



The Wrap-O-Matic

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Section I: Introduction

1.1 Purpose

The purpose of this Software Requirement Specifications document is to outline the requirements and functionality of the Wrap-o-Matic, a machine designed to wrap chocolates.

1.2 Scope

The software this document describes is hereto referred to as WrapSoft, the software to be installed on the embedded system that controls the physical hardware of the Wrap-o-Matic.

WrapSoft will control all functionality, timing, and reporting concerning the Wrap-o-Matic machine.

WrapSoft will allow operator manifest data entry describing a production run.

1.3 Definitions, Acronyms & Abbreviations

Inputs to the Wrap-o-Matic include the following:

Chocolates: Specification of input chocolates including:

- Composition
- Configuration
- Viscosity
- Weight
- Size
- Input Stream Distribution Frequency and Pattern

Manifest: Description of a production run including the box chocolate layout selection.

Paper: Refers to the type of paper used to wrap chocolates

Ribbons: Refers to the type of ribbon used to wrap chocolates

Empty Boxes: Refers to the type of boxes wrapped chocolates are placed in including:

- Box Shape
- Box Size
- Box Configuration

Wrap-o-Matic Users include:

Operator: Refers to the operator of the Wrap-o-Matic, whose tasks include monitoring status, Entering manifests, Starts, Stops

Auditor: Refers to the auditor of the Wrap-o-Matic, whose tasks include reviewing Batch reports, Daily reports, and Monthly reports

Loader: Refers to the loader of the Wrap-o-Matic, whose tasks include loading materials into the Wrap-O-Matic including wrapping paper, chocolates and ribbons.

Unloader: Refers to the unloader of the Wrap-o-Matic, who is responsible for unloading Boxed chocolates and Rejected Chocolates.

Health Inspector: Refers to the health inspector, who inspects the Wrap-O-Matic for Contamination, checks whether Ingredient match labels, and for the presence of nuts.

Maintainer: Refers to the maintenance personnel responsible for Emergency repair, Periodic maintenance, Updates, Upgrades, and Cleaning

WrapSoft: The software that will control the Wrap-o-Matic

Wrap-o-Matic: The physical machine designed to wrap chocolates

1.4 References

This document complies with IEEE Standard 830-1998 for Software Requirement Specifications.

1.5 Overview

The remainder of this document contains a full description of the functionality of the Wrap-o-Matic followed by specific requirements of the system.

Section II: Overall Description

2.1 Product Perspective

The Wrap-o-Matic performs the packaging step of a system designed to create boxes of chocolates. The inputs to the Wrap-o-Matic (including chocolates, manifest, papers, ribbons, and empty boxes) can be created using any method or machinery desired, subject to the size and shape constraints of the configured inputs to the Wrap-o-Matic. The Loader loads these inputs into the Wrap-o-Matic. The output, packaged chocolates can then be further boxed and shipped to the appropriate location using any machinery desired. The Unloader is responsible for unloading the boxed chocolates for further processing.

2.1.1 System Interfaces

The Wrap-o-Matic interfaces with the remainder of the chocolate box creation system at the loading and the unloading area.

Loading Area: The system external interfaces to the Wrap-o-Matic providing chocolates, papers, ribbons, and boxes.

Unloading Area: The system external interfaces allowing for unloading boxed and rejected chocolates.

2.1.2 User Interfaces

Users interact with the Wrap-o-Matic through different interfaces depending on their roles:

Operator: The Operator will interact with the console. WrapSoft provides functionality allowing the operator to monitor the status of the Wrap-o-Matic, enter manifests, and start/stop the machine.

Auditor: The Auditor will interact with the console to request production reports. WrapSoft must therefore provide functionality to create Daily, Monthly, and Batch reports.

Loader: The Loader interacts with the loading areas of the Wrap-o-Matic.

Unloader: The Unloader will interact with the unloading area of the Wrap-o-Matic.

Health Inspector: The Health Inspector will interact with the console. The Health Inspector can pause the Wrap-o-Matic and remove and inspect completed boxes of chocolates.

Maintainer: The Maintainer will interact with the Wrap-o-Matic to ensure proper functionality and maintenance. The Wrap-O-Matic console enables the Maintainer to update or upgrade Wrap-O-Matic firmware.

2.1.3 Operations

Input Manifest:
In this mode, the Wrap-o-Matic will enable the operator to input the Manifest information.

Running:
In this mode, the Wrap-o-Matic is packaging the chocolates.

Stopped:
In this mode, the Wrap-o-Matic has stopped packaging chocolates.

Data Logging:

In the background at all times the reporting functions of WrapSoft are monitoring and storing data.

Backup

All stored data in the Wrap-O-Matic may be backed up on a third party storage device at user-configurable intervals.

Restore

Wrap-O-Matic data may be restored from previously prepared backups.

Restart

In the case of a malfunction, the system can be restarted after error conditions or malfunctions are cleared.

2.2 Product Functions

2.2.1 Wrapping & Ribboning Chocolates

The Wrap-o-Matic may takes individual chocolates and wraps them in paper and ties them with a ribbon. The wrapped chocolates are then inserted into a box.

Paper available to wrap the chocolates:	None, Thin, Wax, Foil, Tissue
Ribbon available to tie the chocolates:	None, Thread, String, Cord, Wire, Wide

2.2.2 Boxing Chocolates

Once the individual chocolates have been wrapped and/or ribboned (if specified), the Wrap-o-Matic inserts the finished chocolates into the selected box. The Wrap-o-Matic is designed to box chocolates with the following parameters:

Type:	Rectangular, Circular, Heart Shaped, OEM Custom, Bag
Size:	Small, Medium, Large
Configuration:	Single Layer, Multiple Layer

2.2.3 Reporting

WrapSoft automatically performs all data logging and report creation in the background. This includes Monthly, Weekly, and Batch Reports.

Section III: Specific Requirements

3.1 External Interface Requirements

- 3.1.1 User interfaces
 - 3.1.1.1 The Wrap-O-Matic console consists of a display, keyboard and mouse.
 - 3.1.1.2 The display is a 14 inch LCD monitor with a resolution of 1366x768 pixels.
 - 3.1.1.3 The keyboard is a US 102 Key QWERTY Layout Keyboard are available for operator data entry.
 - 3.1.1.4 The mouse is PC style with two buttons.
 - 3.1.1.2 The operator can use the console to stop and start the Wrap-O-Matic, and enter & configure manifests (see 3.2.4.2 to 3.2.4.5).
 - 3.1.1.3 The auditor can use the console to display and print Daily, Monthly, and Batch reports (see 3.2.4.x).
 - 3.1.1.4 There are twenty inbound conveyor belts to accept the chocolates loaded by the loader (see 3.2.1.1).
 - 3.1.1.5 There are four loading slots to accept paper
 - 3.1.1.6 There are four spools to accept ribbons
 - 3.1.1.7 There is one bin to accept empty boxes
 - 3.1.1.6 There is an output conveyor belt that transfers the completed boxes of chocolates to the unloader (see 3.2.3.1).
- 3.1.2 Hardware interfaces
 - 3.1.2.1 No additional hardware interfaces are required.
- 3.1.3 Software interfaces
 - 3.1.3.1 No additional software interfaces are required.
- 3.1.4 Communications interfaces
 - 3.1.3.2 No additional communication interfaces are required.

3.2 System Features

- 3.2.1 Loading of Chocolates & Additional Material
 - 3.2.1.1 There are twenty inbound conveyor belts.
 - 3.2.1.2 There are four input paper trays.
 - 3.2.1.3 There are four input ribbon spools.
 - 3.2.1.4 There is a loading area where the empty boxes are loaded by the loader.
- 3.2.2 Wrapping & Boxing of Chocolates
 - 3.2.2.1 Chocolates can be wrapped in Thin, Foil, Wax or Tissue paper, or not wrapped at all.
 - 3.2.2.2 Chocolates can be tied in Thread, String, Cord, Wire or Wide ribbon, or not tied at all.
 - 3.2.2.3 Chocolates can be placed in boxes in the pattern as designated in the manifest.
 - 3.2.2.4 Chocolates can be placed in Rectangular, Circular, Heart shaped or OEM Custom boxes, or in a bag.
 - 3.2.2.5 Chocolates can be placed in Small, Medium, or Large boxes.
 - 3.2.2.6 Chocolates can be placed in boxes with Single or Multiple layers.
- 3.2.3 Output of Chocolates
 - 3.2.3.1 Completed boxes of chocolates are transferred to the unloader.
- 3.2.4 Monitor Control of the Wrap-o-Matic
 - 3.2.4.1 The monitor has a machine status panel providing information on the current state of the Wrap-o-Matic: current manifest information, rate and frequency of chocolate processing, and a constantly updated batch report. This is the main display tab.
 - 3.2.4.2 The monitor has a button to start the machine (commence processing with current settings).
 - 3.2.4.3 The monitor has a button to stop the machine (immediately cease processing with current settings).
 - 3.2.4.4 If the monitor is stopped and subsequently started, processing resumes as previously.
 - 3.2.4.5 If the monitor is stopped and subsequently reconfigured, the Wrap-o-Matic will clear all other chocolates from the system prior to starting the process with the new manifest.

- 3.2.4.6 The monitor has a secondary tab for all reporting purposes. From this tab, the auditor can select a date range, the type of report (Weekly, Monthly or Batch reports), and generate the reports.
- 3.2.4.7 When a report is requested, it is displayed on the screen. On this report display there is a button offering to email or print the report.
- 3.2.4.8 The monitor has a reset button that will completely purge all materials currently being processed by the Wrap-o-Matic, and reset WrapSoft to the default manifest.

3.3 Performance Requirements

- 3.3.1 The Wrap-o-Matic supports and requires only one terminal and a single user.
- 3.3.2 There will not be user accounts. WrapSoft will have a simple password protected interface (see 3.5.3).
- 3.3.3 There are no strict timing requirements on the system, however all user actions must be realized within 10 seconds of instruction initiation.
- 3.3.4 The Wrap-o-Matic should complete one box of chocolates per ten seconds.

3.4 Design Constraints

- 3.4.1 Standards Compliance
 - 3.4.1.1 FDA Food processing standards conformance.

3.5 Software System Attributes

- 3.5.3 Security
 - 3.5.3.1 The Wrap-o-Matic security will be controlled by WrapSoft, which has a simple password protected interface known only to personnel with the appropriate privileges. Operator passwords allow only login and operation of the Wrap-o-Matic. Administrator passwords allow the password(s) to be changed, in addition to the privileges above.

Decision Table

Wrapping & Ribboning Chocolates

Wrap-O-Matic Decision Table

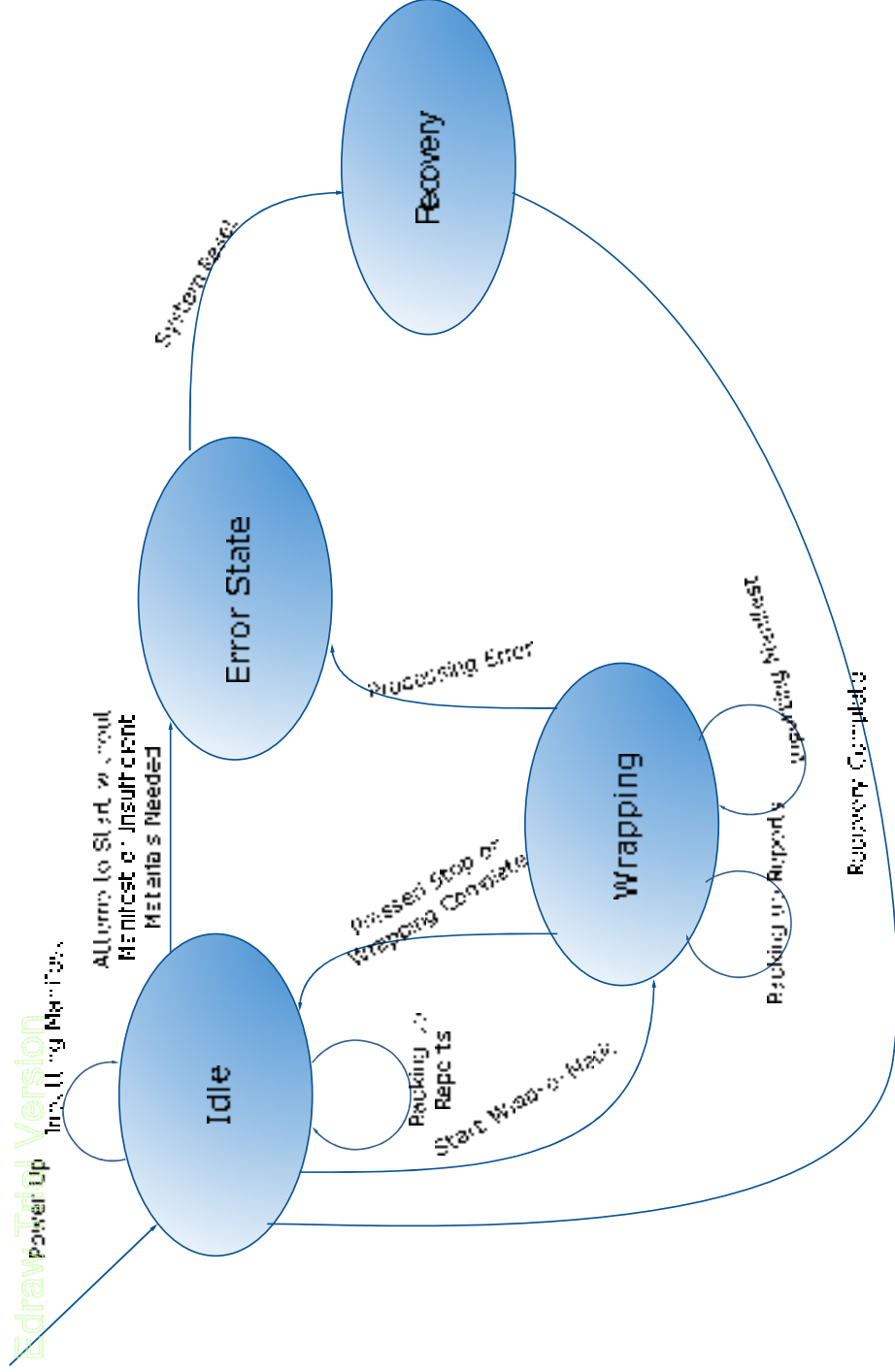
Wrapping Rules:

- The Wrap-O-Matic:
 - Disallows ribbons applied to unwrapped chocolates.
 - Disallows hollow chocolates tied with metallic ribbon.
 - Uses the gentle wrapping algorithm with tissues wrappers.
 - Uses the rapid wrapping algorithm whenever chocolates do not have ribbons and do not have tissue wrappers.
 - Uses the gentle algorithm whenever hollow chocolates are tied with ribbons.
 - Uses the normal algorithm for all other cases.

Wrap-O-Matic Decision Table

		Rules														
		R01	R02	R03	R04	R05	R06	R07	R08	R09	R10	R11	R12	R13	R14	R15
Conditions	Viscosity	Hollow									Not Hollow					
	Ribbon	Metallic			Other			None			Metallic or Other			None		
	Wrapper	Metallic or Paper	Tissue	None	Metallic or Paper	Tissue	None	Metallic or Paper	Tissue	None	Metallic or Paper	Tissue	None	Metallic or Paper	Tissue	None
Actions	Disallow	x	x	x	.	.	x	.	.	.	.	.	x	.	.	.
	Rapid Algorithm	.	.	.	-	.	-	X	.	x	.	.	.	x	.	x
	Normal Algorithm	.	.	.	.	.	.	.	.	.	x	.	.	.	.	.
	Gentle Algorithm	.	-	.	x	x	x	.	x	.	.	x	.	.	x	.

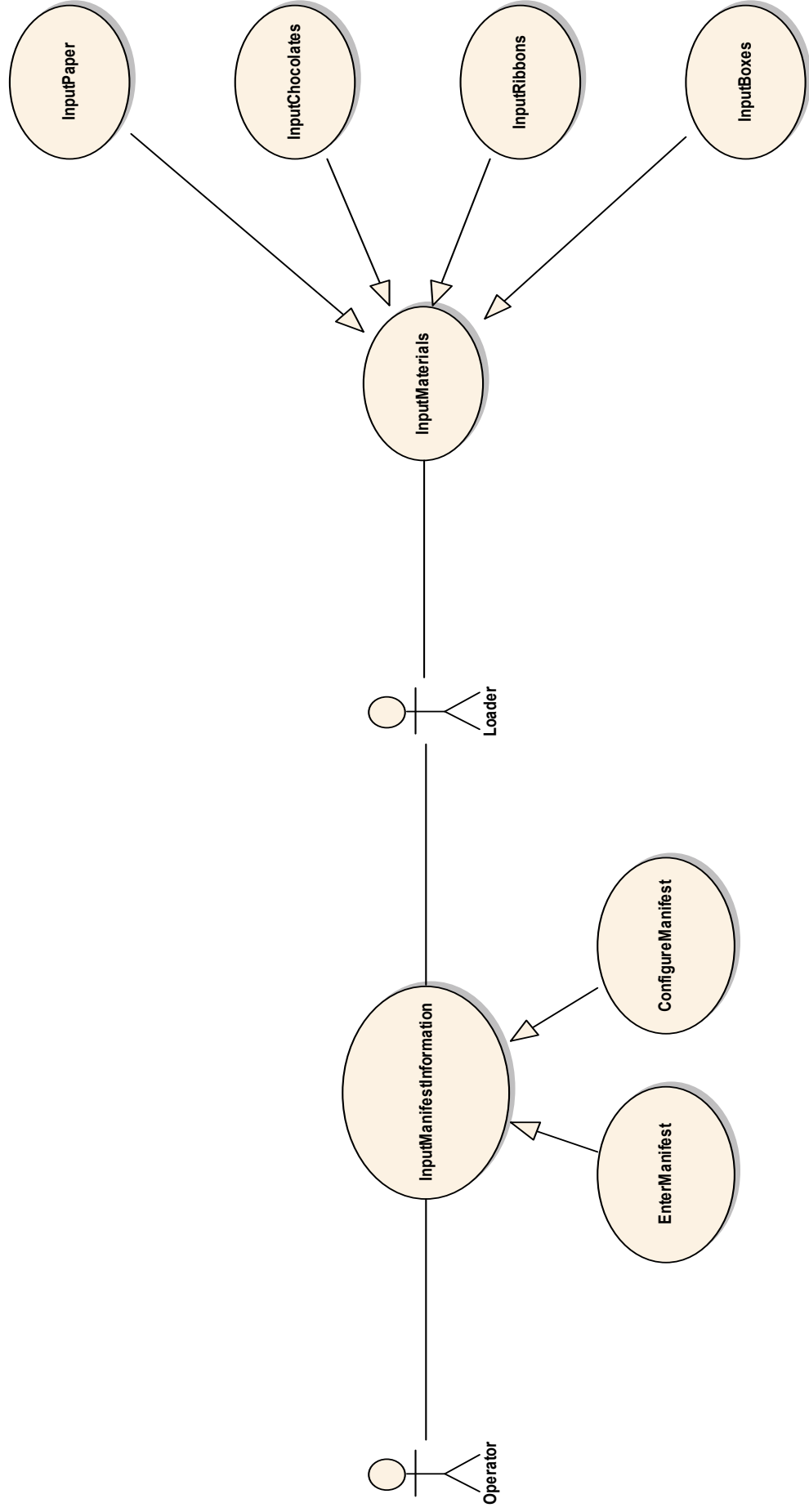
The Wrapping and Boxing Chocolate Process



Use Case Sample

Operation: Input Manifest

ud Primary Use Cases



Creating a New Manifest

This use case allows a new manifest to be entered into WrapSoft.

Use Case Name:	<u>InputManifestInformation</u>
Participating Actors:	Initiated by <u>Operator</u> Communicates with <u>Loader</u>
Flow of Events:	<ol style="list-style-type: none">1. The Operator activates the “Input Manifest Information” function of the console2. WrapSoft responds by presenting an options page. The page includes the choice of configuring or creating a manifest3. The Operator chooses the option to create a manifest and choose a name for it4. Wrapsoft responds by presenting a form to the Operator. The form includes the following options: chocolate, paper, ribbons, boxes.5. The Operator chooses the materials needed by scrolling through the scroll down menu of each option. Once completed the Operator submits the form.6. Wrapsoft receives the form, saves it in the database and notifies the Loader by a pop-up dialog7. The Loader reviews the submitted information and makes sure all the materials are in stock. The loader then sends a confirmation to the Operator to begin.
Entry Conditions:	<ul style="list-style-type: none">- The Operator is logged into Wrapsoft- The Operator stopped the Wrap-o-Matic
Exit Conditions:	<ul style="list-style-type: none">- The Operator receives acknowledgement OR- The Operator receives an explanation why transaction cannot be completed

Configuring an Existing Manifest

This use case allows an existing manifested to be configured/alterd and then stored into WrapSoft.

Alternate Flow of Events: <u>Configuring an existing Manifest</u>	<ol style="list-style-type: none">1. The Operator activates the “Input Manifest Information” function of the console2. WrapSoft responds by presenting an options page. The page includes the choice of configuring or creating a manifest3. The Operator chooses the option to configure a manifest4. Wrapsoft responds by presenting a page of existing manifests. The page includes all existing manifest by their respective names.5. The Operator chooses the manifest needed.6. Wrapsoft responds by presenting a form with the existing selected options of the manifest chosen. The Operator chooses the materials to be configured by scrolling through the scroll down menu of the option needed to be changed. Once completed the Operator submits the form7. Wrapsoft receives the form, saves it in the database and notifies the Loader by a pop-up dialog8. The Loader reviews the submitted information and makes sure all the materials are in stock. The loader then sends a confirmation to the Operator to begin.
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Creating a Manifest with Insufficient Material

This use case indicates to the operator that the created manifest does not have the material needed to start packaging chocolates.

<p>Error Flow: <u>Material needed out of stock</u></p>	<ol style="list-style-type: none">1. The Operator activates the “Input Manifest Information” function of the console2. WrapSoft responds by presenting an options page. The page includes the choice of configuring or creating a manifest3. The Operator chooses the option to create a manifest and choose a name for it4. Wrapsoft responds by presenting a form to the Operator. The form includes the following options: chocolate, paper, ribbons, boxes.5. The Operator chooses the materials needed by scrolling through the scroll down menu of each option. Once completed the Operator submits the form.6. Wrapsoft receives the form, saves it in the database and notifies the Loader by a pop-up dialog7. The Loader reviews the submitted information and makes sure all the materials are in stock. One of the materials is out of stock. Therefore the loader sends an explanation why the manifest cannot be completed at this time
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User (WrapSoft) stories for the Wrap-o-Matic

Identifier	Description
IDK00001	WrapSoft can allow operators to login based on a password protected system.
IDK00002	WrapSoft can allow administrators to login based on a password protected system.
IDK00003	WrapSoft can allow administrators to change password(s) and permissions on the system.
IDK00004	WrapSoft can perform a system check. WrapSoft can deliver messages to the operator based on system checks (these messages include maintenance warnings, insufficient inputs (paper/ribbon/boxes), etc)
IDK00005	
IDK00006	WrapSoft can accept new manifests.
IDK00007	WrapSoft can run a previously saved manifest. WrapSoft can reconfigure a previously saved manifest, while overwriting or preserving the old manifest as desired.
IDK00008	
IDK00009	WrapSoft can start the processing of chocolates corresponding to a new manifest. WrapSoft can continue processing an existing manifest while a new manifest is entered or configured.
IDK00010	WrapSoft can alter the chocolate input speed and frequency by changing the speed of the inbound conveyor belts.
IDK00011	
IDK00012	WrapSoft can determine if a box of chocolates does not meet quality standards and reject the box.
IDK00013	WrapSoft can wrap individual chocolates with paper of type Thin, Foil, Wax or Tissue.
IDK00014	WrapSoft can place a printed manifest describing box configuration into each box of chocolates. WrapSoft can box chocolates in boxes of type Rectangular, Circular, Heart Shaped, OEM Custom, or Bag
IDK00015	
IDK00016	WrapSoft can box chocolates in boxes of size small, medium, or large.
IDK00017	WrapSoft can box chocolates in boxes of configuraion single layer or multiple layer.
IDK00018	WrapSoft can tie boxes of chocolates with ribbon of type Thread, String, Cord, Wire, or Wide. WrapSoft can accept and package inbound chocolates of composition Milk, Dark, Fudge, Hard Candy, White, Bitter, Semisweet, Swiss, or Belge.
IDK00019	WrapSoft can accept and package inbound chocolates of configuration Truffle, Praline, Bar, Traditional Chocolate, Turtle, Bon Bon, or Filled.
IDK00020	WrapSoft can accept and package inbound chocolates of viscosity Solid, Jelly, Semi Solid, or Hollow.
IDK00021	
IDK00022	WrapSoft can accept and package inbound chocolates of weight Too Light, In Range, or Too Heavy.
IDK00023	WrapSoft can accept and package inbound chocolates of size One, Two, or Three.
IDK00024	WrapSoft can turn off the Wrap-o-Matic.
IDK00025	WrapSoft can reset the Wrap-o-Matic.
IDK00026	WrapSoft can recover reports and manifests stored on a backup disk.
IDK00027	WrapSoft can backup reports and manifests.
IDK00028	WrapSoft can create Monthly, Weekly, and Batch Reports.
IDK00029	WrapSoft can continually monitor and store data for use in reporting functions.
IDK00030	WrapSoft will complete the packaging of one box of chocolates every 10 seconds.
IDK00031	WrapSoft will detect and report paper, ribbon, or box jams. WrapSoft will monitor temperature levels in the machine and report a warning if temperatures rise above 35 degrees.
IDK00032	
IDK00033	WrapSoft can deliver finished boxes of chocolates to the unloader via the outbound conveyor belt.
IDK00034	WrapSoft can print reports.
IDK00035	WrapSoft can enter idle mode when no manifest is being processed. WrapSoft can be connected to a network for purposes of global control, emergency shutoff, or system override.
IDK00036	WrapSoft can continually monitor current status of the Wrap-o-Matic and display this to the operator or administrator.
IDK00037	

