## Heart rate measurement from fingertip

## Abstract:

The purpose of this project is to design and develop a detector which shall be used in hospitals for measuring **Heart rate measurement from fingertip**.

This project demonstrates a technique to measure the heart rate by sensing the change in blood volume in a finger artery while the heart is pumping the blood. It consists of an infrared LED that transmits an IR signal through the fingertip of the subject, a part of which is reflected by the blood cells. The reflected signal is detected by a photo diode sensor. The changing blood volume with heartbeat results in a train of pulses at the output of the photo diode, the magnitude of which is too small to be detected directly by a microcontroller. Therefore, a two-stage high gain, active low pass filter is designed using two Operational Amplifiers (Op-amps) to filter and amplify the signal to appropriate voltage level so that the pulses can be counted by a microcontroller. The heart rate is displayed on a 3 digit seven segment display.

## Block Diagram:



## Salient features that makes best selection as an academic project:

* Schematics creation through PSPICE
* Firmware Knowledge with high-end AVR controller from ATMEL
* Power supply with battery management
* Signal Conditioning through Op-amp
* Parallel data communication to display
* Use of internal Clock along with Calibration

## Product features:

* Operated with +9V battery
* The Product can measure heart rate between 0 to 150 BPM
* 3 ½ 7 segment LED Display is used for the heart rate display in BPM
* Handheld –mobile device