# East West University

**EEE 302: TERM PROJECT**

**Name of the Project: Build a low-cost user-friendly smart watch.**

## Submitted to:

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## ABSTRACT:

A smartwatch includes a variety of features, such as a watch, cell phone, notification, calculator, SD card, touchscreen and rechargeable battery. A computer-based watch that provides an extension to a smartphone via Bluetooth.

## OBJECTIVE:

To build a microcontroller-based low cost and user-friendly smart watch for general people that will accurately via synchronizing with a smart phone.

## INTRODUCTION:

An Arduino based table smart watch, it is compatible with heart rate monitoring system with calculator or painting and flash light facilities. Otherwise, it is wireless portable device also for smart watch main facilities with notifiers from phone notification access and also it can show international time with day year and date by Bluetooth connectivity with lower delay as much instant. About App for this smart watch made with java programming language by android studio. After all self-updatable application which can obtain the notifications from the notifiers like Facebook, messenger, what's app and manage the phone calls by smart watch with a permission from application.

## DESIGN PROCEDURE:
### Elements:
1. Arduino Uno r3 At-mega 328p
2. HC-05 Bluetooth module
3. Led 1 W
4. 1 K ohm resistor
5. Display shield: - SPFD 5408 TFT LCD TOUCH SCREEN 2.4-INCH
6. Pulse sensor (heart rate monitoring sensor)
7. Some wire
8. Ebonite for frame
9. Arduino cable
10. Dual cell l-ion battery per cell 600 MAH total 1200 MAH with fast charging facilities.
11. Power bank module to use as dc-to-dc boost converter

Here we divided this procedure into 2 sections
Section 1
- Hardware implementation:
    1. Firstly, we need Arduino Uno with cable
    2. Then we need a Bluetooth module such as HC-05 which connected with TX RX pin from Arduino after uploading the code.
    3. The main part of display is TFT LCD 2.4-inch touch screen shieled SPFD 5408 ILI9341 which is directly implementable solution for Arduino uno.
    4. Bost converter 3.8 v dc to 5 v dc with lithium ion single BMS (battery management system) for fast charging module which output is connect with Arduino Vin pin and GND.
    5. Battery 1200 MAH with battery cutoff facilities which is connected with BMS

6. Power switch
7. Heart rate universal sensor connected with A5 pin from Arduino and the sensor VCC and GND are connected with Arduino POWER UNIT 5V and GND

- Software Simulation:
    1. Firstly, we have to open our Arduino Uno IDE.
    2. Next, we will add the library SPFD5408_Adafruit_GFX.h, SPFD5408_Adafruit_TFTLCD.h, SPFD5408_TouchScreen.h from Tools> Manage libraries
    3. Make sure hardware implementation was successful
    4. Secondly, we have to verify and upload our modified code and observe it.
    5. Finally, we will observe the output what was implemented for over the smart watch.

## Arduino code

This code is modified by us and taken small version form and menu ordering concepts of code from YouTube [1] and the drivers or other libraries also modified for solving the display workings from original library. In short all works and operating system are made by us except the concept which is taken from YouTube.

This OS are made off few different demands such as calculator [2], painting [2], heart rate monitoring [3], Wireless connectivity system [4]
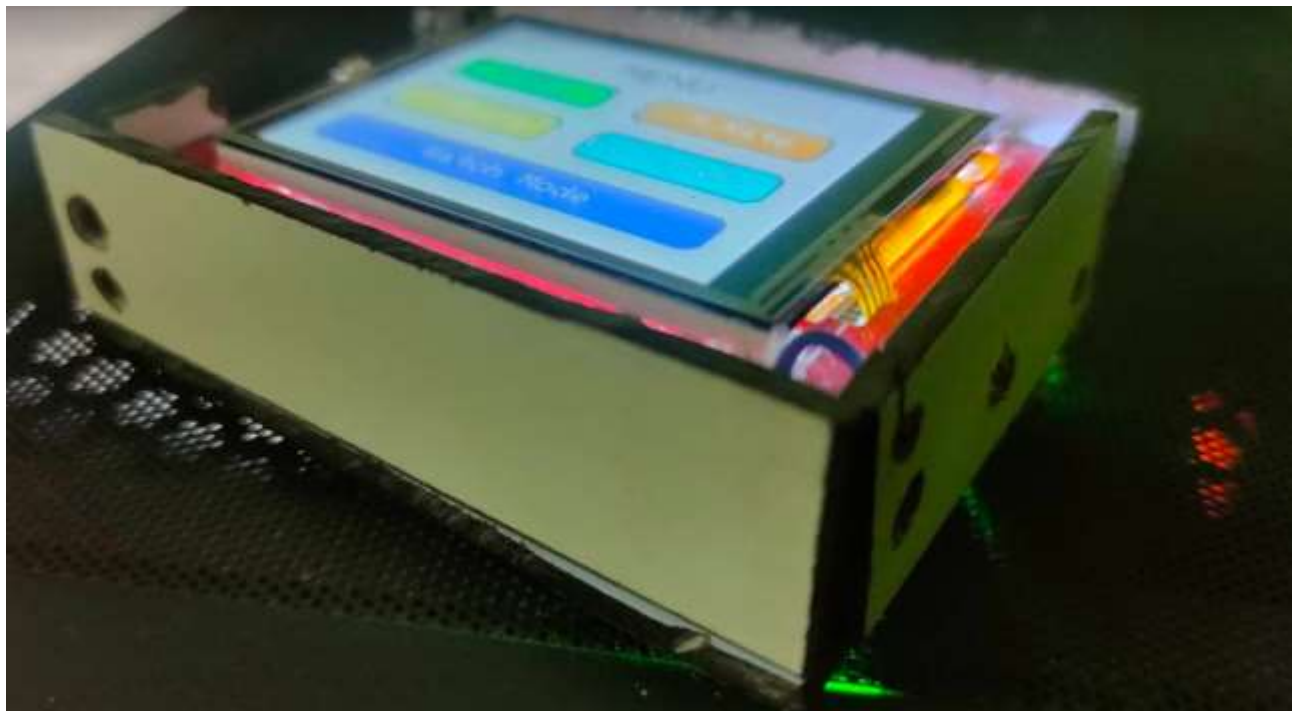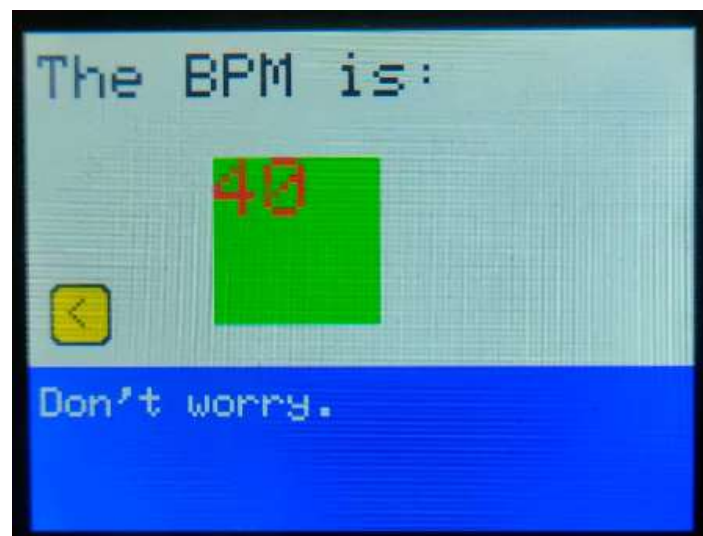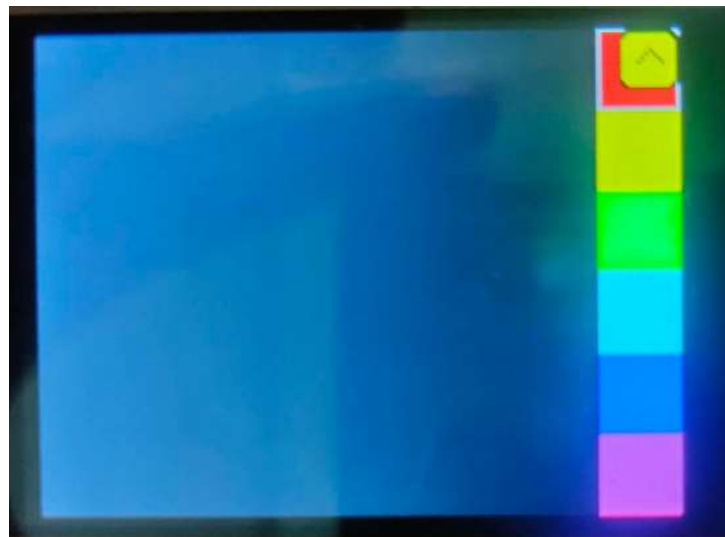
**Project overview:**



**Fig.1**

**Fig.2**

**Fig.3**



**Fig.4**

**Fig.5**
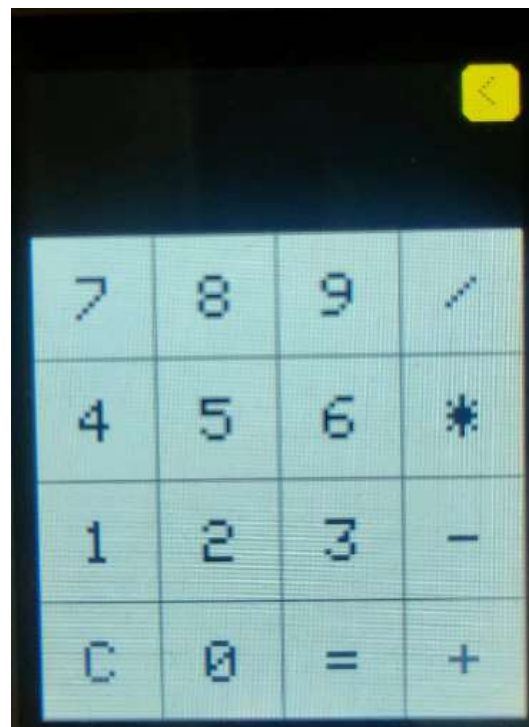


**Fig.6**

**Fig.7**

## BUDGET:

| Instrument name | Quantity | price |
|---|---|---|
| Arduino Uno r3 | 1 | 900 |
| HC-05 Bluetooth module | 1 | 350 |
| Display shield: - SPFD 5408 TFT LCD TOUCH SCREEN 2.4-INCH | 1 | 650 |
| Pulse sensor (heart rate monitoring sensor) | 1 | 750 |
| Ebonite | 2 small pitches | 30 |
| Battery 600 MAH | 2 | 100 |
| Power bank module | 1 | 30 |
| | Total | 2810 taka |

## PROJECT OUTCOMES:

Outcomes:

1. Knowing about the procedures of building a smart watch.
2. Having the experience to conduct a project using Arduino Uno.
3. Working with assembly language and Java code.
4. Learning about how to make a mobile app and synchronize it with a smart watch.
5. Knowing about the configurations of TFT display and heart rate sensors.
6. Learning the difference of various display types.
7. Familiar with power bank module with single BMS and its working process.

## CONCLUSION:

After completing this project, we can try to make something new with C++ language via Arduino uno and can add special features in that by the knowledge of Java code. So, by this project we can achieve all project outcomes which we expected and can implement the knowledge properly on that.

References:
1. https://www.youtube.com/watch?v=hJCeRvi-YcQ&feature=share&fbclid=IwAR3uOmGMN402G7eC0JW2F3Z8Pgat0lePbYw7TYEBzPBLsjPKkvRrSB7Xj-k
2. https://github.com/SarjanaElectro/Kalkulator-Taochscreen-TFT-2.4-?fbclid=IwAR3GUPp_wcro4pvilDWDWcBQg_oSxLM99s_6LO1A_dFL8RZV22zU6GrL-J0
3. https://github.com/aditya-rathi/Heart-Rate-Monitor?fbclid=IwAR3_tnpEEc2X4rUimVjgD0-RQT4sQvz5TILYOvyrfJWC26Tr1NM4pXdN6uA
4. https://github.com/BoldizsarZopcsak/Arduino-tutorial-code/tree/main/Arduino-smartwatch