**Chapter I**

**INTRODUCTION**

One of the most important organs of the body is Heart. It consists of the atrium and ventricles. The heart is responsible for the pumping of blood through the network of arteries and veins called the cardiovascular system all over the body. The heart has four chambers (1) the right atrium receives blood from the veins and pumps it to the right ventricle (2) the right ventricle receives blood from the right atrium and pumps it to the lungs, where it is loaded with oxygen (3) the left atrium receives oxygenated blood from the lungs and pumps it to the left ventricle and (4) the left ventricle (the strongest chamber) pumps oxygen-rich blood to the rest of the body and vigorous contractions create our blood pressure.

Blood Pressure is the pressure circulating blood on the walls of blood vessels. Blood pressure is usually expressed in terms of the systolic pressure (maximum during one heart beat) over diastolic pressure (Minimum in between two heart beats) and is measured in millimeters of mercury (mmHg). Normal resting blood pressure in an adult is approximately 120 mmHg systolic, and 80 mmHg diastolic, abbreviated “120/80 mmHg”. Blood pressure has two states the low blood pressure also known as the hypotension and hypertension for the high blood pressure. Long term hypertension can affect the body it is a risk factor for many diseases, including heart disease, stroke, and kidney failure. Pulse rate is one of the vital signs. It is the number of times per minute that the heart contracts or beats. The resting pulse rate is the rate where you’re sitting or lying and when you’re calm it is said that the pulse rate is normally between 60 (beats per minute) and 100 (beats per minute).

Monitoring of blood pressure is important for the very reason that hypertension heart disease is the number 1 cause of death associated with high blood pressure. If the blood pressure is always high the pressure is putting some extra strain in the arteries and in the heart it will cause the arteries to become thicker and less flexible, or to become weaker. When the heart’s pumping power becomes weaker the less effective the heart will be. The arteries become narrower and clogged up. As a result, it will lead to kidney disease, dementia, stroke or heart attack. If the blood pressure is properly monitored it can prevent the higher risk of health problems in the future.

**Background of the Study**

The researchers became interested in picking this study because monitoring a patient Blood Pressure is very crucial to avoid further complications. High blood pressure (hypertension) can quietly damage your body for years before symptoms develop. Left uncontrolled, you may wind up with a disability, a poor quality of life or even a fatal heart attack. Roughly half the people with untreated hypertension die of heart disease related to poor blood flow (ischemic heart disease) and another third die of stroke. And sometimes a patient needs to monitor blood pressure at least 3 times. Clinics/Hospitals don’t release a patient unless the reading of blood pressure became normal. Other people practice reading their own or others blood pressure using the stethoscope and brachial pressure but sometimes error occur they misinterpreting because of the failure to identify the Korotkoff sounds that can lead to over and under estimation of the blood pressure.

In this study, the researchers design a monitoring device that will allows the patient to measure their blood pressure and pulse rate. The system will notify the patient or the user if the system detects abnormalities such as low blood pressure, pre-high blood pressure and high blood pressure in the measurement. Different features will be added to the system that will be beneficiary to the user. The user can view history that can be use for keeping records which can be useful for future use and the system is design to use by multiple users. The researchers will add a printing system that enables the user to have printable hard copy which can be given to doctors for them to analyze the patient’s condition. This study will gather the measurements and store the data in an organize way to see the record and monitor easily.

**OBJECTIVES**

The general intent of this study is to develop a device that measure and monitor the blood pressure and pulse rate.

1. To determine the sensors that will be used in the system.

2. To create a program that can record and print the measurement of blood pressure and pulse rate.

3. To evaluate the efficiency and accuracy of the device.

**Significance of Study**

This study will be beneficial to the persons who have a high blood pressure or low blood pressure. This study will help to improve the accessibility of the device for the patient, so that the patient will able to monitor his/her blood pressure and pulse rate in a handy way. This will also decrease the expenditures of the patient by consulting to the doctor or physician. This research will also lessen the risk of worsening the condition of the patient or user. One of the beneficial result this study is that to encourages the patient on being a health conscious by gaining responsibility to their own health, motivating for improved diet, physical activities and proper medication. This study could be a tool for keeping track of the user’s record.

**Scopes and Limitation**

This study includes creating a system that will only measure the blood pressure and pulse rate of the user for monitoring and keeping record. This study will use sensors to get the measurement of blood pressure and pulse rate. This study will also allow a multiple user so that other user can use the device without interfering the data of the other users. The application will allow the user to add his/her profile information for the betterment of keeping records.

The notification will be based on the age of the patient. If the system detects abnormalities in the result of measurements.

This study also capable of printing the weekly and monthly reading of the blood pressure and pulse rate. The printing form will only consist of the user’s name, age, the date and time the user conduct the reading, the result of the blood pressure and the pulse rate.

**Definition of Terms (Self Explain)**

1. **Android** is an operating system for smartphones and other devices, developed by Android, Inc. and later purchased by Google.

2. **Blood Pressure** is the pressure of the blood in the circulatory system, often measured for diagnosis since it is closely related to the force and rate of the heartbeat and the diameter and elasticity of the arterial walls.

3. **C programming language** is a programming language that is ideal for developing firmware or portable applications. It is a [procedural language](https://simple.wikipedia.org/w/index.php?title=Procedural_language&action=edit&redlink=1), which means that people can write their [programs](https://simple.wikipedia.org/wiki/Computer_program) as a series of step-by-step instructions.

4. [**Database**](https://en.wikipedia.org/wiki/Database) is the collection of [schemas](https://en.wikipedia.org/wiki/Database_schema), [tables](https://en.wikipedia.org/wiki/Table_(database)), [queries](https://en.wikipedia.org/wiki/Query_language), reports, [views](https://en.wikipedia.org/wiki/View_(SQL)), and other objects. The data are typically organized to model aspects of reality in a way that supports [processes](https://en.wikipedia.org/wiki/Process_(computing)) requiring information, such as modelling the availability of rooms in hotels in a way that supports finding a hotel with vacancies.

5. **Diastolic Pressure** is the blood pressure after the contraction of the heart while the chambers of the heart refill with blood.

6. **Hardware** is a comprehensive term for all of the physical parts of a computer, as distinguished from the data it contains or operates on, and the software that provides instructions for the hardware to accomplish tasks.

7. **Pulse rate** is the speed of the heartbeat measured by the number of contractions of the heart per minute (bpm).

8. **Java** is a widely used programming language expressly designed for use in the distributed environment of the internet.

9. **Microcontroller** is a computer present in a single integrated circuit which is dedicated to perform one task and execute one specific application. It contains memory, programmable input/output peripherals as well a processor.

10. **Sensor** is an [electronic component](https://en.wikipedia.org/wiki/Electronic_component), module, or subsystem whose purpose is to detect events or changes in its environment and send the information to other electronics, frequently a [computer processor](https://en.wikipedia.org/wiki/Computer_processor).

11. **Software** is that part of a [computer system](https://en.wikipedia.org/wiki/Computer_system) that consists of [data](https://en.wikipedia.org/wiki/Data_(computing)) or computer instructions, in contrast to the [physical hardware](https://en.wikipedia.org/wiki/Computer_hardware) from which the system is built.

12. **Sphygmomanometer** is an instrument for measuring blood pressure in the arteries, especially one consisting of a pressure gauge and a nylonor rubber cuff that wraps around the upper arm and inflates to constrict the arteries.

13. **System** is a set of detailed methods, procedures and routines created to carry out a specific activity, perform a duty, or solve a problem.  
14. **Systolic Pressure** is specifically the maximum arterial pressure during contraction of the left ventricle of the heart.

15. **Personal health record (PHR)** is a collection of health-related information that is documented and maintained by the individual it pertains to.

16. **Pulse rate** is a rhythmical throbbing of the arteries as blood is propelled through them, typically as felt in the wrists or neck.

17. **Raspberry Pi** is a low cost, credit card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse originally designed for education.