

**Department of Computer Engineering**

**Academic Term: First Term 2023-24**

**Class: T.E /Computer Sem – V / Software Engineering**

<b>Practical No:</b>	<b>1</b>
<b>Title:</b>	<b>Software Requirement Specification</b>
<b>Date of Performance:</b>	27/08/2023
<b>Roll No:</b>	9615
<b>Team Members:</b>	Omkar Surve Emmanuel Guddinho Soham Khochare

**Rubrics for Evaluation:**

<b>Sr. No</b>	<b>Performance Indicator</b>	<b>Excellent</b>	<b>Good</b>	<b>Below Average</b>	<b>Total Score</b>
1	On time Completion & Submission (01)	01 (On Time )	NA	00 (Not on Time)	
2	Theory Understanding(02)	02(Correct )	NA	01 (Tried)	
3	Content Quality (03)	03(All used)	02 (Partial)	01 (rarely followed)	
4	Post Lab Questions (04)	04(done well)	3 (Partially Correct)	2(submitted)	

**Signature of the Teacher:**

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## ABSTRACT

The implementation of an IoT based dustbin that segregates dry and wet waste and senses the level of the dustbin is a step towards effective waste management. The system consists of two compartments for dry and wet waste, sensors to detect the level of waste in each compartment, a microcontroller to control the sensors, a Wi-Fi module to connect the device to the internet, and a website to display the data collected by the device. The microcontroller reads the sensor data and sends it to the internet, where it is processed, and the website is updated in real-time. The dustbin segregates the waste based on the sensor data, making it an efficient and convenient solution for waste management. The system's implementation and testing involved building the physical dustbin, programming the microcontroller, building the website, and testing the IoT based dustbin to ensure that it functioned correctly. The IoT based dustbin can be deployed in the required location and will contribute to effective waste management practices.

## INTRODUCTION

Waste management or waste disposal includes the processes and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process and waste-related laws, technologies, economic mechanisms. Proper management of waste is important for building sustainable and liveable cities, but it remains a challenge for many developing countries and cities. A report found that effective waste management is relatively expensive, usually comprising 20%–50% of municipal budgets. Operating this essential municipal service requires integrated systems that are efficient, sustainable, and socially supported. A large portion of waste management practices deal with municipal solid waste (MSW) which is the bulk of the waste that is created by household, industrial, and commercial activity. According to the Intergovernmental Panel on Climate Change (IPCC), municipal solid waste is expected to reach approximately 3.4 Gt by 2050; however, policies and law-making can reduce the amount of waste produced in different areas and cities of the world. Measures of waste management include measures for integrated techno-economic mechanisms of a circular economy, effective disposal facilities, export and import control and optimal sustainable design of

products that are produced. The aim of waste management is to reduce the dangerous effects of such waste on the environment and human health. A big part of waste management deals with municipal solid waste, which is created by industrial, commercial, and household activity.

## Project Description

The objective of this project is to design and develop a smart dustbin that can segregate dry and wet waste, sense the level of dustbin, and display the data on a website. The proposed system will be based on IoT technology and will consist of various sensors, microcontrollers, and communication modules.

The working principle of the system is simple. The dustbin will be divided into two compartments - one for dry waste and the other for wet waste. Each compartment will have a dedicated sensor to detect the level of waste in it. The sensors will be connected to a microcontroller that will process the data and send it to a server through a Wi-Fi module. The server will then display the data on a website, allowing users to monitor the dustbin's status from anywhere.

## REQUIREMENTS

### Software Specifications:

For Frontend Development of our website, we will be using the following languages:

HTML: The Hyper Text Markup Language or HTML is the standard markup language for documents designed to be displayed in a web browser.

CSS: Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML or XML.

JavaScript: JavaScript often abbreviated to JS, is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. All major web browsers have a dedicated JavaScript engine to execute the code on user's devices.

For Backend Development of our website, we will be using the following languages:

Express.js: Express.js, or simply Express, is a back-end web application framework for building RESTful APIs with Node Js, released as free and open-source software under the MIT License. It is designed for building web applications and APIs.

## Hardware Specifications

1. Arduino Uno 9V: We'll be using ArduinoUno for programming
2. Servo Motor: Servo Motor will be used for segregation of Wet waste and Dry Waste
3. Ultrasonic Sensor (Motion Sensor): To measure the level of garbage in the dustbin
4. 9V battery
5. M2M, F2M, F2F jumper wires.
6. IR Sensor: To detect the presence of the garbage.
7. GSM 900 module: To send SMS/Notification to the concerned Authorities.

## Postlab :

1. Some of the specific impacts of a well-defined SRS on project success:
  - **Reduced risk of project failure.** A well-defined SRS helps to reduce the risk of project failure by preventing misunderstandings, scope creep, and defects.
  - **Improved project efficiency.** A well-defined SRS helps to improve project efficiency by providing a clear understanding of the requirements, which can lead to more efficient planning, development, and testing.
  - **Increased customer satisfaction.** A well-defined SRS helps to increase customer satisfaction by ensuring that the final product meets the needs of the stakeholders.

Overall, a well-defined SRS is a critical component of any software development project. By clearly defining the requirements, the SRS helps to improve the chances of project success.

2. The given sample srs is can be further improved by adding abbreviation which could added and also be used in the document. Adding the references to previous projects also helps to understand the technical feasibility of the project