

Robot Design Documentation – SINJAB

1. Introduction

The project 'SINJAB' is a circular robot designed with the primary goal of collecting nuts and delivering them to the nest. The design was created using SolidWorks and aims to provide efficient and stable movement while maintaining a compact structure.

2. Robot Specifications

Robot Name: SINJAB

Purpose: To get the nuts to the nest

CAD Software: SolidWorks

Shape and Dimensions: Circular robot with a diameter of 200 mm and a 100 mm parallel jaw grip

Main Components: Body, Wheels, Grip, Stem, Head

Material: 3D printed plastic (PLA)

Drive System: Two wheels with a caster for support

Mechanical Team Members: Hussein Youssef and Bashir Awad

3. Design Overview

The SINJAB robot was modeled in SolidWorks using a modular approach. The design consists of a main circular body housing the motors and electronics, a stem supporting the head and grip mechanism, and two driven wheels with a rear caster for balance.

4. Component Breakdown

- **Body:** The main structure that holds all components together.
- **Wheels:** Two driven wheels provide movement and are supported by a front caster.
- **Grip:** A 100 mm parallel jaw mechanism designed to pick up nuts.
- **Stem:** Connects the main body with the head and ensures stable lifting motion.
- **Head:** Contains sensors or visual components for detection and control.

5. Materials and Manufacturing

The entire robot structure is designed to be plastic material. This choice provides a lightweight, cost-effective, and easily replaceable structure suitable for prototyping and testing.

6. Drive System

SINJAB uses a differential drive system consisting of two powered wheels and one caster for stability. This setup allows the robot to move forward, backward, and rotate around its axis for precise navigation.

7. Conclusion

The SINJAB robot represents a compact and efficient design ideal for nut collection and delivery tasks. Its simple mechanical structure and 3D-printed build make it highly suitable for testing, improvement, and educational applications.