**IEEE-830 Software Requirements Specification (SRS) Document**

**Project Name: Inventory Management System**

**Team Members Names:** Alfred Beam, Kenneth Battle, Shelton Adams

**Software Requirements Specification**

**Version 3.5**

**Revisions**

|  |  |  |  |
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| 1/18/25 | 1.5 | Addition of Test Plan and Test Cases | Shelton M Adams |
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# **1.0 Introduction**

## **Purpose**

This Software Design Document describes the system design and architecture for the GB Manufacturing Inventory Management System. It is designed to help the company manage high value tools and materials. The system will track high value tools with a check-in and check-out system and assign them to a specific employee. The system will also allow the creation of work orders and allow employees to add materials. Finally, the system will determine which warehouse the materials are housed in (if any) and create either a delivery memo or a purchase order.

## **Scope**

This document describes the implementation details of the GB Manufacturing Inventory Management System. It contains several components: Work Order Management, High Value Tool Management, Material Management, and Material Delivery/Ordering Management.

## **Definitions, acronyms, abbreviations**

|  |  |
| --- | --- |
| Acronym | Meaning |
| IMS | Inventory Management System |
| RFID | Radio Frequency Identification |
| SMTP | Simple Mail Transfer Protocol |

## **References**

1. 830-1998 – IEE Recommended Practice for Software Requirement Specifications

## **Overview**

This software is designed to develop an inventory management system that will contain a portal which allows employees to enter tasks to be completed by the maintenance personnel. After a task is initiated, the portal will then create a work order for the task and allow management to assign an employee. The assigned employee will then be granted permission to add tools and materials that will be needed to complete the task, which will be checked out of the systems and the warehouse’s inventory. Once the task is completed the tools and materials, management will ensure the correct tools are back and mark them as returned.

The software will also monitor the materials and tools at both warehouses. After the creation of the work order and an employee is assigned, the system will automatically check for the tools and materials availability at both warehouses. If the parts are available but in the wrong warehouse a delivery ticket will be generated to move the materials automatically, so they are ready for the employee ahead of time. If the parts are not available, a purchase request will be generated and sent over to the purchasing team for approval and ordering.

# **2.0 Overall Description**

## **2.1 Product perspective**

The purpose of this project is to develop an inventory management system. The system should contain a portal that allows employees to enter tasks that they need accomplished by the maintenance personal. The portal should then create a work order for the task and allow management to assign an employee. The system should allow the assigned employee to add tools and materials that will be needed to complete the task to the work order which will check them out of the system. When the employee returns the tools a member of management can mark them as returned.

The final portion of the Inventory Management System will monitor the materials at each of the two warehouses. When a work order is created and assigned to an employee it will automatically check for part availability at each location. If the parts are available but in the wrong warehouse a delivery ticket will be generated to move the materials automatically, so they are ready for the employee ahead of time. If the parts are not available, a purchase request will be generated and sent over to the purchasing team for approval and ordering.

## **2.2 Product functions**

**Equipment Checkout and Check-In System**

* **Requirement ID**: SYS-001
* **Description**: The system will allow employees to check out equipment by scanning their employee ID and the equipment barcode.
* **Requirement ID**: SYS-002
* **Description**: The system will ensure that only employees with the correct skill classification can check out specific equipment.
* **Requirement ID**: SYS-003
* **Description**: The system will automatically record the transaction details (e.g., employee ID, equipment ID, date/time).

**Employee Accountability**

* **Requirement ID**: SYS-004
* **Description**: The system will generate a monthly statement of equipment transactions for each employee.
* **Requirement ID**: SYS-005
* **Description**: The system will generate an exception report identifying employees with excessive equipment losses.

**Reporting and Analysis**

* **Requirement ID**: SYS-006
* **Description**: The system will allow supervisors and depot staff to generate predefined and ad hoc reports.
* **Requirement ID**: SYS-007
* **Description**: The system will provide real-time data on equipment inventory and employee transactions.

**Notification and Alerts**

* **Requirement ID**: SYS-008
* **Description**: The system will notify employees when equipment on order becomes available.
* **Requirement ID**: SYS-009
* **Description**: The system will send alerts to employees and supervisors for overdue equipment.

**Integration with Inventory Management**

* **Requirement ID**: SYS-010
* **Description**: The system will synchronize equipment inventory data with the materials warehouse to reduce duplicate orders and inventory costs.
* **Requirement ID**: SYS-011
* **Description**: The system will allow employees with the appropriate access level to add, display, and delete tools from the inventory management system.
* **Requirement ID**: SYS-012
* **Description**: The system will allow employees with the appropriate access level to add, display, and delete materials from the inventory management system.
* **Requirement ID**: SYS-013
* **Description**: The system will allow employees with the appropriate access level to add, display, and delete employees from the inventory management system.

**User Access**

* **Requirement ID**: SYS-014
* **Description**: The system will verify an employee’s login credentials before allowing them access to the IMS system.

## **2.3 User characteristics**

Non-functional requirements (NFR) can be left empty with this week’s requirements.

## **2.4 Constraints**

Database Requirements

* The system shall store employee data, including:
  + Employee ID, name, skill classifications, and employment status.
* The system shall maintain a database of equipment, including:
  + Equipment ID, description, condition, and availability status.
* The database shall log all transactions, including:
  + Check-in/check-out details, timestamps, and employee-equipment associations.
* The database should provide fast performance to support real-time updates and reports generated.

## **2.5 Assumptions and dependencies**

<Provide details>

# **3.0 Specific requirements**

## 

## **3.1 External interface requirements**

### **3.1.1 User interfaces**

The system shall provide a web-based graphical user interface accessible through a secure login for maintenance employees, supervisors, and equipment depot staff.

Employees shall use the GUI to:

* Check in and out equipment.
* View their transaction history and current possession of tools.
* Receive notifications on equipment availability or overdue returns.

Supervisors and depot staff shall use the GUI to:

* Generate predefined and custom reports.
* Monitor equipment losses or overdue returns.
* Enforce skill classifications for equipment checkout.

### **3.1.2 Hardware interfaces**

* The system shall integrate with barcode scanners to streamline the check-in and check-out process by scanning employee ID cards and equipment barcodes.
* The system should connect thermal printers to generate labels for new equipment.
* RFID technology may be considered to enhance tracking and minimize losses.

### **3.1.3 Software interfaces**

* The system shall integrate with the company’s existing HR software to retrieve and update employee information.
* Due to two warehouses the system should interface with inventory management software to ensure synchronization between the equipment depot and materials warehouse.

### **3.1.4 Communications interfaces**

* The system should use HTTPS for secure communication between clients and the server.
* Notifications regarding equipment availability or overdue items shall be sent using email and/or SMS, leveraging SMTP and an SMS gateway.
* If integrating RFID, the system shall comply with ISO/IEC 18000 standards for RFID communication.

## **3.2 Functional requirements**

### **3.2.1 Subsystem A name**

<Provide details>

#### **3.2.1.1 Requirements statement**

<Provide details>

#### **3.2.1.2 Requirements statement**

<Provide details>

### **3.2.1 Subsystem B name**

<Provide details>

#### **3.2.1.1 Requirements statement**

<Provide details>

#### **3.2.1.2 Requirements statement**

<Provide details>

## **3.3 Performance requirements**

<Provide details>

### **3.3.1 Standards**

<Provide details>

### **3.3.2 Hardware limitations**

<Provide details>

### **3.3.3 Software System Attributes**

The important qualities that our system must include are as follows:

* **Performance:** Performance ensures the system can handle requests and operations efficiently, even under heavy workloads. In the context of improving the IMS, a high-performing system ensures that IMS portals, or other needed platforms run smoothly, providing a seamless experience for users. Delays or slow responses could frustrate employees trying to use the system.
* **Reliability:** Reliability guarantees that the system operates consistently without unexpected failures. A reliable platform ensures employees and managers can depend on it for accessing previous work orders or creating and checking out items needed for a job. Downtime could hinder opportunities, create dissatisfaction, and harm the business image as a place for growth.
* **Security:** Security is critical for protecting sensitive data, such as personal information of users or payment details related to work orders. Addressing vulnerabilities requires systems that safeguard data, build user trust, and comply with regulations (ISO, HIPPA, GRC, etc.), ensuring no one’s privacy or assets are at risk.
* **Usability:** Usability ensures that the system is easy to navigate for all users, including individuals unfamiliar with technology. A user-friendly interface can help attract more users, drive efforts more effectively as well as break down barriers to access and encourage participation from all employees and management.
* **Maintainability:** Maintainability focuses on how easily the system can be updated or modified. In a community focused system, this ensures it can adapt to new features and requirements, or evolving technology, allowing it to remain relevant and impactful over time without requiring excessive resources.
* **Portability:** Portability enables the system to work across multiple devices and platforms, such as smartphones, tablets, and desktops. This is crucial for a community-based system, as users may have varied access to technology and should be able to create work orders from them.
* **Scalability:** Scalability ensures the system can grow to handle increased demand as more business needs grow and more individuals use it. The IMS system must accommodate growth without sacrificing performance, or security ensuring long-term success and usability.
* **Availability:** Availability ensures the system is accessible whenever users need it, with minimal downtime. For example, employees and management should never encounter interruptions. High availability builds trust and keeps users engaged.

## **3.4 Design constraints**

<Provide details>

### **3.2.1 Availability**

<Provide details>

### **3.2.2 Security**

<Provide details>

### **3.2.3 Maintainability**

<Provide details>

## **3.5 Other requirements**

<Provide details>

# **4.0 Test Plan**

## **4.1 Test Plan Identifier**

BG-InventoryManagementSystem\_TestPlan\_V1.0\_16JAN2024

## **4.2 Introduction**

This test plan was created to verify that the BG Inventory Management System meets the product specifications that were laid out in the Functional Requirements section of the project IEEE 830 Software Requirements Specification. This plan covers the comprehensive testing of the core features which are checking in and out tools, adding materials and tools to a work order, and checking the availability of materials. To ensure the system meets the requirements the testing will be carried out on a internal test network that mimics the actual company network.

## **4.3 Test Items**

The systems to be tested include:

* Employee Login Portal
* Manager Approval Portal
* Work Order Generator
* Tool Management GUI
* Material Management GUI
* Inventory/Tool Location Verification

These systems should be tested on company approved desktops, laptops, and mobile devices. Testing should not be performed on employee personal computers or mobile devices.

## **4.4 Features to Be Tested**

Features to be tested include the following:

* As a Manager: Creating Employee Accounts
* As a Manager: Deleting Employee Accounts
* As a Manager: Updating Employee Accounts
* As an Employee: Adding Tools to a Work Order
* As an Employee: Deleting Tools from a Work Order
* As an Employee: Updating Tool Quantities on a Work Order
* As an Employee: Adding Materials to a Work Order
* As an Employee: Deleting Materials from a Work Order
* As an Employee: Updating Material Quantities on a Work Order
* As an Employee: Checking Out Tools
* As an Employee: Checking In Tools
* As an Employee: Checking Tool/Material Availability

## **4.5 Features Not to Be tested**

The features related to the creation and assignment of work order, the generation of delivery notes, and the creation of purchase orders will not be tested.

## **4.6 Approach**

The tests will be performed according to the documented test cases stored in the Inventory Management System project folder. The project test lead will assign each test case to a team of at least two validators. Each team will run the assigned test case and upon completion mark it as a pass or fail. The team will indicate what features did not pass and generate a bug report with any relevant details as to the nature of the failure.

## **4.7 Item Pass/Fail Criteria**

The Pass / Fail criteria for each test case will be the functionality of the requirement that it addresses. Each requirement much be fully validated for the test case to be considered a pass. Any critical defect will be considered a failure and will be submitted to the development team in a bug report for review and remediation.

Any bugs found that are not directly related to a requirement and do not prevent that requirement being fulfilled should not be considered when determining a Pass / Fail result. The bug should still be recorded and reported to the development team in a bug report.

## **4.8 Suspension Criteria and Resumption Requirements**

Testing should continue even if a critical failure is discovered. All requirements listed should have their test case attempted during the testing process unless a bug prevents the complete execution of a test.

If a test cannot be attempted because of a critical bug, the test team should attempt to document in as much detail as possible the failure preventing the testing and submit a bug report to the development team. Testing will resume once the test lead received a software update and release notes from the development team that list the failure as being corrected.

## **4.9 Test Deliverables**

Once testing has been completed for a test case the test team will submit their pass / fail report to the test lead. If any bugs were discovered, then a separate bug report will be submitted to the test lead who will forward it to the development team and notify the project lead.

## **4.10 Test Tasks**

The following activities must be completed during the testing process:

* Each requirement to be tested will be included in a test plan.
* The test plans along with the functional requirements will be delivered to the test lead.
* The software should be installed on the test network by the development team and a Test Ready Notification (TRN) should be sent to the test lead at least 2 business days prior to testing.
* The test lead will verify all documents are complete and ready and assign the test plans to test teams.
* The test teams will perform the tests.
* The results of the test will be communicated to the test lead in writing at the conclusion of each test.
* The test lead will compile and transmit the test results to the project lead and development teams.

## **4.11 Environmental Needs**

The test network must be configured by the development team to be representative of the real work company network with all updated software packages that are to be tested.

These include:

* Desktop (company standard OS image)
* Laptop (company approved OS image)
* Mobile devices (phone / tables)
* Network infrastructure (Switches, Routers, cabling)

## **4.12 Responsibilities**

The software development team is responsible for installing the software patches to the test network and notifying the project lead when it is ready to be tested, and the version used. The project lead is responsible for submitting the TRN to the test lead 2 business days before testing and collecting the results a submitting them to the development team. The test lead is responsible for acknowledging the receipt of the TRN, scheduling the test team resources, verifying all test documents are complete, and reporting the test results to the project lead. The test teams are responsible for following the test plans, recording all results, and reporting their findings to the test lead.

## **4.13 Staffing and Training Needs**

The test teams should be comprised of a minimum of two testers. The lab must be overseen by a test lead. Each test team should receive a briefing from the test lead on the requirements being tested and provide answers to any questions the team has. The pass / fail criteria should be clearly communicated by the test lead to each test team.

## **4.14 Schedule**

Each version of software to be tested will be installed on the test network and a TRN submitted at a minimum of two business days prior to any testing. Each test team will have one business day to report their results after completion to the test lead. The test lead will report all test results to the project lead within two business days of the completion of testing.

Each round of testing on a software version must be completed at least 2 weeks prior to its scheduled deployment on the live company network to ensure all deliverables are on schedule

## **4.15 Risks and Contingencies**

If the first round of testing reveals any bugs that prevent a pass on a requirement, this could delay the release of that software version. The extent of the delay will need to be determined by the project lead based on the severity of the bug and communicated to management and the software development team. The management and the project lead will determine if the severity of the bug precludes the release or if the employees can use the software in its current form and the bug will be corrected in the next version in order to avoid the delay.

## **4.16 Approvals**

The project lead must approval all software version candidates and complete the TRN prior to their installation on the test network and transmission to the test lead. The test lead must approval all test and bug reports prior to their transmission to the project lead and software development team. The project lead, software development lead, test lead, and BG management must all approve each software version prior to its deployment on the live company network.

## **4.17 Test Reports**

### **4.17.0 Test Report BGIMS\_TR#1A\_V1.0\_26FEB2025\_ABB**

|  |  |
| --- | --- |
| **1. Test Report ID:** | |
| BGIMS\_TR#1\_V1.0\_26FEB2025\_ABB | |
| **2. Test Case ID:** | |
| BGIMS\_TC#1\_V1.0\_15FEB2025 | |
| **3. Tester** | |
| Alfred Beam | |
| **4. Summary:** | |
| This test was performed to validate the tool class and tool GUI tab for the BG IMS program. It involved adding, deleting, and displaying tool data that was stored in an SQL database. | |
| **5.Assessment:** | |
| When data is entered into all of the fields provided the program will add a tool to the database and display all the tools currently loaded. When data in the incorrect format is entered and the “Add Tool” button is pressed the system responds with a message telling the user what needs to be fixed. If any field is left blank the system informs the user that the missing data needs to be entered. | |
| **6. Incident Description** | |
| 1. **Inputs:** | One or more text fields are left blank. Incorrect data type is entered into a field. |
| 1. **Expected Results:** | The program should catch the error and prompt the user to fix the incorrect data and or enter the missing data. |
| 1. **Actual Results:** | The program responds correctly and does not crash. The user is prompted to fix the incorrect or missing data. |
| 1. **Unexpected Anomalies:** | None |
| 1. **Other Information:** | None |
| **7. Impact** | |
| 1. **Severity:** | No impact, the software performed correctly. |
| 1. **Priority:** | None, the software performed correctly. |
| **8. Images:** | |
| A screenshot of a computer  AI-generated content may be incorrect.  A screenshot of a computer  AI-generated content may be incorrect.  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.** | |

### **4.17.1 Test Report BGIMS\_TR#2A\_V1.0\_28FEB2025\_ABB**

|  |  |
| --- | --- |
| **1. Test Report ID:** | |
| BGIMS\_TR#2\_V1.0\_28FEB2025\_ABB | |
| **2. Test Case ID:** | |
| BGIMS\_TC#2\_V1.0\_15FEB2025 | |
| **3. Tester** | |
| Alfred Beam | |
| **4. Summary:** | |
| This test was performed to validate the material class and tool GUI tab for the BG IMS program. It involved adding, deleting, and displaying tool data that was stored in an SQL database. | |
| **5.Assessment:** | |
| When data is entered into all of the fields provided the program will add a material to the database and display all the materials currently loaded. When data in the incorrect format is entered and the “Add Material” button is pressed the system responds with a message telling the user what needs to be fixed. If any field is left blank the system informs the user that the missing data needs to be entered. | |
| **6. Incident Description** | |
| 1. **Inputs:** | One or more text fields are left blank. Incorrect data type is entered into a field. |
| 1. **Expected Results:** | The program should catch the error and prompt the user to fix the incorrect data and or enter the missing data. |
| 1. **Actual Results:** | The program responds correctly and does not crash. The user is prompted to fix the incorrect or missing data. |
| 1. **Unexpected Anomalies:** | None |
| 1. **Other Information:** | None |
| **7. Impact** | |
| 1. **Severity:** | No impact, the software performed correctly. |
| 1. **Priority:** | None, the software performed correctly. |
| **8. Images:** | |
| A screenshot of a computer  AI-generated content may be incorrect.  A screenshot of a computer  AI-generated content may be incorrect.  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.** | |

### **4.17.2 Test Report BGIMS\_TR#3A\_V1.0\_28FEB2025\_ABB**

|  |  |
| --- | --- |
| **1. Test Report ID:** | |
| BGIMS\_TR#3\_V1.0\_26FEB2025\_ABB | |
| **2. Test Case ID:** | |
| BGIMS\_TC#3\_V1.0\_15FEB2025 | |
| **3. Tester** | |
| Alfred Beam | |
| **4. Summary:** | |
| This test was performed to validate that the system will allow employees with the appropriate access level to add, display, and delete employees to and from the IMS. | |
| **5.Assessment:** | |
| When data is entered into all of the fields provided the program will add an employee to the database and display all the tools currently loaded. When data in the incorrect format is entered and the “Add Employee” button is pressed the system responds with a message telling the user what needs to be fixed. If any field is left blank the system informs the user that all employee fields must be filled out. | |
| **6. Incident Description** | |
| 1. **Inputs:** | One or more text fields are left blank. Incorrect data type is entered into a field. |
| 1. **Expected Results:** | The program should catch the error and prompt the user to fix the incorrect data and or enter the missing data. |
| 1. **Actual Results:** | The program responds correctly and does not crash. The user is prompted to fix the incorrect or missing data. |
| 1. **Unexpected Anomalies:** | None |
| 1. **Other Information:** | None |
| **7. Impact** | |
| 1. **Severity:** | No impact, the software performed correctly. |
| 1. **Priority:** | None, the software performed correctly. |
| **8. Images:** | |
| A screenshot of a computer  AI-generated content may be incorrect.  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.** | |

### **4.17.3 Test Report BGIMS\_TR#4A\_V1.0\_28FEB2025\_ABB**

|  |  |
| --- | --- |
| **1. Test Report ID:** | |
| BGIMS\_TR#4A\_V1.0\_26FEB2025\_ABB | |
| **2. Test Case ID:** | |
| BGIMS\_TC#4\_V1.0\_15FEB2025 | |
| **3. Tester** | |
| Alfred Beam | |
| **4. Summary:** | |
| This test was performed to validate that the system will verify an employee’s login credentials before allowing them access to the IMS and allow a successful log out. | |
| **5.Assessment:** | |
| When the program is started, all tabs and fields except those required for the login process are hidden or disabled. If one or both the fields (Username and Password) are left blank when the login button is pressed the program will prompt you to fill them in. If the username and password are entered correctly the system will log in the user and enable the fields and tabs. When the logout button is pressed the user is logged out and the fields and tabs are disabled. An incorrect username or password will not log the employee in. | |
| **6. Incident Description** | |
| 1. **Inputs:** | Username and Password that exist in the access database. |
| 1. **Expected Results:** | The program should only allow a valid user to log in and prompt the user to fix any incorrect or missing data. |
| 1. **Actual Results:** | The program responds correctly and does not crash. The user is prompted to fix the incorrect or missing data. |
| 1. **Unexpected Anomalies:** | Pressing the “Logout” button when a user is not logged in will still display the “Logged Out Successfully” message. |
| 1. **Other Information:** | None |
| **7. Impact** | |
| 1. **Severity:** | Minor, this bug does not impact software performance. |
| 1. **Priority:** | Minor, should before fixed before the final release to the customer. |
| **8. Images:** | |
| A screenshot of a computer  AI-generated content may be incorrect.  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.** **A screenshot of a computer  AI-generated content may be incorrect.**  **A screenshot of a computer  AI-generated content may be incorrect.** | |

## **4.18 Test Cases**

### **4.18.0 Test # 1 – Tool Management**

#### **4.18.0.1 Test Case Specification Identifier**

**Test Case ID:** BGIMS\_TC#1\_V1.0\_15FEB2025

**Test Description:** Successfully adding, removing, and displaying a tool in the database.

**Creator:** Alfred Beam

**Tester Name:** Alfred Beam

**Test Date:** 02/15/2025

#### **4.18.0.2 requirements Addressed**

**Requirement ID**: SYS-011

**Description**: The system will allow employees with the appropriate access level to add, display, and delete tools from the inventory management system.

#### **4.18.0.3 Features to be Tested**

* Adding a Tool to the SQL Database
* Deleting a Tool From the SQL Database
* Displaying the current Tools in the SQL Database

#### **4.18.0.4 Prerequisites Conditions**

**Workstation:** The tester will need either access to a Headquarters or Satellite Warehouse Workstation that can connect to the IMS Server running the IMS system and database software.

**User Access Level:** Tester should be logged into the IMS with one of the following system access levels:

1. Inventory Manager
2. Manager
3. Admin

#### **4.18.0.5 Test Input**

**Example Tool(s):** The tester should have a list of tools provided by the purchasing department to enter into the system via the IMS GUI. These should include the following data points.

* Tool Name: String variable 1-30 characters
* Tool Serial Number: String variable 1-30 characters
* Tool Value: Double variable

**Description**: The system will allow employees with the appropriate access level to add, display, and delete tools from the inventory management system.

#### **4.18.0.6 Expected Test Results**

**Display Tools:** After the tester clicks on the “Display Tools” button the system should update the JTable object with the table titles and display any tools currently in the SQL database.

**Add Tool:** After the tester enters the tool data into the provided fields the clicks the “Add Tool” button the IMS should add the tool to the SQL database and redisplay the tool list.

**Delete Tool:** After the tester enters the tool ID number into the provided field and clicks the “Delete Tool” button the system should remove the tool entry from the SQL database and redisplay the remaining tools in the JTable along with the table titles.

#### **4.18.0.7 Test Procedure**

**Test 1 – Access the Tools GUI Tabbed Panel**

1. From the Main Menu GUI tab, click on the Tools GUI tab.
2. The Panel should change from the Main Menu GUI Tab to the Tools GUI Tab.

**Test 2 – Display Current Tool List**

1. Click on the “Display Tools” Button
2. The JTable should update and display the current SQL database tool list.

**Test 3 – Add a Tool to the Tool List**

1. Enter the data into the following fields: Tool Name, Tool Serial Number, Tool Value.
2. Click the “Add Tool Button”.
3. The fields should clear the entered text the JTable should update with the tool that was added.

**Test 4 – Delete a Tool from the Tool List**

1. Choose a random tool from the tool list and type its ID number into the Tool ID field.
2. Click the “Delete Tool” Button.
3. The tool associated with the entered tool ID should be deleted form the SQL database and the displayed tool list should update the JTable.

#### **4.18.0.8 Pass / Fail Criteria**

**Test 1 – Pass Criteria**

* The Main Menu Tab GUI panel is hidden, and the Tools GUI panel is displayed.

**Test 1 – Fail Criteria**

* The Main Menu GUI Panel is not hidden.
* The Tools GUI Panel is not displayed.
* Any error messages are displayed or the program crashes.

**Test 2 – Pass Criteria**

* The JTable updates with the tools that are loaded in the SQL database.
* The JTable column titles are updated with the Tool ID, Tool Name, Tool Serial Number, and Tool Value.

**Test 2 – Fail Criteria**

* The JTable does not populate with the SQL database data.
* The JTable column names do not update with the names listed in the pass criteria.
* The “Display Tools” button does not function.
* Any error messages are displayed or the program crashes.

**Test 3 – Pass Criteria**

* The Text Fields in the GUI allow data to be typed into them.
* When the “Add Tool” button is clicked the JTable is updated with the tool data that was typed into the text fields.
* The text fields are cleared of data when the “Add Tool” button is clicked.

**Test 3 – Fail Criteria**

* Data cannot be entered into the tool name, serial number, or value text fields.
* The tool data is not added to the SQL database and displayed in the JTable.
* The tool data is incorrectly displayed in the tool table.
* The “Add Tool” button does not function.
* Any error messages are displayed or the program crashes.

**Test 4 – Pass Criteria**

* The Tool ID text field allows data to be typed into it.
* When the “Delete Tool” button is clicked the JTable is updated and the tool associated with the Tool ID that was entered is removed.
* The Tool ID text field is cleared of data when the “Delete Tool” button is clicked.

**Test 4 – Fail Criteria**

* Data cannot be entered into the Tool ID text field.
* The tool data is not removed from the SQL database and is still displayed in the JTable.
* The tool data is incorrectly displayed in the tool table.
* The “Delete Tool” button does not function.
* Any error messages are displayed or the program crashes.

### **4.18.1 Test # 2 – Material Management**

#### **4.18.1.1 Test Case Specification Identifier**

**Test Case ID:** BGIMS\_TC#2\_V1.0\_16FEB2025

**Test Description:** Successfully adding, removing and displaying a material in the database.

**Creator:** Alfred Beam

**Tester Name:** Alfred Beam

**Test Date:** 02/15/2025

#### **4.18.1.2 Requirements Addressed**

**Requirement ID**: SYS-012

**Description**: The system will allow employees with the appropriate access level to add, display, and delete materials from the inventory management system.

#### **4.18.1.3 Features to be Tested**

* Adding a Material to the SQL Database
* Deleting a Material From the SQL Database
* Displaying the current Materials in the SQL Database

#### **4.18.1.4 Prerequisite Conditions**

**Workstation:** The tester will need either access to a Headquarters or Satellite Warehouse Workstation that can connect to the IMS Server running the IMS system and database software.

**User Access Level:** Tester should be logged into the IMS with one of the following system access levels:

* Inventory Manager
* Manager
* Admin

#### **4.18.1.5 Test Input**

**Example Materials(s):** The tester should have a list of materials provided by the purchasing department to enter into the system via the IMS GUI. These should include the following data points.

* Material Name: String variable 1-45 characters
* Material Description: String variable 1-45 characters
* Material Value: Double variable
* Material Vendor: String Variable 1-45 characters

**Description**: The system will allow employees with the appropriate access level to add, display, and delete materials from the inventory management system.

#### **4.18.1.6 Expected Test Results**

**Display Materials:** After the tester clicks on the “Display Materials” button the system should update the JTable object with the table titles and display any materials currently in the SQL database.

**Add Material:** After the tester enters the material data into the provided fields the clicks the “Add Material” button the IMS should add the material to the SQL database and redisplay the material list.

**Delete Material:** After the tester enters the Material ID number into the provided field and clicks the “Delete Material” button the system should remove the material entry from the SQL database and redisplay the remaining materials in the JTable along with the table titles.

#### **4.18.1.7 Test Procedure**

**Test 1 – Access the Materials GUI Tabbed Panel**

1. From the Main Menu GUI tab, click on the Materials GUI tab.
2. The Panel should change from the Main Menu GUI Tab to the Materials GUI Tab.

**Test 2 – Display Current Material List**

1. Click on the “Display Tools” Button
2. The JTable should update and display the current SQL database tool list.

**Test 3 – Add a Material to the Material List**

1. Enter the data into the following fields: Material Name, Material Description, Material Value, and Material Vendor.
2. Click the “Add Material Button”.
3. The fields should clear the entered text the JTable should update with the material that was added.

**Test 4 – Delete a Material from the Material List**

1. Choose a random material from the material list and type its ID number into the Material ID field.
2. Click the “Delete Material” Button.
3. The material associated with the entered Material ID should be deleted from the SQL database and the displayed material list should update the JTable.

#### **4.18.1.8 Pass / Fail Criteria**

**Test 1 – Pass Criteria**

* The Main Menu Tab GUI panel is hidden, and the Materials GUI panel is displayed.

**Test 1 – Fail Criteria**

* The Main Menu GUI Panel is not hidden.
* The Materials GUI Panel is not displayed.
* Any error messages are displayed or the program crashes.

**Test 2 – Pass Criteria**

* The JTable updates with the materials that are loaded in the SQL database.
* The JTable column titles are updated with the Material ID, Material Name, Material Description, Material Value, and Material Vendor.

**Test 2 – Fail Criteria**

* The JTable does not populate with the SQL database data.
* The JTable column names do not update with the names listed in the pass criteria.
* The “Display Materials” button does not function.
* Any error messages are displayed or the program crashes.

**Test 3 – Pass Criteria**

* The Text Fields in the GUI allow data to be typed into them.
* When the “Add Material” button is clicked the JTable is updated with the material data that was typed into the text fields.
* The text fields are cleared of data when the “Add Material” button is clicked.

**Test 3 – Fail Criteria**

* Data cannot be entered into the material name, description, value, or vendor text fields.
* The material data is not added to the SQL database and displayed in the JTable.
* The material data is incorrectly displayed in the material table.
* The “Add Material” button does not function.
* Any error messages are displayed or the program crashes.

**Test 4 – Pass Criteria**

* The Material ID text field allows data to be typed into it.
* When the “Delete Material” button is clicked the JTable is updated and the material associated with the Material ID that was entered is removed.
* The Material ID text field is cleared of data when the “Delete Material” button is clicked.

**Test 4 – Fail Criteria**

* Data cannot be entered into the Material ID text field.
* The material data is not removed from the SQL database and is still displayed in the JTable.
* The material data is incorrectly displayed in the material table.
* The “Delete Material” button does not function.
* Any error messages are displayed or the program crashes.

### **4.18.2 Test # 3 – Employee Management**

#### **4.18.2.1 Test Case Specification Identifier**

**Test Case ID:** BGIMS\_TC#3\_V1.0\_16FEB2025

**Test Description:** Successfully adding, removing, and displaying an employee in the database.

**Creator:** Alfred Beam

**Tester Name:** Alfred Beam

**Test Date:** 02/16/2025

#### **4.18.2.2 Requirements Addressed**

**Requirement ID**: SYS-013

**Description**: The system will allow employees with the appropriate access level to add, display, and delete employees from the inventory management system.

#### **4.18.2.3 Features to be Tested**

* Adding an Employee to the SQL Database
* Deleting an Employee from the SQL Database
* Displaying the current Employees in the SQL Database

#### **4.18.2.4 Prerequisite Conditions**

**Workstation:** The tester will need either access to a Headquarters or Satellite Warehouse Workstation that can connect to the IMS Server running the IMS system and database software.

**User Access Level:** Tester should be logged into the IMS with one of the following system access levels:

* Inventory Manager
* Manager
* Admin

#### **4.18.2.5 Test Input**

**Example Employee(s):** The tester should have a list of employees provided by the programs department to enter into the system via the IMS GUI. These should include the following data points.

* First Name: String variable 1-45 characters
* Last Name: String variable 1-45 characters
* Email: String variable 1-45 characters
* Phone Number: String Variable 1-45 characters
* Hire Date: Date variable
* Job Title: String variable 1-45 characters
* Department: String variable 1-45 characters
* Salary: Decimal Variable: (10,2) format
* Access Level: ENUM Variable, use ‘Admin” and ‘Manager as test data.
* Username: String variable 1-45 characters
* Password: String variable 1-45 characters

**Description**: The system will allow employees with the appropriate access level to add, display, and delete employees from the inventory management system.

#### **4.18.2.6 Expected Test Results**

**Display Employees:** After the tester clicks on the “Display Employees” button the system should update the JTable object with the table titles and display any employees currently in the SQL database.

**Add Employees:** After the tester enters the employee data into the provided fields the clicks the “Add Employee” button the IMS should add the material to the SQL database and redisplay the employee list.

**Delete Employees:** After the tester enters the Employee ID number into the provided field and clicks the “Delete Employee” button the system should remove the employee entry from the SQL database and redisplay the remaining employees in the JTable along with the table titles.

#### **4.18.2.7 Test Procedure**

**Test 1 – Access the Employee GUI Tabbed Panel**

1. From the Main Menu GUI tab, click on the Employee GUI tab.
2. The Panel should change from the Main Menu GUI Tab to the Employee GUI Tab.

**Test 2 – Display Current Employee List**

1. Click on the “Display Employees” Button
2. The JTable should update and display the current SQL database employee list.

**Test 3 – Add an Employee to the Employee List**

1. Enter the data into the following fields: First Name, Last Name, Email, Phone Number, Hire Date, Job Title, Department, Salary, Access Level, Username, and Password.
2. Click the “Add Employee Button”.
3. The fields should clear the entered text the JTable should update with the employee that was added.

**Test 4 – Delete an Employee from the Employee List**

1. Choose a random employee from the employee list and type its ID number into the Employee ID field.
2. Click the “Delete Employee” Button.
3. The employee associated with the entered Employee ID should be deleted from the SQL database and the displayed employee list should update the JTable.

#### **4.18.2.8 Pass / Fail Criteria**

**Test 1 – Pass Criteria**

* The Main Menu Tab GUI panel is hidden, and the Employee GUI panel is displayed.

**Test 1 – Fail Criteria**

* The Main Menu GUI Panel is not hidden.
* The Materials GUI Panel is not displayed.
* Any error messages are displayed or the program crashes.

**Test 2 – Pass Criteria**

* The JTable updates with the employees that are loaded in the SQL database.
* The JTable column titles are updated with the Employee ID, First Name, Last Name, Email, Phone Number, Hire Date, Job Title, Department, Salary, Access Level, Username, and Password.

**Test 2 – Fail Criteria**

* The JTable does not populate with the SQL database data.
* The JTable column names do not update with the names listed in the pass criteria.
* The “Display Employees” button does not function.
* Any error messages are displayed or the program crashes.

**Test 3 – Pass Criteria**

* The Text Fields in the GUI allow data to be typed into them.
* When the “Add Employee” button is clicked the JTable is updated with the employee data that was typed into the text fields.
* The text fields are cleared of data when the “Add Employee” button is clicked.

**Test 3 – Fail Criteria**

* Data cannot be entered into the employee first name, last name, email, phone number, hire date, job title, department, salary, access level, username, or password text fields.
* The employee data is not added to the SQL database and displayed in the JTable.
* The employee data is incorrectly displayed in the employee table.
* The “Add Employee” button does not function.
* Any error messages are displayed or the program crashes.

**Test 4 – Pass Criteria**

* The Employee ID text field allows data to be typed into it.
* When the “Delete Employee” button is clicked the JTable is updated and the employee associated with the Employee ID that was entered is removed.
* The Employee ID text field is cleared of data when the “Delete Employee” button is clicked.

**Test 4 – Fail Criteria**

* Data cannot be entered into the Employee ID text field.
* The employee data is not removed from the SQL database and is still displayed in the JTable.
* The employee data is incorrectly displayed in the material table.
* The “Delete Employee” button does not function.
* Any error messages are displayed or the program crashes.

### **4.18.3 Test # 4 – Employee Login**

#### **4.18.3.1 Test Case Specification Identifier**

**Test Case ID:** BGIMS\_TC#4\_V1.0\_16FEB2025

**Test Description:** Verifying employee login and employee logout

**Creator:** Kenneth Battle

**Tester Name:** Kenneth Battle

**Test Date:** 02/16/2025

#### **4.18.3.2 Requirements Addressed**

**Requirement ID**: SYS-014

**Description**: The system will verify an employee’s login credentials before allowing them access to the IMS system and allow a successful log out.

#### **4.18.3.3 Features to be Tested**

* Employee with correct credentials login
* Employee successful logout

#### **4.18.3.4 Prerequisite Conditions**

**Workstation:** The tester will need either access to a Headquarters or Satellite Warehouse Workstation that can connect to the IMS Server running the IMS system and database software.

Testers must possess correct credentials to gain access to the IMS system and database software.

**User Access Level:** Tester credentials must be able to log into the IMS with one of the following system access levels:

1. Inventory Manager
2. Manager
3. Admin
4. Employee

#### **4.18.3.5 Test Input**

**Example:** The tester should have credentials to the IMS system as either an Inventory Manager, Manager, Admin, or Employee. The following data points are required to gain access:

* Employee Username: String variable 1-30 characters
* Employee Password: String variable 1-30 characters

No Input is needed by the tester or employees to log out of the system.

**Description**: The system will allow employees with the appropriate access level to log in to the IMS system and provide a simple way to log out of the system.

#### **4.18.3.6 Expected Test Results**

**Employee Log in:** After the tester enters their credentials and click the “Log In” button, the system will check to make sure the credentials entered are correct and allow the user into the system.

**Employee Log Out:** After a successful log in, the tester will have a “Log Out” tab available. After clicking on the “Log Out” tab, the system will successfully take the tester back to the “Log In’ screen with the username and password blocks emptied.

#### **4.18.3.7 Test Procedure**

**Step 1 – Employee Log In**

1. From the Employee GUI tab, click on “Username” and enter the correct username specified to the tester that is logging in.
2. After username is entered, click on “Password” and enter the correct password for that tester.
3. Click on the “Log In” button for the system to validate and grant access to the tester.

**Step 2 – Employee Log Out**

1. After a successful log in, click on the “Log Out” button.
2. The system will successfully take the tester back to the Log In screen and the username and password tabs will be emptied.

#### **4.18.3.8 Pass / Fail Criteria**

**Step 1 – Pass Criteria**

* The system will accept inserted credentials and verify whether it is an Inventory Manager, Manager, Admin, or Employee log in and successfully log the user in.

**Step 1 – Fail Criteria**

* The credentials typed in do does not match what is in the system.
* The system is unable to determine who is trying to log in.

Example: Inventory manager or Employee.

* Any error messages are displayed upon login or the program crashes.

**Step 2 – Pass Criteria**

* The “Log Out” button can be seen after the user logs in.
* After clicking on “Log Out”, the system goes back to the Log in Screen with empty “username” and “Password” slots.

**Step 2 – Fail Criteria**

* The “Log Out” button is not displayed upon user logging in.
* After clicking “Log Out”, the system does nothing and continues to display the page the user is currently on.
* Any errors are displayed on the screen or if the program crashes.

# **5.0 OOAD Diagrams**

## **5.1 Use Case Diagram**

A diagram of a company

Description automatically generated

## **5.1.1 Component Level Diagram**

A diagram of a computer network

AI-generated content may be incorrect.

## **5.2 Use Case Specifications**

### **5.2.1 Use Case #3 – Employee adds tools to the work order**

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case Name: Employee adds tools to the work order | | ID: UC003 | Importance Level: High |
| Primary Actor: Employee | Use Case Type: System | | |
| Stakeholders and Interests: Employee, Customer, Manager | | | |
| Brief Description: Once a manager has assigned a work order to an employee, they can begin to add tools to it. The work order GUI will have a button to add tool line items and quantities to it. | | | |
| Trigger: Employee clicks the “Add Tool” button on the work order GUI.  Type: Implementation | | | |
| Relationships:  Association: Employee  Include: Update Work Order, Update Tool Location, Update Tool Quantity  Extend:  Generalization: | | | |
| Normal Flow of Events:   1. Employee clicks the “Add Tool” button. 2. The system presents the employee with a drop-down list of all tool names that are loaded in the system. 3. The employee selects the tool name from the drop-down menu and clicks “Update” to add the tool to the work order. 4. Once the tool has been added a quantity drop down menu button is generated on the GUI with a default value of zero. 5. The employee clicks the quantity drop down and selects the desired number and then clicks the “Update” button. 6. The name and quantity are saved. The employee can now add additional tools if desired. 7. Once all tools are entered the employee click the “Save” button on the GUI to save all changes to the work order. | | | |
| Sub Flows:  S-1: Check Tool Name   1. When the “Add Tool” button is clicked by the employee the system queries the SQL database of tools and creates a tool list object with their available quantities. 2. The tool list is and quantities are presented to the employee to select from. 3. When the “Save” button is clicked the tool list object is destroyed.   S-2: Check Tool Inventory   1. When the “Update” button is clicked by the employee the work order object is updated with the tool name and or quantity. If the quantity is updated, then the amount is updated on the work order and the tool list object. | | | |
| Alternate/Exceptional Flows: | | | |

### **5.2.2 Use Case #4 – Employee adds materials to the work order**

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case Name: Employee adds materials to the work order | | ID: UC004 | Importance Level: High |
| Primary Actor: Employee | Use Case Type: System | | |
| Stakeholders and Interests: Employee, Customer, Manager | | | |
| Brief Description: Once a manager has assigned a work order to an employee, they can begin to add materials to it. The work order GUI will have a button to add material line items and quantities to it. | | | |
| Trigger: Employee clicks the “Add Material” button on the work order GUI.  Type: Implementation | | | |
| Relationships:  Association: Employee  Include: Update Warehouse, Update Material Quantity  Extend: Check Material Availability  Generalization: | | | |
| Normal Flow of Events:   1. Employee clicks the “Add Material” button. 2. The system presents the employee with a drop-down list of all material names that are loaded in the system. 3. The employee selects the material name from the drop-down menu and clicks “Update” to add the tool to the work order. 4. Once the material has been added a quantity drop down menu button is generated on the GUI with a default value of zero. 5. The employee clicks the quantity drop down and selects the desired number and then clicks the “Update” button. 6. The name and quantity are saved. The employee can now add additional materials if desired. 7. Once all materials are entered the employee click the “Save” button on the GUI to save all changes to the work order. | | | |
| SubFlows:  S-1: Check Material Name   1. When the “Add Material” button is clicked by the employee the system queries the SQL database of materials and creates a material list object with their available quantities. 2. The tool list is and quantities are presented to the employee to select from. 3. When the “Save” button is clicked the tool list object is destroyed.   S-2: Check Material Inventory   1. When the “Update” button is clicked by the employee the work order object is updated with the tool name and or quantity. If the quantity is updated, then the amount is updated on the work order and the tool list object. | | | |
| Alternate/Exceptional Flows: | | | |

### **5.2.3 Use Case #5 – Inventory Management System checks out tools to the Employee**

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case Name: Inventory Management System Checks out tools to the Employee | | ID: UC005 | Importance Level: High |
| Primary Actor: Employee | Use Case Type: System | | |
| Stakeholders and Interests:  Employee: Needs tools to perform tasks efficiently.  Manager: Ensures accountability for tools.  Customer: Indirectly benefits from timely tool use. | | | |
| Brief Description: The IMS checks out tools to the employee and removes the checked-out items from the inventory. | | | |
| Trigger: The employee initiates the process of checking out tools by Clicking the ‘Check Out’ button.  Type: External. | | | |
| Relationships:  Association: Employee.  Include: Update Tool Location, Update Warehouse, Update Work Order  Extend: Generate Purchase Order  Generalization: | | | |
| Normal Flow of Events:   1. The employee logs into the IMS system. 2. The employee selects the tools to be checked out. 3. The IMS validates the employees’ credentials. 4. The IMS confirms the availability of the tools. 5. The system records the checked-out tools under the employee’s account and updates the inventory. | | | |
| SubFlows:  S-1: Employee credentials invalid   1. The system prompts the employee to re-enter credentials or contact support.   S-2: Tools unavailable   1. The system notifies the employee of unavailability and provides alternative options. | | | |
| Alternate/Exceptional Flows: If the employee’s account is locked, the system denies access and alerts the manager. | | | |

### **5.2.4 Use Case #6 – Employee checks in tools to the Inventory Management System**

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case Name: Employee checks in tools to the Inventory Management System. | | ID: UC006 | Importance Level: High |
| Primary Actor: Employee | Use Case Type: System | | |
| Stakeholders and Interests:  Employee: Needs to return tools to avoid penalties.  Manager: Tracks tool availability and accountability.  Customer: Benefits from tools being available for the next task. | | | |
| Brief Description: The IMS allows the employee to check in tools and updates the inventory accordingly. | | | |
| Trigger: The employee initiates the process of checking in tools by clicking the ‘Check Tools In’ button.  Type: External. | | | |
| Relationships:  Association: Employee.  Include: Update Tool Location, Update Warehouse, Update Work Order  Extend: Generate Purchase Order  Generalization: | | | |
| Normal Flow of Events:   1. The employee logs into the IMS system. 2. The employee selects the tools to be checked in. 3. The IMS validates the returned tools against the employee’s account. 4. The system updates the inventory to reflect the returned tools. 5. The system generates a confirmation receipt for the employee. | | | |
| SubFlows:  S-1: Tools damaged   1. The system prompts the employee to verify the tools or contact a manager.   S-2: Tools do not match records   1. The system prompts the employee to verify the tools or contact support. | | | |
| Alternate/Exceptional Flows: If the employee returns tools without logging in, the system denies the check-in and prompts the employee to log in first. | | | |

### **5.2.5 Use Case #7 – Inventory Management System checks material availability at warehouses**

|  |  |  |  |
| --- | --- | --- | --- |
| Use Case Name: Inventory Management System checks material availability at warehouses | | ID: UC007 | Importance Level: High |
| Primary Actor: System | Use Case Type: Inventory | | |
| Stakeholders and Interests: General Employee, System, Management | | | |
| Brief Description: After the general employee enter a task, the work order has been assigned, and the tools are selected, the system will check to see if the material is available, at which warehouse, either generate an order ticket, create a delivery ticket, or say the materials are ready if they are in the correct warehouse. | | | |
| Trigger: The employee selects the “Add Material” or “Update Material” options  Type: Implementation | | | |
| Relationships:  Association: System  Include: Update Material Quantity, Update Warehouse  Extend: Generate Delivery Ticket, Generate Purchase Order  Generalization: | | | |
| Normal Flow of Events:   1. Employee selects the “Add Tool” option 2. The system then looks for the tools required by the employee 3. If the tools selected are available in the correct warehouse the system will say “Tools Available” 4. If the tools are in the wrong warehouse, then a delivery ticket is submitted so that the tools can be transferred from one warehouse to the other 5. If neither warehouse has the tools available, then an order ticket is submitted which will cause the system to order the tools automatically. 6. After the tools are selected and made available, the employee will click “Save” and the tools will be checked out of the system. | | | |
| SubFlows:  S-1: Inventory Update   1. After the employee click “’Save” and the tools are checked out of the system. The system will update both warehouses’ inventory with the new list of tools that are available at both locations.   S-2: Inventory Upkeep   1. Once both warehouses’ inventory is updated, the system will check to see which tools quantity is at 0. Then the system will proceed to create an order ticket for these tools which management will review and approve. | | | |
| Alternate/Exceptional Flows: | | | |