Digimeter

PROJECT MANAGEMENT PLAN

1. WORK BREAKDOWN STRUCTURE (WBS)

1.0 UNDERSTANDING THE SYSTEM

1.1 What to Understand

1.1.1 How are we going to measure distance?

1.1.2 How and where do we display that measurement?

1.1.3 How do we perform the associated function – beep (when measurement is completed)?

1.1.4 How do we wirelessly integrate the device with the display?

1.2 How to Understand

1.2.1 Discussing our idea with electronic technicians, mentors, peers and seniors.

1.2.2 Researching about our project through web-surfing and videos

1.2.3 Finding gadgets that have similar functionality

2.0 PREPARING DESIGN

2.1 Basic Layout

2.1.1 Drawing the circuit

2.1.2 Understanding working of the circuits

2.1.3 Analyzing the placement of components

2.2 Identify the required components

2.2.1 For measuring lengths: Wheel Encoder

2.2.2 Microprocessor: Arduino Nano

2.2.3 Wirelessly connecting the device and display: Bluetooth Module

2.2.4 To mark-out length: Buzzer

2.3 Acquiring the Skills

2.3.1 C programming for Arduino

2.3.2 Java for Android App Development

2.4 Procurement of Components

2.4.1 Research about availability of components

2.4.2 Procure standard components online

2.4.3 Go to the market

2.4.3.1 Exploring various alternative options of components

2.4.3.2 Finalizing the best quality product

2.4.3.3 Purchasing the product

3.0 PROJECT DESIGN

3.1 Digimeter Design

3.1.1 Choose a suitable body for the device

3.1.2 Attach the wheel encoder to the body and connect it to the Arduino

3.1.3 Connect the Bluetooth Module to the Arduino

3.1.4 Connect a Buzzer to the Arduino

3.1.5 Assemble the components in an organised manner

3.2 Developing the App and Incorporating Desired Features

3.2.1 Measuring area and volume

3.2.2 Options for units

3.3 Coding the Arduino

3.3.1 Transfer the received data via Bluetooth Module to the App

3.3.2 Cause the buzzer to produce a sound

3.4 Integrating the System

3.4.1 Combining all units as a whole

3.4.2 Ensuring the compatibility of hardware and software

3.4.3 Checking the performance of the device

4.0 TESTING AND CALIBRATION

4.1 Perform the following tests

4.1.1 Move the Digimeter along a range of lengths

4.1.2 Move the Digimeter along different types of surfaces

4.1.3 Try displaying areas and volumes of different types of objects

4.1.4 Try displaying the results in various units

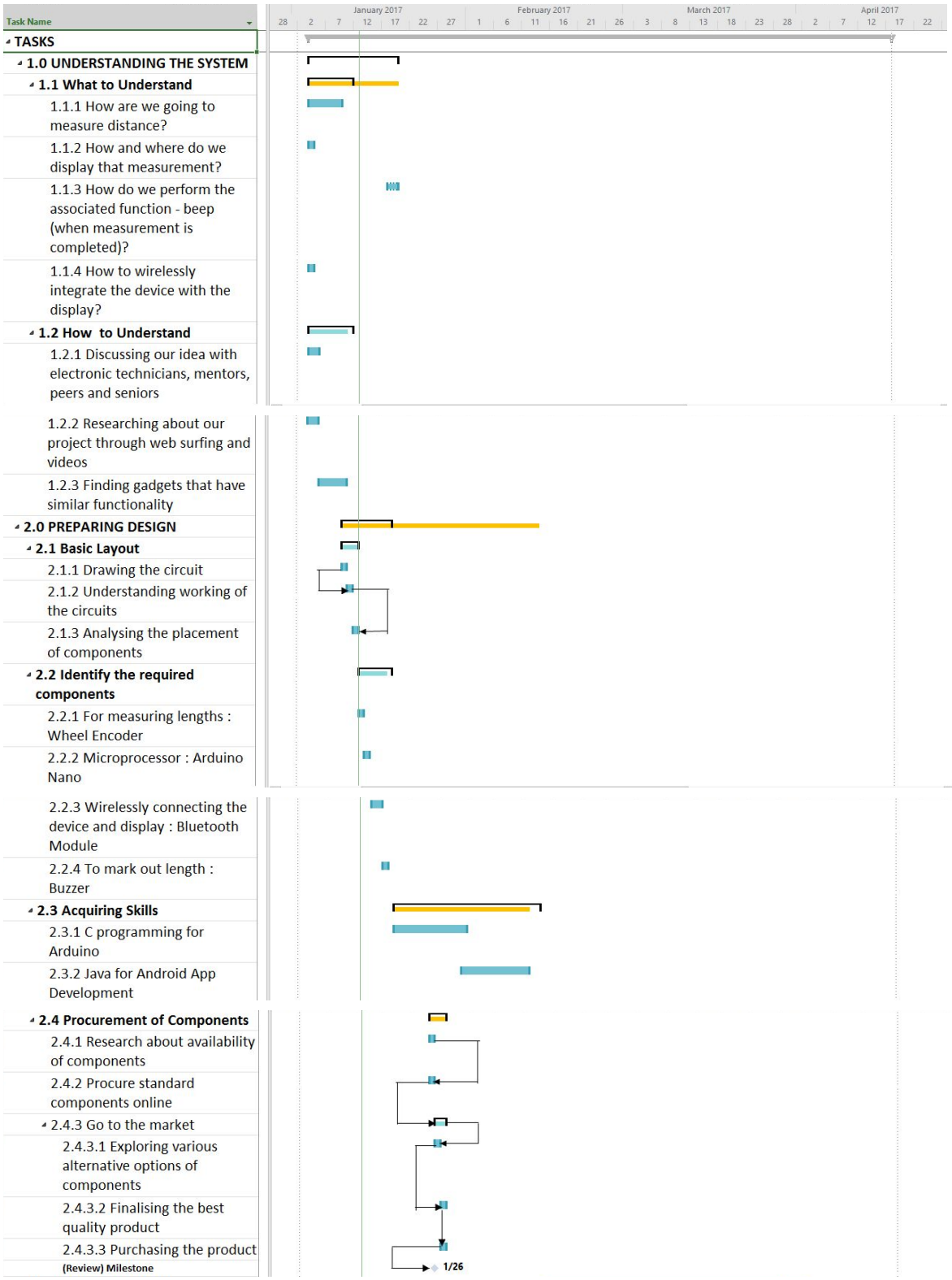
4.1.5 Test the working range of the Bluetooth Module

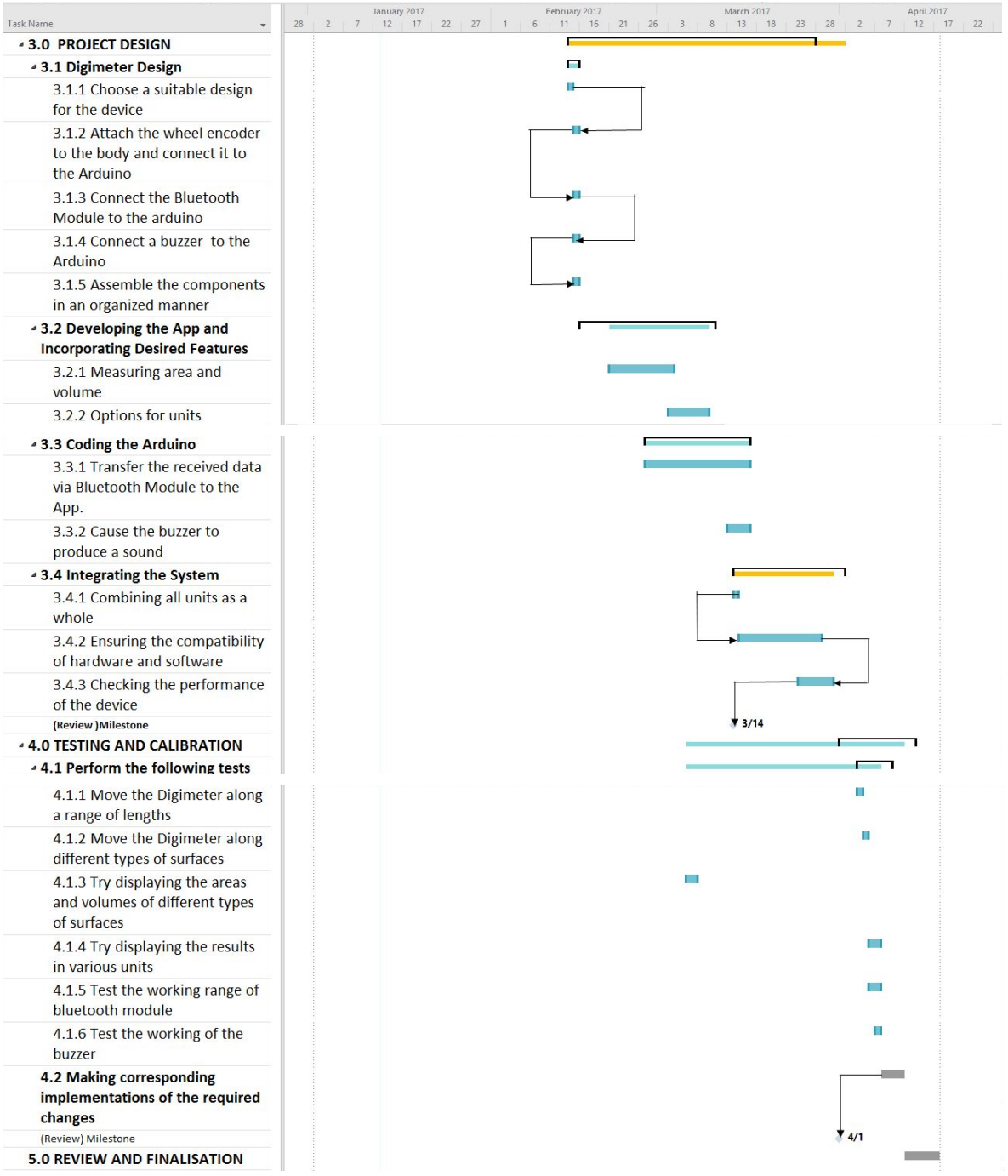
4.1.6 Test the working of the buzzer

4.2 Make corresponding implementations of the required changes

5.0 REVIEW AND FINALIZATION

2. GANTT DIAGRAM




Task Name
January 2017
February 2017
March 2017
April 2017
28 2 7 12 17 22 27 1 6 11 16 21 26 3 8 13 18 23 28 2 7 12 17 22
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(Review)Milestone
3/14
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4.1.2 Move the Digimeter along different types of surfaces
4.1.3 Try displaying the areas and volumes of different types of surfaces
4.1.4 Try displaying the results in various units
4.1.5 Test the working range of bluetooth module
4.1.6 Test the working of the buzzer
4.2 Making corresponding implementations of the required changes
(Review) Milestone
4/1
5.0 REVIEW AND FINALISATION

3. PROJECT COSTS

S.NO	COMPONENT	COST (IN INR)
1.	Arduino Nano	400
2.	Wheel Encoder	400
3.	Buzzer	100
4.	Bluetooth Module	300
5.	Batteries, Wires etc.	1000
6.	Arduino Kit	850
	TOTAL	3050

4. PROCUREMENT STRATEGY

- Discuss with our mentor, electronic technicians, peers and seniors and learn about the components that might be of use to us
- Identify the most suitable components
- Research about the availability of the components
- Procurement Procedure:
    - Check the components available in the lab
    - Search and if necessary, order online
    - Go to the market
- We plan to purchase the Arduino Nano, Bluetooth Module and the wheel encoder online while buy the buzzer, batteries, wires and other miscellaneous parts from Lajpat Rai Market or Janakpuri.
- We will make sure all our products are of best quality so that they work well and are long lasting.
- We will also use our budget judiciously and acquire all products at the best possible price.

5. RISK MANAGEMENT

- The components might turn out to be faulty/fake despite our best efforts.
- Carelessness/lack of experience with components might cause issues.
- The device might not move along a straight line, leading to an inaccurate outcome.
- The bluetooth module might not be able to establish a proper connection with the phone beyond a particular distance.
- The device might not turn out to be handy.

6. LIST OF DELIVERABLES AND OUTCOMES

- A handheld device integrated with a self developed Android application
- The device serves two purposes :
    1. measure the length of the path the device traverses
    2. measure and mark a given length.
- We have employed **application 1** to extend the capabilities of the device by extending its usage to measure area and volume as well..The app allows the user to select area/volume of the shape/object he desires to measure. The required measurements are made as per the pre-fed formula and the values of parameters obtained.
  We have also provided for an option to display required result in different units to suit the convenience of the user.
- **Application 2** will enable the user to feed in a certain input and as soon as the device traverses the fed length, a beeping sound is produced which alerts the user.

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