**Chapter 2**

**CONCEPTUAL FRAMEWORK**

*<introduction paragraph here>*

**Review of Related Literature**

***Operating System***

Operating system is a system software which is required for a basic computer to function. It acts as a medium for both software and hardware devices to work in sync. It manages system resources, processes and memory allocations. According to statistics, the widely known Microsoft Windows is the leading desktop operating system worldwide in market shares, followed by Apple Inc.’s MacOS, while Linux are collectively in third place from 2013 to 2018.

***Operating Systems for Raspberry Pi***

Raspberry Pi is a small-sized or a “headless” computer

***Raspbian OS***

Raspbian OS is a system optimized for the Raspberry Pi hardware. The system is free to use and also provides over 3,500 packages and pre-compiled software. It is based on Debian Linux and created by a small team of developers. Although it was said to be completed in June of 2012, the system is still under active development to improve its stability and performance.

The Raspian desktop environment is known as the “Lightweight X11 Desktop Environment” or in short LXDE. This has a fairly attractive user interface that is built using the X Window System software and is a familiar point and click interface. We shall look more into how to install and use this OS in the next section.

***Raspberry Pi***

Raspberry Pi is a small-sized computer that was originally planned to help to motivate the interest of school-age children and promote basic education about computer science. The goal of Eben Upton, the creator of Raspberry Pi, is to create an affordable computer that would enhance hardware understanding and programming skills of software students. Raspberry Pi consist of feature ports for SD Card, USB 2.0, HDMI, analog audio, composite video, internet, and power.

***Types of Raspberry Pi***

Raspberry Pi 1 Model B is the original Raspberry Pi**.** Thespecifications of this type have two USB ports, with a RAM of 512mb, the Ethernet port is 100mb, and the SD card is not included.

Raspberry Pi 1 Model A is simpler and cheaper than Raspberry Pi 1 Model B. The memory of Model A was originally to have had 128mb of RAM, and was upgraded to 256mb before release.

Raspberry Pi 1 Model B+ is the final revision of the Raspberry Pi 1 Model B, the original Raspberry Pi. The specifications of this type have four USB ports compare to Model B only provides two, it has more GPIO pins with 40 pins with the same pinout for the first 26 pins as the Model A and B, and it also has micro SD card included.

Raspberry Pi 1 Model A+ replaced the original Raspberry Pi 1 Model A. Compared to Model A it has more GPIO pins with 40 pins with the same pinout for the first 26 pins as the Model A and B, it also has micro SD card included, and smaller neater form factor.

Raspberry Pi Zero is most affordable Pi and smallest as half the size of a Model A+ with twice a utility. The specifications of this type has 1GHz single-core CPU, 512 RAM, Mini HDMI port, Micro USB OTG port, Micro USB power, HAT-compatible 40-pin header, and CSI camera connector (v1.3 only).

Raspberry Pi 2 Model B replaced the original Raspberry Pi 1 Model B+ and a second-generation Raspberry Pi. The specifications of this type has ARMv7 quad core processor with 900MHz, and 1 GB RAM compared to Raspberry Pi 1.

Raspberry Pi 3 Model B replaced the original Raspberry Pi 3 Model B and it is the earliest model of the third-generation Raspberry Pi. The specifications of this type has 1.2GHz quad core processor with wireless LAN and Bluetooth connectivity.

Raspberry Pi 3 Model B+ replaced the original Raspberry Pi 2 Model B and Raspberry Pi Model B+ and a third-generation Raspberry Pi. It was faster than the first and second generation of Raspberry Pi. It has more powerful processor with additional features, the wireless LAN and Bluetooth connectivity.

Raspberry Pi Zero W extended the Pi zero family with added features. The specifications of this types is the same as the Pi Zero but with additional features, the wireless LAN and Bluetooth connectivity.

***Python Programming Language***

Python is a popular language preferred to teach beginners some basic serial programming. It is a high-level programming language that supports multi programming paradigms such as imperative, functional, and object-oriented.

**Related Studies**

This part of the document, it contains different studies, researches, thesis and documents that related to this study. And it also a crucial aspect of the planning of the study.

***Title: Development of an Electronic Bulletin Board with GSM using Raspberry Pi for Technological University of the Philippines***

***Author: Queenilyn V. Martinez, Kristel Joy Morales, Ernest Jovan G. Recalde***

The study is about the Development of an Electronic Bulletin Board with GSM using Raspberry Pi that helps the administrators post announcements and other important information in an efficient manner utilizing the available technologies. The developed system can record cellphone numbers and messages received by GSM and store them in the system database. It can help the students to be updated on the current information and activities other important rules and regulations, they need to know. This study used the hardware like Raspberry Pi, GSM, Arduino and Dot Matrix for displaying the announcement, and software like Java, C, and MySQL. The system was evaluated using the TUP Evaluation Instrument for Prototype Developed, and it was rated highly acceptable.

***Title: Development of a PC-Based Electronic Bulletin Board***

***Author: Morvic D. Bayais, Linnacus T. Bundalian, Rizelle Maurine Hazel Z. Contreras, Neljon P. Lusterio, Dianne T. Mangilin, Rhowel Dellosa, Rionel Caldo, Joseph Maiquez.***

The study is about of development of a PC-Based Electronic Bulletin Board that use to give an information to the students like announcement, notices or messages. It will easy for them to inform the latest announcements or notices. The display message is coming from the messages that were sent through an SMS by a user. It is a computer based system that used mobile and web technology. It was developed on Visual Basic Studio and Microsoft SQL Server Management Studio. For Hardware, a computer unit, broadband dongle, Sim Card, LED television. It is designed with a user-friendly interface where the users can easily understand and use the system

***Title: Teachers and Computer Bulletin Board***

***Author: Paul D. Chandler***

The study is about the implementation of a Wireless Bulletin Board where it used a Bluetooth technology. In this application, the duty of the Bluetooth is to connect the client to the server where it will construct a connection between them. After the connection was accepted by the Bluetooth, the client can transmit a data and display the data to a message board or LED Screen. It included a hardware component which consists the KC wireless Bluetooth and BX-4A1 with additional of LED Screen.