export of goods from Indonesia should be increased

p ∧ q   : The entry of imported goods into Indonesia must be limited and the export of goods from Indonesia should be increased.

A.3 Disjunction (∨)

Disjunction is a combination of two statements using the word "or", the writing symbol of this operation is denoted (∨). The format of writing the conjunction is if

the existing statement notation is p or q so it can be written as "p ∨ q".

The determination of the truth value p v q in disjunction is:

- p ∨ q is true if both are true.
- p ∨ q is false if both are false.

So, the statement will be true if both statements are true, but the statement will be false if both are false. The following is a problem model that has been created by disjunction:

p : The entry of imported goods into Indonesia must be limited.

q : export of goods from Indonesia is further enhanced.

p ∨ q : the entry of Indonesian imported goods must be limited or the export of goods from Indonesia should be further increased.

A.4 Implication (→)

Implication is a conditional statement made from a combination of two statements using the word "if". The writing symbol of this logical operation is denoted (→). Conjunction writing format is if the statement notation is p

→ q then it can be written as "if p then q".

Determination of the truth value p → q in implication is as follows:

- p → q is true if both are true.
- If p is false and q is true, then it is possible that p → q is true.

So, the statement is true if bothPy a are true. However, if the statement is true if p is false and q

is true. The following problem models have implications:

p : The entry of imported goods into Indonesia must be limited.

q : export of goods from Indonesia is further enhanced.

p → q : in order for the export of goods from Indonesia to increase, imported goods must be limited.

A.5 Biimplication (↔)

Biimplication is that if p and q are coupled and connected using the conjunction "if only if", then a new statement is obtained "p if and only if q". The biimplication can be written as "p ↔ q".

Determining the truth value p↔q in bi the implications is as follows:

- if both are true then p↔q is true
- if both are false, then p↔q is true

So, the statement is true if both are true and false. Following are the problem models that have been made with bi implications:

p : The entry of imported goods into Indonesia must be limited.

q : export of goods from Indonesia is further enhanced.

p↔q : The entry of imported goods into Indonesia must be limited if and only if the export of goods from Indonesia is further increased.

B. Truth table design

To get a better decision, it would be better if both statements are arranged in a truth table.

p	q		¬q	p∧q	p∨q	p→q	p↔q
T	T		F	T	T	T	
T	F		T	F	T	F	
F	T		F	F	T	T	
F	F		T	F	F	T	

Table 1. The Truth Table

B.1 The Case Number 1

Too many imported goods have entered Indonesia. Therefore, imported goods must be limited in order for local products to be sold.

the premise,

p : too many imported goods have entered Indonesia

q : restrict imports

r : local products are sold

general statement:

Do imported goods have to be limited in order for local products to be sold?

Statement in the logic of informatics:

If many imported goods enter Indonesia, then imported goods are limited and local products are sold.

Solution 1:

      If p then q and r

 Solution 2:

     P → (q ∧ r)

P	q	r	q ∧ r	p → (q ∧ r)
T	T	T	T	T
T	T	F	F	F
T	F	T	F	F
T	F	F	F	F
F	T	T	T	T
F	T	F	F	T
F	F	T	F	T
F	F	F	F	T

Table 2. Case 1 Table Truth

True = 5, false = 3

Conclusion:

Based on the data in the truth table that has been obtained, the final result of the statement is tautology (true), because the number of true is greater than the number of false, then the decision can be implemented.

B.2 The Case Number 2

The government limits imported goods to Indonesia so that locally made products have an increase in exports. And that is a new policy that will be implemented.

The premise,

p   : the government restricts imported goods to Indonesia

q   : Local products have an increase

r   : is a new policy

general statement:

Is it necessary to implement a new policy, namely limiting imported goods to Indonesia so that locally made products have an increase in exports?

Statements in the logic of informatics:

The government limits imported goods to Indonesia if and only if locally made products have increased and that is a new policy.

Solution 1:

     (p if and only if q) and r

Solution 2:

    (p↔ q) ∧ r

p	q	r	p ↔ q	(p ↔ q) ^ r
T	T	T	T	T
T	T	F	T	F
T	F	T	F	F

T	F	F	F	F
F	T	T	F	F
F	T	F	F	F
F	F	T	T	T
F	F	F	T	F

Table 3. Case 2 Truth Table

CONCLUSION

From the explanation that the author has made, therefore, it can be concluded that in accordance with the title of the study, namely "THE APPLICATION OF INFORMATIC LOGIC IN THE IMPORTATION OF OUTSIDE TO INDONESIA "the author concludes that using informatics logic as a decision can be made. The strengths and weaknesses of this experiment are:

Advantages:

- Accurate in determining whether or not a problem is true.
- Easy to use in determining various problems.
- Quick in determining problems so as to save time.

Weakness:

- Not knowing the effect of the decisions that have been taken.
- Quick to determine problems when only a few statements exist.

REFERENCES

Ramadhani, F., & Ilona, D. (2018). Determinants of web-user satisfaction: using technology acceptance model. In *MATEC Web of Conferences* (Vol. 248, p. 05009). EDP Sciences.

Ramadhani, F., Ramadhani, U., & Basit, L. (2020). Combination of Hybrid Cryptography In One Time Pad (OTP) Algorithm And Keyed-Hash Message Authentication Code (HMAC) In Securing The Whatsapp Communication Application. *Journal of Computer Science, Information Technology and Telecommunication Engineering*, *1*(1), 31-36.

Ramadhani, F., Zarlis, M., & Suwilo, S. (2020). Improve BIRCH algorithm for big data clustering. In *IOP Conference Series: Materials Science and Engineering* (Vol. 725, No. 1, p. 012090). IOP Publishing.

Syah, R., Nasution, M. K., & Elveny, M. (2021). Sensitivity of MAPE using detection rate for big data forecasting crude palm oil on k-nearest neighbor. *International Journal of Electrical & Computer Engineering (2088-8708)*, *11*(3).

Sari, I. P., Hutagalung, F. S., & Hutasuhut, B. K. (2020). Determination of Campus Promotion Policy Strategy Applied The Profile Matching Method. *Journal of Computer Science, Information Technology and Telecommunication Engineering*, *1*(1), 17-23.

Hutagalung, F. S., Mawengkang, H., & Efendi, S. (2019). Kombinasi Simple Multy Attribute Rating (SMART) dan Technique For Order Preference by Similarity To Ideal Solution (TOPSIS) dalam Menentukan Kualitas Varietas Padi. *InfoTekJar: Jurnal Nasional Informatika dan Teknologi Jaringan*, *3*(2), 109-115.

Sari, I. P., Hutagalung, F. S., & Hutasuhut, B. K. (2020). Analisa Model Pemanfaatan Jaringan Komputer Yang Efektif untuk Peningkatan Produktivitas pada Jaringan LAN Universitas Muhammadiyah Sumatera Utara. *InfoTekJar: Jurnal Nasional Informatika dan Teknologi Jaringan*, *5*(1), 193-197.

Hutagalung, F. S., Sari, I. P., & Hutasuhut, B. K. (2020). Analisa SWOT Strategi Perencanaan Pemasaran Fakultas Ilmu Komputer dan Teknologi Informasi Universitas Muhammadiyah Sumatera Utara. *InfoTekJar: Jurnal Nasional Informatika dan Teknologi Jaringan*, *5*(1), 198-201.

Lubis, A. R., & Prayudani, S. (2020, October). Optimization of MSE Accuracy Value Measurement Applying False Alarm Rate in Forecasting on Fuzzy Time Series based on Percentage Change. In *2020 8th International Conference on Cyber and IT Service Management (CITSM)* (pp. 1-5). IEEE.