**CMIS-4900-400**

**Fall 2025**

**Team 2 Project Scope Definition**

**Problem Description:**

Production data is currently only tracked by three out of four departments at Kiczan Manufacturing. This data is tracked using a Microsoft Access database and Microsoft Excel workbook. For management at Kiczan Manufacturing to accurately track work orders through the fabrication process after a purchase order is received from a customer, the fourth department’s data must be included to guarantee accuracy across all data for the entire shop. To achieve this, an information system must be implemented and deployed to four user terminals, consisting of an intuitive and easy to navigate front end interface, a database to store and query production data, and a programmed back end to facilitate data exchange and manipulation.

**Anticipated Business Benefits:**

* Work order production data input by fabrication and machine shop department managers at their terminals.
* Accurate record storage with identifiable attributes.
* Record retrieval and sort mechanisms to present department managers with accurate production data.
* Query by specific date ranges, as well as part numbers, operators, and departments to observe volume.
* Retrieve data in the event of lost physical work order to prevent the occurrence of redundant production.
* Multiuser access will provide those with access the ability to find sought after information in a self-reliant manner.
* Business Outcomes- KPIs
  + Upon completion of the project, the department managers are expected to digitally track 100% of work orders within the new database with a 24-hour window of validation.
  + Work Orders being tracked after 90 days of going live should decrease the number of partial orders shipped by 5%.
  + Reduce the occurrence of work orders completed past their scheduled delivery date by 10% from going live after 90 days.
  + Reduce shrink in inventory by 5% after 6 months from live deploy by reducing redundant purchase orders on fabrication materials.

**System Capabilities:**

* Database table structure written in SQL and host on MySQL DBMS.
* SQL queries written as stored procedures that serve the needs of department managers.
* A simple and intuitive front end written in Windows Forms (.NET) that provides ease of use.
* A backend written in C# to facilitate the database connection, data transfer, and data manipulation.
* A backend written with modularity and customization, to allow for the possibility of additional functionality as needed in the future.
* Returned query results presented to the user in a row and column table structure.
* Input validation on all required fields for SELECT, INSERT, UPDATE, and DELETE queries.
* Inline alert messages that inform the user of the field whose input is incorrect, and what the proper format is to pass validation constraints.
* Queries will not execute until all required fields have passed validation conditional checks.

**Input Validation & Data Integrity:**

* Part Number: Must be alphanumeric + hyphen only.
* Quantity: Integer ≥ 1. Error if invalid.
* Dates: Must be entered in mm/dd/yyyy format.
  + Error if Due Date < Received Date.
* Purchase Order Number: Must be alphanumeric only (no special characters).
* Required Fields: PART\_NUMBER, DATE\_RECEIVED, DATE\_DUE, PURCHASE\_ORDER\_NUMBER, QTY.
* Controlled Picks: CUSTOMER\_ID and OPERATOR\_ID must be selected from drop-down lists populated from the CUSTOMERS and OPERATORS tables. OPERATIONS must be chosen from the hardcoded backend list.
* Soft Delete (TO\_DELETE flag): All records default to TO\_DELETE = FALSE. On delete action, TO\_DELETE is set to TRUE, and the record is hidden from future queries.
* Hard Delete: Reserved only for Database Administrator.

Role Permission Table (CRUD)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Department** | **Create** | **Read/Search** | **Update** | **Soft Delete** | **Hard Delete** |
| *Fabrication* | ✓ | ✓ | ✓ | ✓ | X |
| *Machining* | ✓ | ✓ | ✓ | ✓ | X |
| *Quality* | X | ✓ | X | X | X |
| *Shipping* | X | ✓ | X | X | X |
| *Database Admin* | ✓ | ✓ | ✓ | X | ✓ |

**Data Model:**

**Entity Relationship Diagram**

**A screenshot of a computer program

AI-generated content may be incorrect.**

**Data Migration:**

* All existing records on each of the four tables will be exported as .csv (comma separated values) from the Microsoft Excel Workbook that currently serves as a data entry method. There will be one .csv file per table containing the stored records on each table.
* MySQL import wizard will be utilized through the MySQL DBMS, importing each .csv file to its corresponding table to store the records in the new database.
* No attributes in records will contain null values.
* The bridging table PART\_HISTORY uses the primary key PART\_HISTORY\_ID, and two foreign keys, CUSTOMER\_ID, and OPERATOR\_ID, to uniquely identify a record on the table to prevent the occurrence of duplicate records.

**Field Mapping**

|  |  |
| --- | --- |
| **Source: CUSTOMERS Table** | **Target: CUSTOMERS Table** |
| **CUSTOMER\_ID (Integer)** | **CUSTOMER\_ID (Integer)** |
| **CUSTOMER\_NAME (Text)** | **CUSTOMER\_NAME (Text)** |

|  |  |
| --- | --- |
| **Source: OPERATORS Table** | **Target: OPERATORS Table** |
| **OPERATOR\_ID (Integer)** | **OPERATOR\_ID (Integer)** |
| **OPERATOR\_NAME (Text)** | **OPERATOR\_NAME (Text)** |
| **JOB\_ID (Integer)** | **JOB\_ID (Integer)** |

|  |  |
| --- | --- |
| **Source: JOBS Table** | **Target: JOBS Table** |
| **JOB\_ID (Integer)** | **JOB\_ID (Integer)** |
| **JOB\_DESC (Text)** | **JOB\_DESC (Text)** |

|  |  |
| --- | --- |
| **Source: PART\_HISTORY Table** | **Target: PART\_HISTORY Table** |
| **CUSTOMER\_ID (Integer)** | **CUSTOMER\_ID (Integer)** |
| **OPERATOR\_ID (Integer)** | **OPERATOR\_ID (Integer)** |
| **PART\_NUMBER (Text)** | **PART\_NUMBER (Text)** |
| **DATE\_DUE (Date)** | **DATE\_DUE (Date)** |
| **PURCHASE\_ORDER\_NUMBER (Text)** | **PURCHASE\_ORDER\_NUMBER (Text)** |
| **QTY (Integer)** | **QTY (Integer)** |
| **OPERATIONS (Text)** | **OPERATIONS (Text)** |
| **DATE\_RECEIVED (Date)** | **DATE\_RECEIVED (Date)** |

**Non-Functional Requirements:**

* **Performance:**
  + Queries that return records with search criteria such as date ranges, operators, department & part number will return results to the user in less than ten seconds if the returned data set is large (greater than 1000 records).
  + An average query time of less than five seconds for small to medium sized query results.
* **Availability:**
  + The system will be available to department managers during the operating hours of 7:00 AM to 3:30PM Monday through Friday.
  + The system will be available to department managers during the overtime operating hours 7:00 AM to 12:00 PM on Saturday.
* **Validation:**
  + Input validation will be implemented for required fields for SELECT, INSERT, UPDATE, and DELETE queries to enforce validation constraints on all user input to prevent the submission of bad data during use.
  + Alert messages will inform the user of the occurrence of a data entry that violates a validation constraint and present the user with the proper format.
  + Queries will not execute until the user input passes validation conditional checks for all required fields.

**System Backup and Restore:**

* The MySQL database will have a scheduled nightly backup procedure to reflect any changes made during the operating hours the precede the backup procedure. This backup file will be stored on the server hosting the database.
* On the last Friday of every month, a copy of the most recent backup file will be saved on a USB flash drive and stored in the Fabrication Managers office, inside of a locked filing cabinet.

**Security:**

* Department managers each have login credentials for their respective work terminals where the application will be installed.
* Security policies are assigned and enforced with Microsoft Active Directory for all terminals on the Kiczan Windows domain network.

**Transaction Audit:**

* The audit function will be enabled on the MySQL database using the general log to track events and transactions that take place.
* If the general log does not provide sufficient information, the MariaDB Audit Plugin will be installed and configured on the database to meet information requirements.

**Risk Analysis:**

* **Feasibility Evaluation:**
  + **Organizational/Culture:** Kiczan Manufacturing follows a horizontal organization structure comprised of four departments, shipping, quality, machining, and fabrication. Each department manager has expressed an interest in the need for a centralized information source to ensure that the jobs received have been entered into the business’ production process.
  + **Technological:** C#, MySQL, and Windows Forms (.NET) will be the technology stack utilized during the implementation of the information system. Hardware necessities will be fulfilled by existing onsite hardware which consists of preexisting work terminals for the application to be installed on, and an onsite Windows OS server to host the database itself through MySQL DBMS.
  + **Schedule:** The currently anticipated completion date of a fully planned, implemented, and deployed information system solution is early May of 2026. To maintain schedule feasibility, the team will meet weekly and use the following RACI matrix to assign tasks, ensuring all deliverables are obtained within the given timeframe and adhering to the 4 milestones listed ahead.
    - **Milestone 1 Dec 2025:** fully designed and documented within the scope of the project.
    - **Milestone 2 Mar 2026:** complete initial build to deploy on local servers for testing.
    - **Milestone 3 Apr 2026:** Complete testing of the final build and deploy on target terminals and servers.
    - **Milestone 4 May 2026:** Work through any deployment issues on deployed terminals and servers and hand off to stakeholders for final use.
  + **Resources:** *Human Resources*: The required personnel are already available within Kiczan Manufacturing. Department managers and staff will operate and maintain the system, while management can participate in system testing and implementation. No additional hiring is necessary.

*Technological Resources*: The technological requirements are feasible with existing infrastructure. Kiczan Manufacturing already owns the necessary Windows computers and a Windows Server. Community editions of MySQL, Visual Studio, and Windows Forms (.NET) will be used to prevent additional licensing costs.

*Financial Resources*: The project is financially feasible despite having no dedicated budget. By relying on community software versions and existing onsite hardware, direct costs are eliminated. Potential indirect costs include staff time for implementation and testing, along with minimal expenses for backup storage devices.

* **Constraints and Limitations:**
  + **Budgetary:** No funds are allocated for purchasing software licenses or new hardware. All needs will be met through free community editions and existing onsite equipment, including the Windows Server and four departmental terminals.
  + **Hardware/Environment:** All onsite hardware operates on Windows OS. The application must run on the four existing terminals and the onsite Windows Server hosting MySQL, with no cloud or external hosting options.
  + **Network Dependence:** If the WAN connection is lost, terminals and the server will maintain local connectivity. However, if an intermediary network device fails, any terminals downstream from it will lose access to the database until restored.
  + **Technology:** The system is restricted to a MySQL database, a C# backend, and a Windows Forms (.NET) front end.
  + **Schedule:** The project must be fully completed and deployed by May 2026, with an internal target of mid-April 2026. Expansion of scope beyond the defined features (CRUD, queries, reporting, backups) risks delay.
  + **Organizational:** Department managers and operators must transition from Excel/Access into the new system. Because training resources are limited, the user interface must remain simple and intuitive.
  + **System Limitations:**
    - Access is restricted to onsite shop-floor terminals; no mobile or remote use.
    - Reporting is limited to basic tabular and filtered outputs, not advanced dashboards or analytics.
    - Data entry remains manual by managers; no automated imports or IoT integration with shop machines.
    - Security is limited to Windows login credentials and Active Directory policies, with basic database logging and auditing.
* **Onboarding Procedures and Guidelines:**

This document outlines the onboarding process for users of the new Kiczan Manufacturing Production Tracking System. The goal is to ensure that all department managers and system administrators can successfully log in, enter, retrieve, and manage work order data with confidence and accuracy.

**Step 1 – Account Setup**

* The IT administrator creates Windows user accounts for each department manager.
* User roles and permissions are assigned in both Active Directory and the MySQL system.
* Each manager confirms their login credentials before training.

**Step 2 – System Access**

* The Production Tracking Application is installed on all four department terminals.
* Each user logs into their respective terminal using their assigned credentials.
* The IT administrator verifies that all connections to the MySQL database are functioning properly.

**Step 3 – User Orientation**

* Each manager receives a short walkthrough of the system interface:
  + **Navigation** (menu, search bar, input form)
  + **Data Entry** (creating and updating records)
  + **Query/Search Functions** (by part number, date, operator, etc.)
  + **Soft Delete Process** (marking records for removal)

**Step 4 – Practice Session**

* Managers complete a mock data entry exercise:
  + Entering a sample work order with required fields
  + Searching for the entered order
  + Updating a record
  + Performing a soft delete
* The admin verifies data accuracy and system response times.

**Step 5 – Validation and Go-Live**

* Once each department manager demonstrates proper use of their functions, they are cleared for production use.
* All departments go live simultaneously to ensure full data synchronization.
* Any errors or user issues are reported directly to the project team for review and resolution.
* **Training and Support**
* **Initial Training:** Conducted by project team members during installation week (approx. 1 hour per manager).
* **Reference Guide:** A printed quick-start guide with screenshots and field descriptions will be provided.
* **Ongoing Support:** The IT admin will handle login issues, while the Database Admin will maintain data integrity and backups.
* **Feedback:** Users will be encouraged to report interface or functionality issues during the first 30 days post-launch.
* **Post-Onboarding Review**

After two weeks of active use, the project team will:

* Collect feedback from all department managers.
* Review common errors or bottlenecks.
* Apply any necessary minor updates or documentation adjustments.
* **Success Indicators**
* All department managers successfully log in and record data within 24 hours of go-live.
* 100% of work orders entered within one business day of receipt.
* No data entry or permission errors reported after the first week of operation.