**CHAPTER II  
BASIC OF THEORY**

**II.1 Definition of Barcode**

Barcode is an optical machine-readable representation of data relating to the object to which it’s attached. Barcode can be described as an optical Morse code. It’s the small image of lines (bars) and spaces that is affixed to identification the information. Barcodes originally were scanned by special optical scanners called barcode readers. The code uses a sequence of vertical bars and spaces to represent number and other symbols are read with a scanner that turned into a line of text for your device, which measures reflected light and interprets the code into numbers and letters that are passed on to a device­.



**Figure 2.1 Fifth Generation – Artificial Intelligence (REF:** [**http://barcode-test.com/barcode-201-barcode-work /**](http://barcode-test.com/barcode-201-barcode-work%20/) **)**

A barcode essentially is a way to encode information in visual pattern that a machine can read the combination of white and black bars represents different text character which follows a set algorithm for that barcode type, if you change the sequence of bars, you will get the different of text from that barcode.

Originally barcodes systematically represented data by varying width and spacing of parallel lines and may be referred to linear barcode (1D) and then evolved into rectangles, dots, hexagons and other geometric patterns barcode (2D) and now is 3 Dimension barcode.Barcode symbol typically consist of five parts is a quiet zone, a start character, data characters, a stop character and another quiet zone. Barcode can hold any type of text information that you encode but with the product labels the price in not usually encoded.

Barcode will denote what product its and your POS software like cashier or database will have pricing information associated to this. At the Point Of Sale (POS), shoppers can get product discounts or special marketing offers through the email address or home address provided at registration. Depending on the specific barcode type, Linear Barcodes can have from 20-25 Characters then Matrix Barcode go up to 2000 Characters, if increase the amount of information, the barcode will became more bigger.

The Symbologies of the barcode technology can be arranged or mapped in a variety of ways, Continuously Symbology and Discrete Symbology. A continuous symbology is marked by the characters beginning with a black line and ending with a white line or space, discreet symbologies have characters encoded as a black line a space and then another black line.[[1]](#footnote-2)In Discrete Barcode, character begin and end with bars and the space between characters will be ignored by scanner. In Continuous Linear Barcode, each character begins with a bar and ends with a space, allowing characters to be strung together continuously.

**II.2 Definition Of Computer According the Experts**

**II.2.1 Definition of a computer according to Robert H. Bilssmer 1985**

Computer is an electronic device that can perform a series of tasks that accept input, process the input according to instructions given, keep the commandments and its products, and provides output in the form of information.

**II.2.2 Definition of a computer according to Donald H. Saders 1985**

Computer is an electronic system that can manipulate data quickly and accurately as well as designed and organized automatically receive and store input data, process it and produce output based on the instructions that have been stored in a memory.

**II.2.3 Definition of a computer According to VC. Hamacher ZG**

Computer is an electronic calculating machine that can quickly receive digital input information, processing in accordance with a program stored in memory (stored program) and generate output information.

**II.2.4 Definition of a computer According to William M Fuori**

Computer is a data processor (data processor) that can perform large calculations and faster including a large arithmetic or logic operations without human intervention during processing.

**II.2.5 Definition of a computer According to Gordon B. Davis**

Computers are a special type of computing tool has certain definite properties.

From the definition of a computer according to experts mentioned above, an outline that computers are:

1. Can process data
2. Provide information
3. Electronic devices
4. It can receive data input
5. Using a program stored in computer memory (stored program)
6. Works automatically
7. Able to store programs and processing results  
     
    While the so-called program in this case is a collection of some of the detailed instructions or orders which have been prepared so that the computer can perform its functions in a predetermined manner. In general, the computer system itself consists of elements that are interconnected to form a single unit for the principal purpose of implementing the system. The main objective of a computer system is processing the data to produce information that needs to be supported by elements composed of hardware (hardware), software (software), and brain-ware.

**II.3 History of Computer**

The computer as we know it today had its beginning with a 19th century English mathematics professor name Charles Babbage.He designed the Analytical Engine and it was this design that the basic framework of the computers of today are based on Generally speaking, computers can be classified into three generations. Each generation lasted for a certain period of time, and each gave us either a new and improved computer or an improvement to the existing computer.

First generation: 1937 – 1946 - In 1937 the first electronic digital computer was built by Dr. John V. Atanasoff and Clifford Berry. It was called the Atanasoff-Berry Computer (ABC). In 1943 an electronic computer name the Colossus was built for the military. Other developments continued until in 1946 the first general– purpose digital computer, the Electronic Numerical Integrator and Computer (ENIAC) was built. It is said that this computer weighed 30 tons, and had 18,000 vacuum tubes which was used for processing. When this computer was turned on for the first time lights dim in sections of Philadelphia. Computers of this generation could only perform single task, and they had no operating system.

Second generation: 1947 – 1962 - This generation of computers used transistors instead of vacuum tubes which were more reliable. In 1951 the first computer for commercial use was introduced to the public; the Universal Automatic Computer (UNIVAC 1). In 1953 the International Business Machine (IBM) 650 and 700 series computers made their mark in the computer world. During this generation of computers over 100 computer programming languages were developed, computers had memory and operating systems. Storage media such as tape and disk were in use also were printers for output.

Third generation: 1963 - present - The invention of integrated circuit brought us the third generation of computers. With this invention computers became smaller, more powerful more reliable and they are able to run many different programs at the same time. In1980 Microsoft Disk Operating System (MS-Dos) was born and in 1981 IBM introduced the personal computer (PC) for home and office use. Three years later Apple gave us the Macintosh computer with its icon driven interface and the 90s gave us Windows operating system.

1972 – 2010: Fourth Generation – Microprocessors - This revolution can be summed in one word: Intel. The chip-maker developed the Intel 4004 chip in 1971, which positioned all computer components (CPU, memory, input/output controls) onto a single chip. What filled a room in the 1940s now fit in the palm of the hand. The Intel chip housed thousands of integrated circuits. The year 1981 saw the first ever computer (IBM) specifically designed for home use and 1984 saw the MacIntosh introduced by Apple. Microprocessors even moved beyond the realm of computers and into an increasing number of everyday products.

The increased power of these small computers meant they could be linked, creating networks. Which ultimately led to the development, birth and rapid evolution of the Internet. Other major advances during this period have been the Graphical user interface (GUI), the mouse and more recently the astounding advances in lap-top capability and hand-held devices.



**Figure 2.1 Fifth Generation – Artificial Intelligence (REF:** [**http://www.btob.co.nz**](http://www.btob.co.nz/)**/)**

2010-  : Fifth Generation – Artificial Intelligence - Computer devices with artificial intelligence are still in development, but some of these technologies are beginning to emerge and be used such as voice recognition. AI is a reality made possible by using parallel processing and superconductors. Leaning to the future, computers will be radically transformed again by quantum computation, molecular and nano technology.  The essence of fifth generation will be using these technologies to ultimately create machines which can process and respond to natural language, and have capability to learn and organise themselves.

As a result of the various improvements to the development of the computer we have seen the computer being used in all areas of life. It is a very useful tool that will continue to experience new development as time passes.

**II.4 Definition of Intel Compute Stick (ICS)**

The Intel Compute Stick is a single-board computer developed by Intel. The computer, according to Intel, is designed to be smaller than conventional desktop or other small-form-factor PCs, while keeping comparable performance. Its main connector, an HDMI 1.4 port, along with a compatible monitor (or TV) and Bluetooth-based keyboards and mice, allows it to be used for general computing tasks.

The small form factor device was launched in early 2015 using Atom Z3735F power-efficient processor from Intel's Bay Trail family, a SoC family that was predominately designed for use with tablets and 2-in-1 devices. The processor offered 1.33 GHz processor base frequency and a maximum RAM of 2 GB. This was sufficient for home entertainment usage and light office productivity as well as thin client and digital signage application.

In mid-2015 it was announced that second generation versions of the Compute Stick would feature advancements on the Bay Trail framework through application of Core M processors in the form factor. The new devices (due Q4 2015) allow Intel to introduce additional processing power as well as 4 GB memory for "more intensive application and content creation" as well as "faster multi-tasking

1. http://www.barcodesinc.com/articles/barcode-technology.htm [↑](#footnote-ref-2)