

# SMART HEART BEAT RATE MONITORING SYSTEM

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A project report submitted to the Faculty of Electrical Engineering,  
Universiti Teknologi MARA in partial fulfillment of the requirements for the award  
of Diploma of Electrical Engineering.

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SEPTEMBER 2015

## ACKNOWLEDGEMENT

We would like to express our deepest appreciation to all those who provided us the possibility to complete this report. A special gratitude we give to our final year project supervisor, Mr. Rozi Bin Rifin, whose contribution in stimulating suggestions and encouragement, helped us to coordinate our project especially in writing this report.

Furthermore we would also like to acknowledge with much appreciation the crucial role of the other lecture's, Ms. Farah Yasmin and Mr. Ezril who help us with the coding for ours project. Special thanks goes to both of us, Munirah Binti Mohd Shamlan and Noor Syazwana Binti Mohamed Zulkhairi, whose help each other and contribute understanding to assemble the parts and gave suggestion about the task "Smart Heart Beat Monitoring System". Last but not least, many thanks go to the supervisor of the project again, Mr. Rozi bin Rifin whose have invested his full effort in guiding the team in achieving the goal. We have to appreciate the guidance given by other supervisor as well as the panels especially in our project presentation that has improved our presentation skills thanks to their comment and advices.

Lastly, we want to thank to our entire friend, since all of us help each other, give others opinion and sometimes give a lot of idea to improve our project. Besides, they also help us to troubleshoot our coding since we are not used to write our own coding, there is a lot of error occurs.

## ABSTRACT

This project describes the design of a simple and user friendly based heart rate measuring device with LCD  $16 \times 2$ . Heart rate of the subject is measured from the finger using pulse sensor to detect the flow of blood through the finger. The main analog signal received from the human body gets captured with a pulse sensor. Then the signal is being converted from analog signal to digital signal by using Arduino Uno. The pulses are counted by a microcontroller and the output of the circuit is displayed on the LCD  $16 \times 2$ . This project installation is very easy and convenient for the user especially for the elders that are not good in using electronic devices. The development of heart pulse instruments rapidly fast in market since 21<sup>st</sup> century. The proposed system is applicable for family, hospital, clinic, community medical treatment, sports healthcare and other medical purposes. Also, fit for the adults and the pediatrics. Heart rate monitoring is extremely essential in order to keep track of one's health. Unlike traditional methods like Electrocardiogram (ECG), which are complicated and non-portable, there is a need for a simple and affordable heart rate measuring device. The performance of heart beat monitoring device was compared with ECG signal represented on an oscilloscope and manual pulse measurement of heartbeat, giving excellent results. Our proposed heart beat monitoring device is economical and user friendly.

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## CHAPTER 1

### 1.1 INTRODUCTION

Heart rate, also known as pulse, is the number of times a person's heart beats per minute. A normal heart rate depends on the individual, age, body size, heart conditions, whether the person is sitting or moving, medication use and even air temperature. Even emotions can have an impact on heart rate. For example, getting excited or scared can increase the heart rate. But most importantly, getting fitter lowers the heart rate, by making heart muscles work more efficiently. Heart is a muscle and just like strengthening other muscles by doing activities. Knowledge about your heart rate can help you monitor your fitness level, and it may help you spot developing health problems if you are experiencing other symptoms. Your resting heart rate is your pulse when you are calmly sitting or lying. It's best to measure your resting heart rate in the morning before you get out of bed. But a heart rate lower than 60 doesn't necessarily mean you have a medical problem. Active people often have lower heart rates because their heart muscles don't need to work as hard to maintain a steady beat. Athletes and people who are very fit can have resting heart rate of 40 bpm. For people that have heart rate lower than 60 could also be the result of taking certain medications.

In this project, The Smart Heart Monitor measures the user's heartbeat using an LED and a very sensitive pulse sensor attached to the fingertip of the user. A green LED will light up when it sense the pulse and red LED will light up after the pulse sensor not detecting any pulse, and the program will calculate the user's beats per minute. The BPM will be displayed on a LCD display 16x2. The potentiometer is used to control the brightness of the LCD screen. The microcontroller used in this project is Arduino Uno as it is the simplest