

Boole's Logic and its applied Dimensions in Computer

The present study is about logic, the computer, and not the contrary that is not the computer and logic because there is great difference between the two statements. We start here originally from logic as a fundamental approach so as to discuss its topics and their dimensions in the computer.

This study is a precise outline of the bases of one of the mathematical logic theories that is the theory of George boole's logic. This may be an introductory to deal with issues regarding its applied Dimensions in computer originating from that treatment.

This present study is divided into three Parts containing eight chapter. preceded by an introduction to the topic of the research and followed by a conclusion containing its most important results.

The study starts with the first Part entitled, **“identifying George Boole and his historical dimensions for his tendency in the algebra of logic”**. This first Part is divided into two chapters, and in the first chapter the researcher introduces **“George Boole, his life, his works, and his essential and historical location in the contemporary studies of Arabic logic”**, He introduced George boole's autobiography where he displays the intervals of his own life, that has been divided into two periods, The first period was from 1815 to 1849 and the second period was from 1849 to 1854. Then, the researcher moves on to introduce a summary of logical and mathematical works, followed by an index which includes his most well-known works which were either the books he wrote or the articles published in the scientific magazines at his time. The researcher finally shows the position which George boole occupied in terms of it's historical importance to the contemporary studies of Arabic Logic.

As for the second chapter, entitled, **“The historical dimensions of George boole's tendency in the Algebra of Logic”**, the researcher introduces that tendency through the contributions of the logicians and mathematicians, prior to George boole or rather accurately within the mathematical and logical developments, prior to George boole so that we maybe able to understand fully and exactly George boole's attempt to establish the logic of classes. These developments have formulated the historical dimensions of George boole's tendency in the Algebra of Logic.

Summary

The second Part entitled, “**the theoretical bases of George boole’s logic, ie, George boole’s view of the logic of classes**”, is divided into three chapters where the researcher introduces particularly within the third chapter “**George boole’s view of his symbolic apparatus**”, for his definition of the science of logic and his own view of the symbolic logical language and the range of its essentiality. He also shows what is meant by the symbolic expression including what is variable and what is invariable. The research then moves on to discuss George boole’s view of the classes where he starts with the definition of the meaning of the class. That is done through either the conception or the extension. Later on, he discusses George boole’s view of the total class and the empty class.

In the fourth chapter entitled, “**George boole’s view of the Categorical Proposition and the mathematical function**”, the researcher introduces George boole’s view of the Categorical Proposition and giving it its own proofs through the equation of the propositions. The researcher, later on, discusses George boole’s view of the mathematical functions and how it develops and expands.

In the fifth chapter, titled, “**George boole’s view of logical operations**”, the researcher introduces the logical operations which George boole’s had performed with classes, the most important of which were: the identity, the logical sum with its two kinds; the inclusive and the exclusive, the process of logical product, the process of logical subtraction and finally an outline of George boole’s view of the process of division. And at the end of this selection the researcher introduces a full index of the laws resulting from the logical processes of George boole.

The third Part is entitled “**the application bases of George boole’s logic, ie, how George boole’s logic can be applied to the computer structure**”. This Part is divided into three chapters the Sixth of which “**defines the computer, its substantial components, its characteristic, its essentiality, its capabilities, and its history**”. There are various topics regarding the identification of the meaning of the computer. The researcher exposes to its material components and shows its characteristics and capabilities. He also shows the difference between man and the computers and there he shows its essentiality through demonstrating the history of the computer in which he tries to identify the situation of applying the logic of George boole in the computer. That is the approach into the seventh chapter in which the researcher tries to identify the position of George boole’s logic in the

Summary

computer's structure more precisely the role of George boole's logic in the computer.

In this seventh chapter, the researcher introduces “**The position of applying George boole's logic in the computer structure for the history of the computers**” starting from

the period of the mathematical calculators and the storage of information and programs and ending with the principles of the computer. Later on, the researcher shows the role of applying George boole's logic in the structure of the computer and that's done through the definition of logical gates and through the knowledge of the relationship between applying George boole's logic and the attitude of these logical gates and circuits.

In the final eight chapter entitled “**the laws of George boole's logic between the theoretical interpretation and applicable dimension**” the researcher introduces the explanations and analyses throughout the chapter to the laws of George boole's logic demonstrating how far the similarities are between these laws with the laws of algebra or arithmetic. He also explains how that some of these laws may be applied to the logical gate of the computer.

The researcher finally shows throughout the eighth chapter the role of some of these laws in simplifying the logical gates within the logical circuits in the computer.

The study is also entailed by a set of the most important results at which the researcher has arrived.

We, which very much Allah al-mighty and most able may make of these results supportive and beneficial to other researchers and scholars.
