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### **Abstract**

This paper concerns with the design of a three degrees of freedom robotic arm, which is intended to pick and place lightweight objects based on a color sorting mechanism. It is mainly made of three joints, a gripper, two rectangular shaped links, a rotary table and a rectangular platform. The angular rotation of each joint is powered by a servomotor. Furthermore, the angular position of each servomotor shaft is controlled by a signal from an Arduino microcontroller which executes a Matlab code. The Matlab code includes the inverse kinematics equations which are necessary for the determination of the target joint angles for a certain Cartesian position of the end-effector. The robotic arm's design process included several static and dynamic calculations, mechanical properties calculations and prototype testing in order to provide a final product with well-established structure and functionalities.

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### Index Terms

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### Keywords

Robotic arm, three degrees of freedom, forward kinematics, inverse kinematics, workspace