Task:

You are working for a small manufacturing organization that has outgrown its current inventory system. They have been using a spreadsheet program to manually enter inventory additions, deletions, and other data from a paper-based system but would now like you to develop a more sophisticated inventory program.

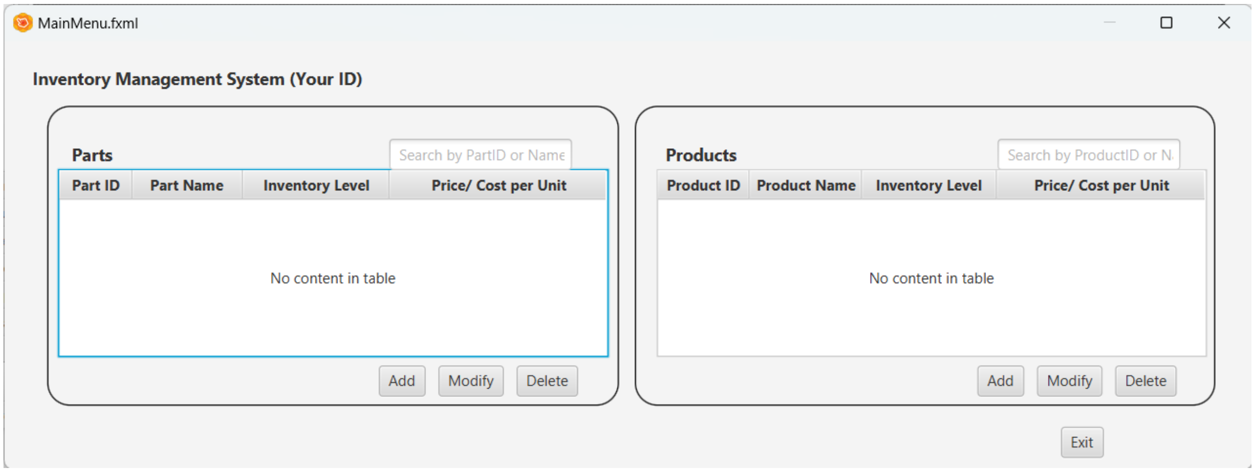
The organization also has specific business requirements that must be included as part of the application. A system analyst from your company created the solution statements outlined in the requirements section based on the manufacturing organization's business requirements. You will use these solution statements to develop your application.

Create a JavaFX application with a graphical user interface (GUI). Write code to display each of the following screens in the GUI:

Front-End

Main Screen

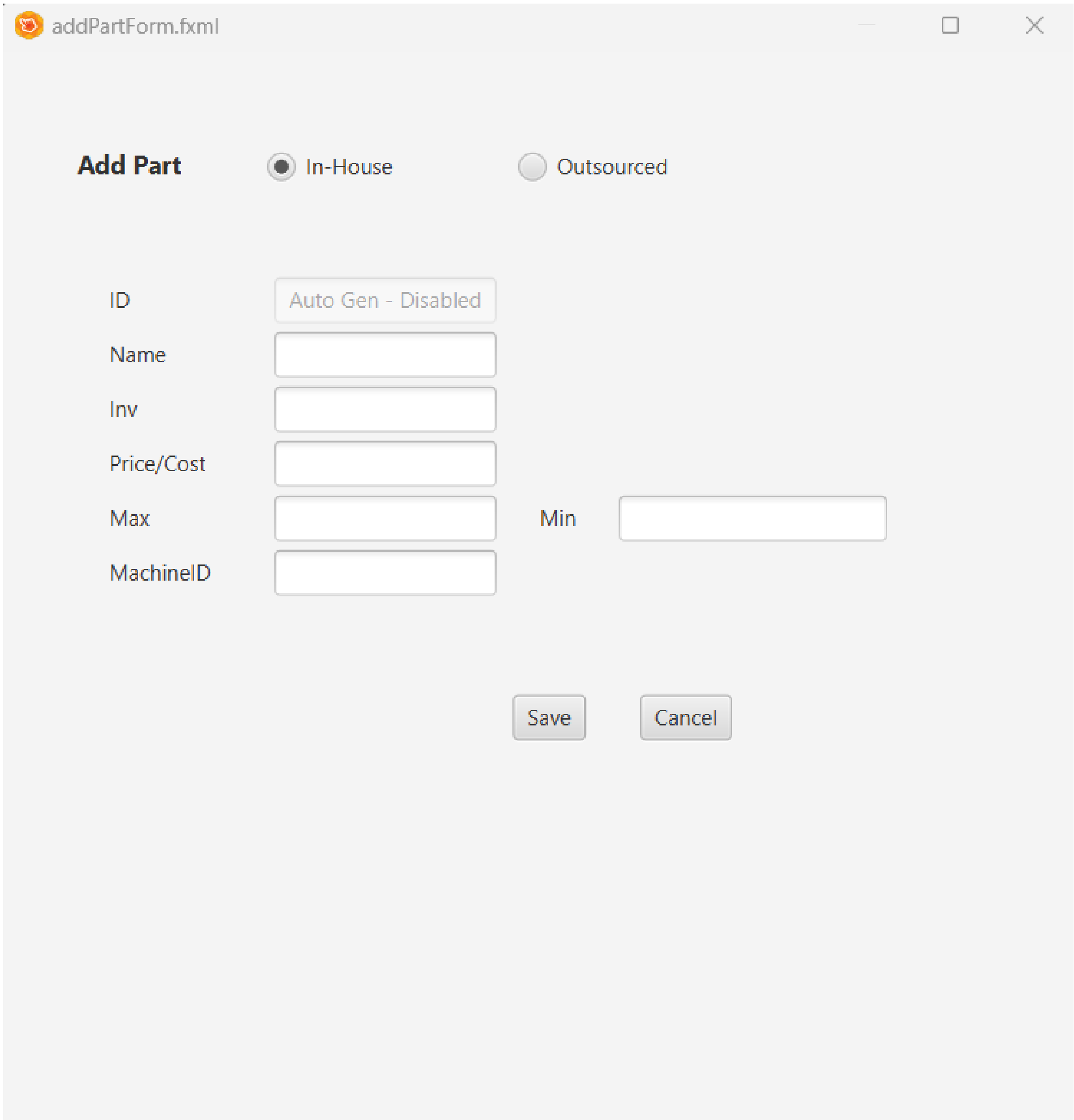
A. A main screen, showing the following controls:
   i. Buttons for "Add", "Modify", "Delete", "Search" for parts and products, and "Exit"
   ii. Lists for parts and products
   iii. Text boxes for searching for parts and products
   iv. Title labels for parts, products, and the application title



Parts Screen

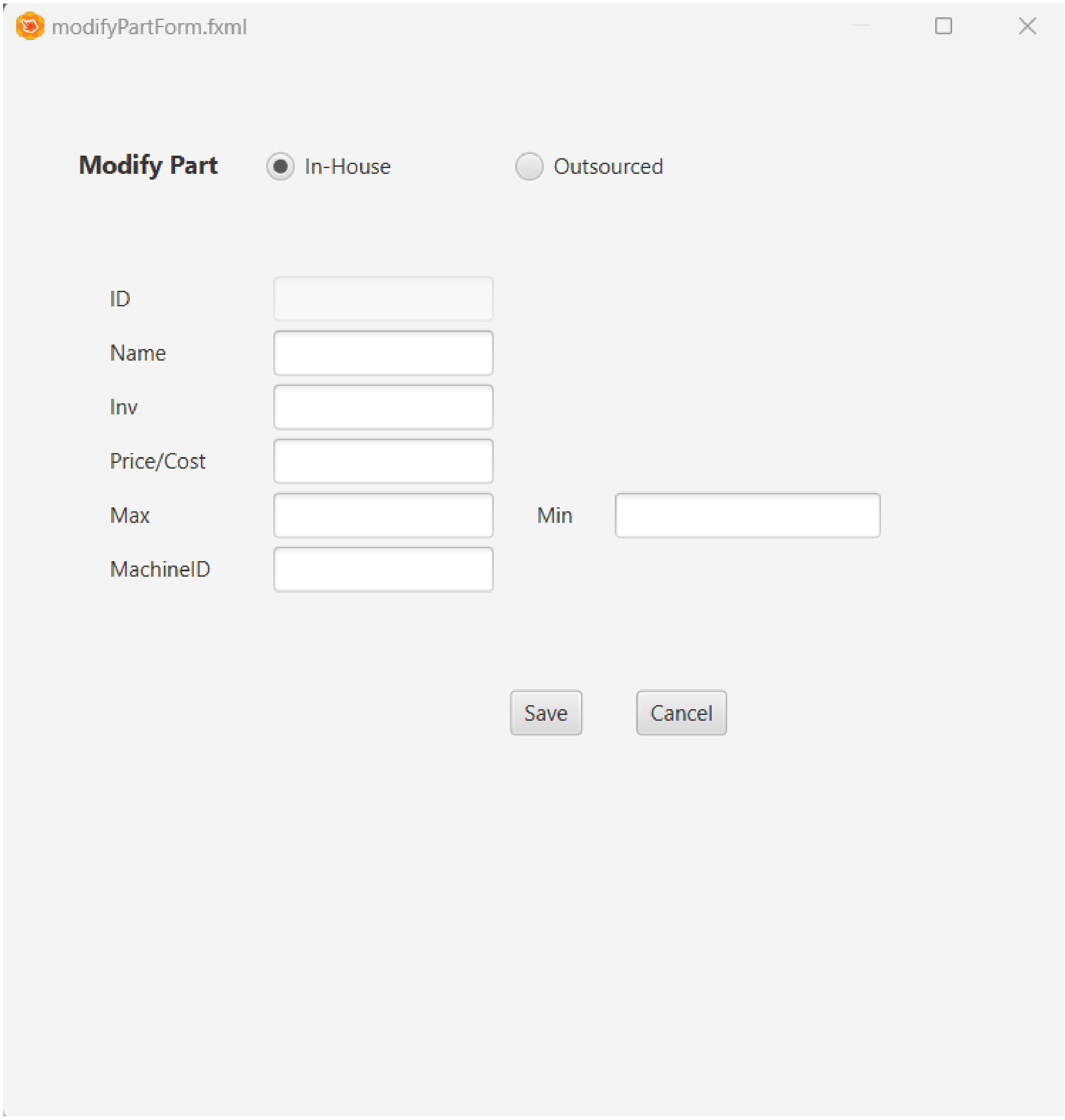
B. An add part screen, showing the following controls:
   i. Radio buttons for "In-House" and "Outsourced" parts
   ii. Buttons for "Save" and "Cancel"

    iii. Text fields for ID, name, inventory level, price, max and min values, and company name or machine ID
    iv. Labels for ID, name, inventory level, price/cost, max and min values, the application title, and company name or machine ID



C. A modify part screen, with fields that populate with pre-saved data, showing the following controls:
    i. Radio buttons for “In-House” and “Outsourced” parts
    ii. Buttons for “Save” and “Cancel”
    iii. Text fields for ID, name, inventory level, price, max and min values, and company name or machine ID

    iv. Labels for ID, name, inventory level, price, max and min values, the application title, and company name or machine ID

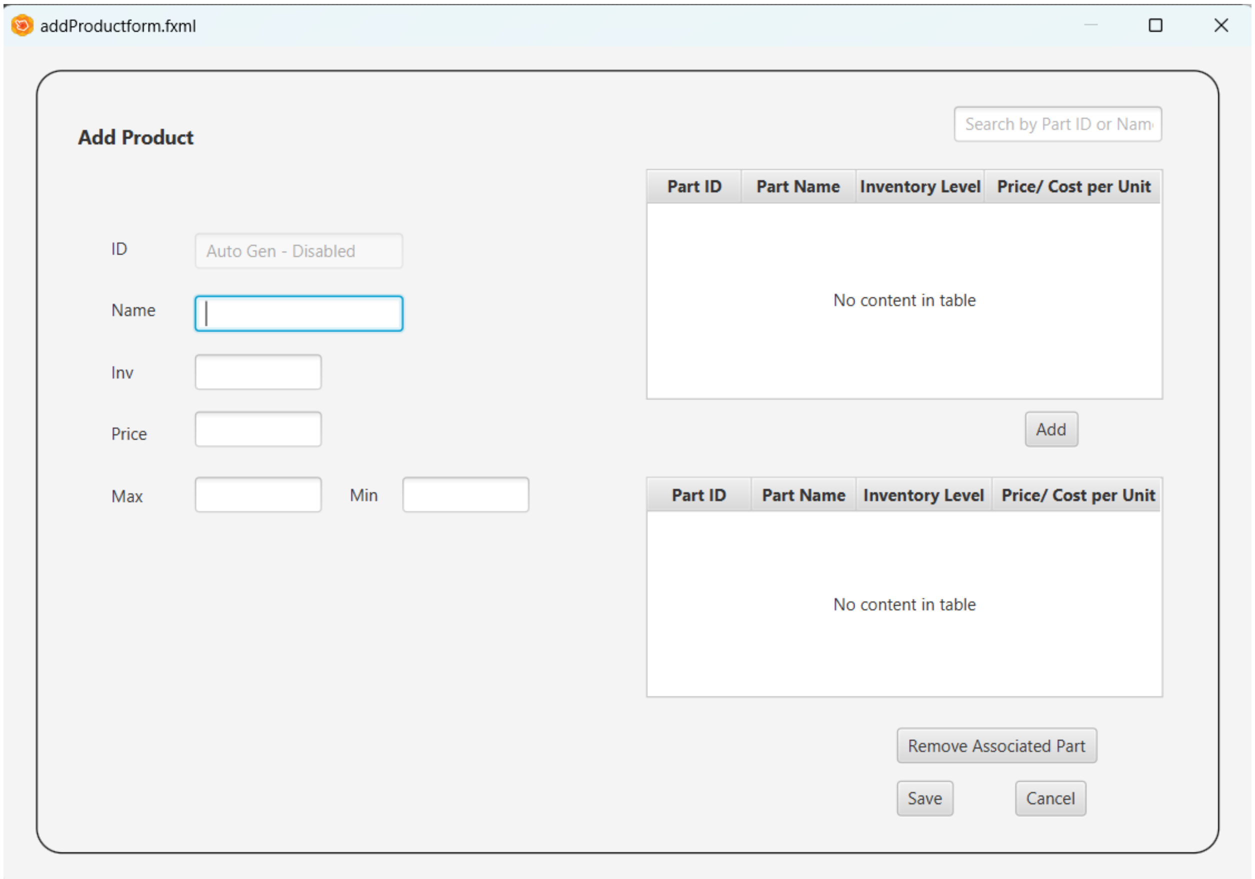


● In-House ○ Outsourced

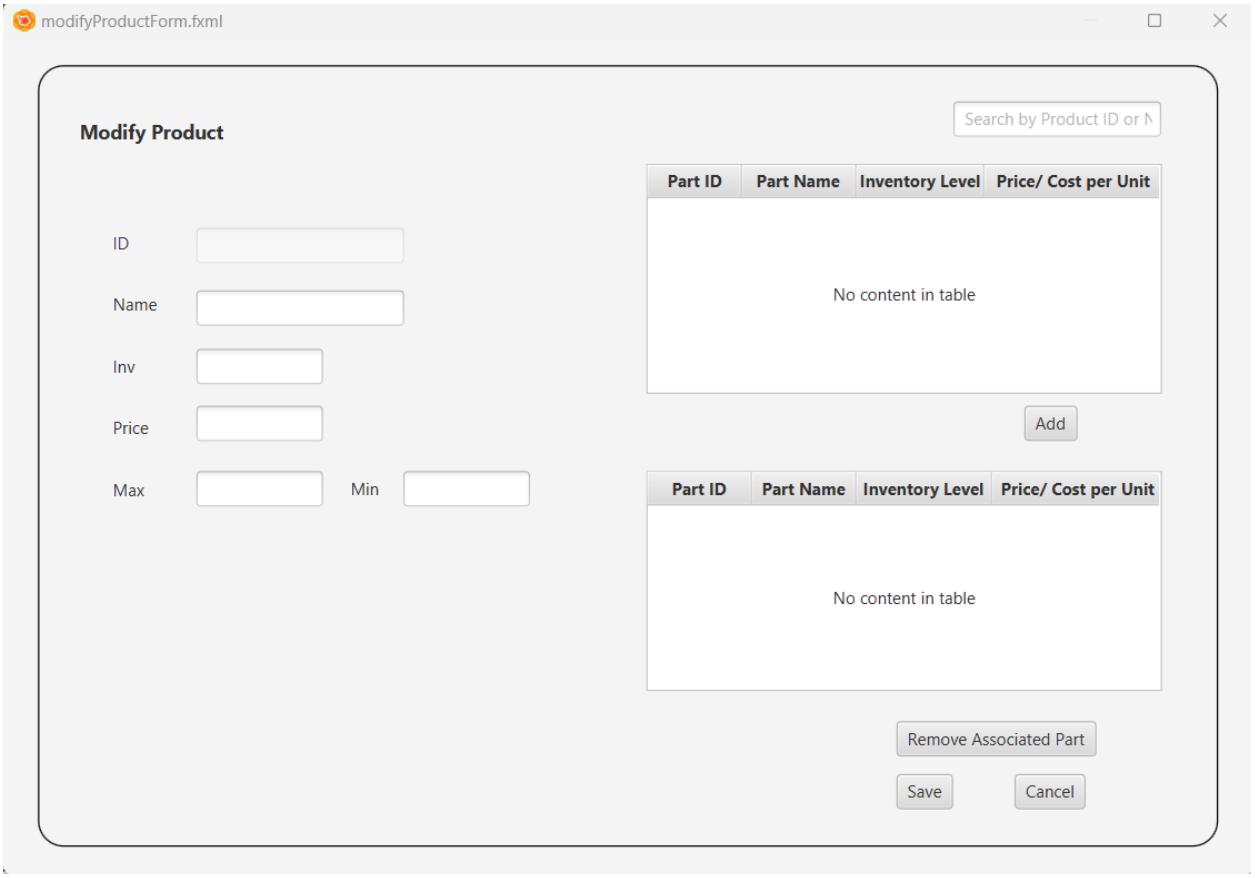
Product Screen

D. An add product screen, showing the following controls:
    i. Buttons for “Save”, “Cancel”, “Add” part, and “Delete” part
    ii. Text fields for ID, name, inventory level, price, and max and min values

    iii. Labels for ID, name, inventory level, price, max and min values, and the application
    iv. A list for associated parts and their products
    v. A “Search” button and a text field with an associated list for displaying the results of the search



E. A modify product screen, with fields that populate with pre-saved data, showing the following controls:
    i. Buttons for “Save”, “Cancel”, “Add” part, and “Delete” part
    ii. Text fields for ID, name, inventory level, price, and max and min values
    iii. Labels for ID, name, inventory level, price, max and min values, and the application
    iv. A list for associated parts and their products
    v. A “Search” button and a text field with associated list for displaying the results of the search



Backend

Now that you've created the GUI, write code to create the class structure provided in the attached "UML Class Diagram". Enable each of the following capabilities in the application:

F. Using the attached "UML Class Diagram", create appropriate classes and instance variables with the following criteria:

- Five classes with the associated instance variables.
- Variables are only accessible through getter methods.
- Variables are only modifiable through setter methods.

Note: The UML Class Diagram may be altered so long as the aspects of the current UML diagram are intact and the changes applied do not provide a work around for key aspects, such as

- ➢ Inheritance.
- ➢ Abstraction.
- ➢ Encapsulation of the data.

G. Add the following functionalities to the main screen, using the methods provided in the attached “UML Class Diagram”:
    i. Redirect the user to the “Add Part”, “Modify Part”, “Add Product”, or “Modify Product” screens
    ii. Delete a selected part or product from the list
    iii. Search for a part or product and display matching results
    iv. Exit the main screen

H. Add the following functionalities to the part screens, using the methods provided in the attached “UML Class Diagram”:

1. “Add Part” screen
    a. Select “In-House” or “Outsourced”
    b. Enter name, inventory level, price, max and min values, and company name or machine ID
    c. Save the data and then redirect to the main screen
    d. Cancel or exit out of this screen and go back to the main screen
2. “Modify Part” screen
    a. Select “In-House” or “Outsourced”
    b. Modify or change data values
    c. Save modifications to the data and then redirect to the main screen
    d. Cancel or exit out of this screen and go back to the main screen

I. Add the following functionalities to the product screens, using the methods provided in the attached “UML Class Diagram”:

1. “Add Product” screen
    a. Enter name, inventory level, price, max and min values, and company name or machine ID
    b. Save the data and then redirect to the main screen
    c. Associate one or more parts with a product
    d. Remove or disassociate a part from a product
    e. Cancel or exit out of this screen and go back to the main screen
2. “Modify Product” screen
    a. Modify or change data values
    b. Save modifications to the data and then redirect to the main screen
    c. Associate one or more parts with a product
    d. Remove or disassociate a part from a product
    e. Cancel or exit out of this screen and go back to the main screen

J. Write code to implement exception controls with custom error messages for each of the following sets:

Set 1

- Entering an inventory value greater than the maximum value for a part or product, or lower than the minimum value for a part or product
- Preventing the minimum field from having a value above the maximum field
- Preventing the maximum field from having a value below the minimum field
- Ensuring that a product must always have at least one part

Set 2

- Preventing the user from deleting a product that has a part assigned to it
- Including a confirm dialogue for all “Delete” and “Cancel” buttons
- Ensuring that the price of a product cannot be less than the cost of the parts
- Ensuring that a product must have a name, price, and inventory level (default 0)

Note: UML diagram is attached as a PDF.