WEC 2022 Programming - Automated Crane Testing Software

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Introduction

The purpose of this program is to test an automated crane in an e-commerce facility. This was done over an eight-hour period online in accordance with instructions provided by the Western Engineering Competition committee. This document serves to provide insight into the decisions made by the Cassiar team during the design process.

The generalized functionality of the program accepts input and process instructions as a line of numbers and creates an output based on the given information. The input describes the number of boxes in each stack, from left to right while the process instructions follow the guidelines listed below.

- 1: Move left
- 2 : Move right
- 3 : Lift a box from the stack
- 4 : Drop a box on the stack box)
- 0 : Quit

System Overview

The program was created using Python 3.8 and worked on collaboratively through GitHub. Through an object-oriented approach, the program is able to interpret and execute crane instructions (as outlined above).

Design Philosophy

Our group decided to use python object-oriented programming for our design. This is because python is a versatile language that would allow us to minimize development time due to the readability and concise syntax offered by the language. We felt an object oriented approach was the best option since it provides modularity and therefore reusability and readability in our code, benefitting any future contributors to the repository.

Data Structures

The data structure used to implement each stack of boxes was the primitive list type provided in python. We chose this data structure because it has constant time element access and mutability through index access. Since the crane can only access and edit one stack at a time, index-based access was ideal.