

Enchanted Treasure Chest

Software Requirements Document

CSC 322: Spring 2024

Enchanted Treasure Chest is a kid's toy for ages 8 to 14. It is like a basic box with the aesthetic of a treasure chest to have a pirate theme. It opens and closes, but instead of using a physical key, it unlocks using an RFID (Radio Frequency Identification) card. After unlocking, it opens itself up. When the card is placed again, it closes itself and locks back up as soon as the lid has reached the closed position.

Feature #1: RFID Lock/Unlock

Be able to read an RFID card and unlock the box.

Functional Requirements:

- The sensor should Read the unique ID from an RFID card.
- It should check if the ID matches the preprogrammed ID.
- It should unlock if the ID is correct.
- It should stay locked if the ID is incorrect.

Non Functional Requirements:

- It should keep the lock in an unlocked state while the chest is opened.
- It should keep the lock in an unlocked state while the chest is closed.
- The placement of the sensor should be clearly indicated.

Acceptance Criteria:

- RFID is able to read within 0.5cm of the box.
- It unlocks virtually instantly when the correct card is placed.
- It waits until the lid is closed before locking.
- 4/4 people should be able to find where to place the card within 20 seconds.

Feature #2: Self-Opening/Closing

Be able to open itself up as soon as it is unlocked and close as soon as the RFID card is placed again.

Functional Requirements:

- The linear actuator should open the lid when the card is placed, and it is currently closed.
- The linear actuator should close the lid when the card is placed, and it is currently opened.

Non Functional Requirements:

- It should not attempt to open when it is already opened.
- It should not attempt to close when it is already closed.

Acceptance Criteria:

- The lid opens within 30 seconds.
- The lid closes within 30 seconds.
- The lid opens up to 80 degrees in the open position.

Feature #3: Storage

Be able to store things inside the chest like any other box.

Functional Requirements:

- The chest should have space to hold everyday items.

Non Functional Requirements:

- The inside and outside should be free of splinters.
- The chest should have an aesthetically pleasing exterior following the pirate theme.

Acceptance Criteria:

- Has a storage volume of at least $10 \times 13 \times 9 \text{ in}^3$.
- Can store 3 school books inside.