**CHAPTER ONE**

**OVERVIEW**

**INTRODUCTION**

**E**lectricity is the set of physical phenomena associated with the presence and flow of electric charge (en.wikipedia.org/wiki/Electricity). It is an interesting part of physics, which has its application all areas of life and it is widely known as a source that brings life into electronics devices.

Electricity was discovered by Benjamin Franklin in 1752 from his famous kite – flying experiment. In the early years, electricity became associated with light where Thomas Edison 1879 focused on inventing a practical light bulb, and in 1882 he was able to start up power station called Edison’s Pearl street power station which can power about 5,000 lamps. ([www.science](http://www.science)inventions.com)

The turning point of the electric age came a few years later with the development of AC (alternative current) power system which superseded the DC (direct current). Power plant invented by Edison electricity became a dependable source of electric current in a year when the Italian scientist named Alessandro Volta carried out an experiment involving salt water and a metallic element where the observed chemical reaction was able to produce an electric current ([www.inventors.about](http://www.inventors.about).com). It was after sometime the English scientist Michael faraday realized that electric current could be produced by passing a magnet through copper wiring where the conversion principle was based on motion energy to electrical energy of the generator and the electric motor.

The introduction of Visual Basic through the drag and drop design, mainly for creating the user interface was derived prototype from the generator that was develop by Alan cooper and his company called tripod, Microsoft contracted with cooper and his associated to develop tripod into a programmable form of system for windows 3.0 under the code name ruby that is ruby programming language, Microsoft then derived to combine it with the basic language to create visual basic. (Michael, 2008).

Microsoft Visual Basic.NET (VB.NET 2010) as one of the basic programming language which primarily has an integrated and interactive development environment (IDE) highly optimized to support rapid application development (RAD), due to its simplicity particularly in executing codes. This has enhanced the development of graphical user interface that could connect them to handler function provided by the application

According to Michael , (2008), the graphical user interface of the VB –IDE also provides an intuitively appealing views for the management of the program structure in large and the various types of entities (such as classes ,module ,procedure ,form e.t.c) , based on this fact VB.NET provides a comprehensive interactive and a context sensitive online help system to the user . The overwhelming advantage of interface in the development of the software package is sets out in a VB.NET class library of the Microsoft Visual Basic. NET programming language. One of the district properties of VB.NET 2008(IDE) when editing program texts is its ability of informing the programmer in a little popup window about the types of constructs that may be entered at the current cursor location called the “intelliscence technology**”**, this makes it extremely easy to use even for people who are not programmers. The integrated language of this software also attained to Microsoft’s component object model (com) and its comes with an enhanced visual designers which has increased application performance of “IDE”, new forms designer ,an in – place menu editor and automatic control anchoring which delivers new productive feature for building more robust application easily and quickly.

**1.2 JUSTIFICATION**

Physics covers virtually every area of life in terms of electricity, nuclear, space technology and so on: it has been observed that interest of students in studying electricity is progressively depreciating in recent years. The study of electricity basically entails highly devoted time and early due its voluminous nature lecture notes used in teaching courses under electricity in recent years have not been that encouraging due to the nature of their compilation which has lead to a voluminous nature of electricity.

Similarly, student with low mathematical skill also find it difficult to study electricity, because most topics under electricity are all mathematically entrenched, so emphasis have been made on studies creative material which shows a positive instructional gain under certain circumstance and encountered real possibilities to learning and teaching improvement, the new technology also provides opportunities old technologies that is blackboard and books. (Francisco esquembre, 2001)

On January 27, 2016, the price of naira fell to 305 against the United States (USD) dollars from 303. In the same vein, on February 24, 2016. The naira rose by 17.3 percent against dollar at the parallel market to 310 from 375 naira .Due to fluctuating in price of naira against dollar. The cost of getting software will be high and expensive, therefore there is need to develop indigenous softwares. Power / electricity software, apart from helping the students, also helps to improve system reliability to achieve high availability. In building of new power plant, installing of transformer and laying of cables e.t.c.

Power/electricity software can be used to calculate /estimate different electricity model, with which one can predict potential failures, alternating problems before they occur and enabling root cause analysis. These helps in achieving high availability .Electricity /power software can also be use validates power quality that complies energy contract, helping ensure the reliable operation of power equipment in usage and optimizing electrical distribution network.

In the same vein, with power/electricity software, operational efficiency can be improved to increase energy savings and sustainability. The cost of electricity is often the largest uncontrolled cost in tertiary and industrial buildings. (Consumption and other utility billing). There is need to develop softwares that helps to identify areas of both waste and improvement in energy usage patterns (both in home devices and industrial machines) to reduce or avoid peak demand and power factor penalties, providing validate information to ensure utility bill is a cost – effective as possible.

Finally, there is need to develop softwares that can give access to power system with simplified interactive interface, both novices, students, and power users can easily access electricity information. User can calculate, analyze and report their information gotten.

**1.3 OBJECTIVES**

The objectives of this project are:

To improve and develop a software package that can compute over forty electrical models to be calculated will be more in as to get more information.

1. Current in a wire
2. Resistance in a wire
3. Current (Electromotive force)
4. Resistance (Electromotive force)
5. Internal resistance
6. Resistivity of material
7. Area in calculating the resistance of a material
8. Length in calculating the resistance of a material
9. Voltage in work done
10. Current in work done
11. Time taken in work done
12. Current density
13. Voltage in calculating electric heat generation
14. Current in calculating electric heat generation
15. Time taken in calculating electric heat generation
16. Force exerted on a conductor carrying current
17. Length in the magnetic force
18. Current (magnetic force)
19. Final temperatures (resistance of a material at certain temperature)
20. Initial resistance (resistance of a material at certain temperature)
21. Initial temperatures (resistance of a material at certain temperature)
22. Current (heat generated by resistor component in an electrical device)
23. Resistance (heat generated by resistor component in an electrical device)
24. Time (heat generated by resistor component in an electrical device)
25. Inductance of the field
26. Current flowing through the field (energy stored in a magnetic field coil)
27. Quantity of charges in the field
28. Cross sectional area
29. Voltage supplied (strength of the magnetic field)
30. Length of the field (strength of the magnetic field)
31. Force field in torque
32. Distance across the conductor (torque produce in a conducting material)
33. Time taken (induced electromotive force (e.m.f) of a coil)
34. Magnetic flux
35. Number of coil (induced electromotive force (e.m.f) of a coil
36. Current (self inductance)
37. Magnetic flux (self inductance)
38. Number of coil (self inductance)
39. Current in self inductance of a solenoid
40. Cross sectional area in self inductance of a solenoid
41. Number of coil in a self inductance of a solenoid
42. Current (mutual inductance of two coaxial solenoid of both primary and secondary solenoid)
43. Number of primary coil (mutual inductance of two coaxial solenoid)
44. Number of secondary coil (mutual inductance of two coaxial solenoid)
45. Cross sectional area (mutual inductance of two coaxial solenoid)
46. Time taken (emf in a magnetic flux)
47. Magnetic flux (emf in a magnetic flux)
48. Length of a magnetic field
49. Distance apart
50. Magnetic flux (flux density)
51. Cross sectional area (flux density)
52. Initial current of the capacitor (current flow through a capacitor)
53. Initial potential of the capacitor (potential across the capacitor)
54. Capacitance (time used in charging capacitor)
55. Resistance (time used in charging capacitor)
56. Capacitor initial charge
57. Capacitance (energy store in the capacitor)
58. Voltage (energy store in the capacitor)
59. Frequency (resistivity of charges)
60. Capacitance (resistivity of charges)
61. Number of primary turns of a transformer
62. Number of secondary turns of a transformer
63. Current in secondary phase of a transformer
64. Voltage at the primary phase of a transformer
65. Voltage at the secondary turns of transformer
66. Frequency (estimating the ripple voltage of a transformer)
67. Capacitance ability of a transformer
68. Direct current
69. Voltage supplied (peak voltage)
70. Area (emission current density)
71. Temperature (emission current density)
72. Resistance of quality of electrical circuit
73. Frequency of quality of electrical circuit
74. Length of the circuit of quality electrical circuit
75. Thickness of material (wire) (hall voltage of a magnetic material)
76. Current (hall voltage of a magnetic material)
77. Magnetic field (hall voltage of a magnetic material)
78. Hall coefficient (hall voltage of a magnetic material)
79. Number of free electrons in hall coefficient
80. Number of free electron in hall coefficient
81. Resonant frequency
82. Quality factor
83. Mobility of electron (drift velocity)
84. Electric field (drift velocity)
85. Conductivity (charge density)
86. Electron mobility in charge density
87. Charge of an electron in charge density
88. Magnetic field in hall voltage
89. Current in number of electron per cubic meter
90. Charge of electron of (number of electron per cubic meter)
91. Hall voltage (number of electron per cubic meter)
92. Time taken (number of electron per cubic meter)