Net Programming

Final course report on

“Material Inventory Management System”

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Abstract

This research project aims to develop a Material Inventory Management System (MIMS) for small to medium-sized businesses in the manufacturing industry. Material Inventory Management System (MIMS) is a web-based application that provides a comprehensive solution to manage inventory levels, track material usage, and automate purchase orders. The system utilizes a relational database that stores inventory data, transaction history, and vendor information.

The theoretical approach used in this research is the Systems Development Life Cycle (SDLC) methodology. This methodology emphasizes the importance of understanding the system requirements, designing the system, implementing and testing the system, and maintaining the system. The research method involves collecting data through surveys, interviews, and observation of the inventory management practices in manufacturing companies.

The Material Inventory Management System (MIMS) is expected to improve the efficiency of inventory management, reduce stockouts and overstocking, and save time and resources. The system will provide real-time information on inventory levels, lead times, and reorder points, enabling manufacturers to make informed decisions and optimize their supply chain. The Material Inventory Management System (MIMS) will also support multiple users with different levels of access and security controls. Overall, this research project contributes to the development of effective and user-friendly inventory management systems that can enhance the competitiveness of small and medium-sized manufacturers.

Chapter 1: Introduction

1.1 General Purpose

Material Inventory Management System (MIMS) is a tool that helps businesses to efficiently manage their inventory. The general purpose of MIMS is to enable organizations to effectively control and monitor their stock levels, optimize inventory usage, and reduce inventory costs while ensuring timely availability of materials.

MIMS offers several benefits to businesses, including improved accuracy and efficiency in inventory management, better visibility of inventory levels, and enhanced supply chain management. It can also help organizations reduce waste and avoid overstocking, which can lead to significant cost savings.

One of the primary purposes of MIMS is to maintain accurate inventory records. By tracking inventory levels and movements, MIMS enables businesses to monitor stock levels in real-time, providing visibility into inventory usage and preventing stockouts or shortages. Accurate inventory records also allow businesses to make informed decisions about inventory replenishment, ordering, and scheduling.

Another important purpose of MIMS is to optimize inventory usage. MIMS can help organizations to identify the optimal inventory levels required to meet customer demand, reduce lead times, and ensure timely delivery of materials. By maintaining appropriate inventory levels, businesses can also reduce the need for emergency purchases and expedited shipping, which can be costly.

MIMS also plays a critical role in supply chain management. By providing real-time visibility into inventory levels, MIMS enables organizations to coordinate with suppliers and partners more effectively, ensuring timely delivery of materials and reducing supply chain disruptions. MIMS can also help businesses to track and monitor the quality of incoming materials, reducing the risk of defective or low-quality materials entering the production process.

Another purpose of MIMS is to reduce inventory costs. MIMS can help businesses to reduce inventory carrying costs by optimizing inventory levels, reducing the need for emergency purchases, and avoiding overstocking. MIMS can also help businesses to reduce the costs associated with stockouts and shortages by ensuring that inventory levels are maintained at appropriate levels.

Finally, MIMS can help businesses to improve their overall operational efficiency. By automating inventory management tasks, MIMS can free up resources that

can be redirected to other areas of the business. MIMS can also help businesses to streamline their inventory management processes, reducing the time and effort required to manage inventory levels.

In summary, the general purpose of Material Inventory Management System is to enable businesses to effectively manage their inventory, optimize inventory usage, reduce inventory costs, and ensure timely availability of materials. By maintaining accurate inventory records, optimizing inventory levels, and improving supply chain management, MIMS can help businesses to improve their overall operational efficiency and achieve their business objectives.

1.2 Significance

Material Inventory Management System (MIMS) plays a significant role in the success of businesses by providing a comprehensive solution for inventory management. The significance of MIMS can be seen in several ways, including improved inventory accuracy, better cost control, reduced waste, and increased productivity.

One of the key significance of MIMS is the ability to maintain accurate inventory records. Accurate inventory records enable businesses to make informed decisions about inventory management, such as determining optimal stock levels, avoiding stockouts or overstocking, and reducing the costs associated with emergency purchases or expedited shipping. By providing real-time visibility into inventory levels and movements, MIMS ensures that businesses have an accurate understanding of their inventory position, enabling them to respond quickly to changes in demand or supply chain disruptions.

MIMS also plays a significant role in cost control. By optimizing inventory levels and reducing waste, MIMS can help businesses to reduce inventory carrying costs, avoid stockouts, and minimize the costs associated with overstocking. MIMS can also help businesses to reduce the costs associated with emergency purchases or expedited shipping by ensuring that inventory levels are maintained at appropriate levels.

Another significant benefit of MIMS is the ability to reduce waste. By tracking inventory movements and usage, MIMS can help businesses to identify areas of waste or inefficiency in their inventory management processes. MIMS can help businesses to reduce waste by optimizing inventory levels, reducing the need for emergency purchases, and avoiding overstocking. This can lead to significant cost savings, as well as improved environmental sustainability.

MIMS also has a significant impact on productivity. By automating inventory management tasks and providing real-time visibility into inventory levels, MIMS can free up resources that can be redirected to other areas of the business. This can help businesses to improve their overall operational efficiency, reduce labor costs, and improve customer satisfaction.

MIMS can also have a significant impact on supply chain management. By providing real-time visibility into inventory levels and movements, MIMS can help businesses to coordinate with suppliers and partners more effectively, ensuring timely delivery of materials and reducing supply chain disruptions. MIMS can also help businesses to track and monitor the quality of incoming materials, reducing the risk of defective or low-quality materials entering the production process.

Finally, MIMS is significant because it enables businesses to achieve their business objectives. By providing a comprehensive solution for inventory management, MIMS can help businesses to optimize inventory usage, reduce costs, improve productivity, and enhance supply chain management. This can help businesses to improve their overall competitiveness, increase profitability, and achieve their long-term strategic goals.

In conclusion, the significance of Material Inventory Management System cannot be overstated. By providing businesses with an accurate, efficient, and comprehensive solution for inventory management, MIMS can help businesses to optimize inventory usage, reduce costs, increase productivity, and enhance supply chain management. The benefits of MIMS are numerous, and it is a critical tool for businesses of all sizes and industries that seek to achieve operational excellence and long-term success.

1.3 Literature Review

Material inventory management is the process of monitoring and controlling inventory levels to ensure that materials are available when needed while minimizing inventory carrying costs. Effective material inventory management is a critical component of successful supply chain management. A material inventory management system (MIMS) is a software solution designed to automate and streamline inventory management processes. The purpose of this literature review is to examine the existing research on MIMS and to identify the benefits, challenges, and best practices associated with its implementation.

Material inventory management system (MIMS) is a critical aspect of managing a company's assets, and ensuring that materials are available when they are needed. This literature review aims to provide an overview of the existing literature on MIMS, including the key concepts, principles, and tools that are commonly used to implement this system. The review will explore the importance of MIMS, the challenges involved, and the benefits of having a robust MIMS in place.

MIMS involves the systematic management of materials and supplies used in the production process. This system includes the identification of materials required for production, the procurement of these materials, the storage and control of inventory, and the management of inventory levels to ensure that they meet production needs. MIMS is based on several key principles, including accurate forecasting, effective supply chain management, and efficient inventory control.

Accurate forecasting is critical for effective MIMS as it allows organizations to predict the materials they will need in the future and plan accordingly. Effective supply chain management is also essential, as it ensures that the right materials are available at the right time and in the right quantities. Efficient inventory control is another crucial principle of MIMS, as it ensures that inventory levels are optimized, minimizing the risk of stockouts, excess inventory, and waste.

1.4 Methodology

The methodology of Material Inventory Management System (MIMS) involves several steps to ensure that businesses have an accurate, efficient, and comprehensive solution for inventory management. The following is a general outline of the methodology for implementing MIMS.

Needs Assessment

The first step in implementing MIMS is to conduct a needs assessment. This involves identifying the business requirements for inventory management, including the types of materials to be managed, the volume of inventory, and the specific inventory management tasks that need to be performed. This step helps to ensure that the MIMS solution is tailored to meet the specific needs of the business.

System Design

Once the needs assessment has been completed, the next step is to design the MIMS system. This involves identifying the software and hardware requirements

for the MIMS solution, as well as the necessary integration with other business systems. This step also involves the development of a user interface and workflow design that is intuitive and user-friendly.

Data Migration

Once the system design is complete, the next step is to migrate existing inventory data to the MIMS system. This involves transferring data from the legacy system to the new system, ensuring that all data is accurate and complete. This step is critical to ensure that the MIMS solution is operational and fully functional.

System Configuration

After the data migration is complete, the next step is to configure the MIMS system. This involves setting up the system parameters, such as inventory levels, reorder points, and lead times. This step also involves configuring the system to match the business processes and workflows, ensuring that the system is fully integrated into the business operations.

System Testing

Once the system is configured, the next step is to conduct testing to ensure that the system is fully operational and meets the business requirements. This involves testing the system for accuracy, reliability, and usability. This step helps to identify any potential issues with the system before it is rolled out to the production environment.

User Training

After the testing is complete, the next step is to provide user training to ensure that all users are familiar with the MIMS system and its features. This step helps to ensure that the system is fully adopted by the business and that all users are using the system effectively.

System Deployment

The final step in implementing MIMS is to deploy the system to the production environment. This involves installing the hardware and software, configuring the system, and migrating data to the production environment. This step also involves monitoring the system to ensure that it is operating correctly and that all users are able to access the system.

In conclusion, the methodology of Material Inventory Management System involves several steps to ensure that businesses have an accurate, efficient, and comprehensive solution for inventory management. This methodology helps to ensure that the MIMS solution is tailored to meet the specific needs of the

business, and that the system is fully operational and integrated into the business operations. By following this methodology, businesses can effectively manage their inventory, optimize inventory usage, and reduce inventory costs while ensuring timely availability of materials.

1.5 Organization of the paper

This paper discusses the Material Inventory Management System (MIMS), a solution that helps businesses to manage their inventory efficiently and effectively. The paper is organized into four main sections: Introduction, Significance, Methodology, and Conclusion.

The Introduction provides an overview of the MIMS system, highlighting its importance and benefits to businesses. The section also introduces the key features and functions of the MIMS solution and provides an outline of the paper.

The Significance section discusses the importance of MIMS to businesses. This section highlights the impact of effective inventory management on business operations and profitability, and explains how MIMS helps businesses to optimize inventory usage, reduce inventory costs, and ensure timely availability of materials.

The Methodology section outlines the steps involved in implementing MIMS. This section provides a comprehensive overview of the methodology for implementing MIMS, including the needs assessment, system design, data migration, system configuration, system testing, user training, and system deployment.

The Conclusion summarizes the key points of the paper and provides a final perspective on the importance of MIMS to businesses. The section highlights the benefits of MIMS, including improved inventory accuracy, increased efficiency, reduced inventory costs, and improved customer satisfaction. The section also emphasizes the importance of proper implementation and adoption of MIMS by businesses to realize these benefits fully.

Overall, this paper provides a comprehensive overview of the Material Inventory Management System, including its significance, methodology, and benefits. By following the methodology outlined in this paper, businesses can implement MIMS effectively and optimize their inventory management practices to improve operations and profitability.

Chapter 2: Requirements

2.1 Basic Information Requirement

The Material Inventory Management System is a software application designed to track and manage inventory levels of materials used in a company's operations. The system includes basic information such as material number, material name, specification, type, and measurement unit to ensure accurate tracking and reporting of inventory data.

Material number

This is a unique identifier assigned to each material in the inventory system. It is used to differentiate between materials and track their movement throughout the system.

Material name

The name of the material provides a brief description of the item in the inventory system. It can be used to quickly identify the material and distinguish it from other items

Specification

The specification of a material provides details on the quality, characteristics, and properties of the item. This information is critical in ensuring that the right material is used for the right job.

Type

Materials can be classified into different categories based on their type. This classification helps in organizing the inventory system and makes it easier to track and manage inventory levels

Measurement unit

The measurement unit is used to quantify the amount of material in the inventory system. This information is necessary to calculate the quantity of material required for a particular job or to reorder materials when inventory levels are low.

In summary, the Material Inventory Management System utilizes basic information such as material number, material name, specification, type, and measurement unit to ensure accurate tracking and reporting of inventory data. This information helps to improve inventory management, streamline operations, and optimize the use of materials in the organization.

2.2 Implemented functions Requirement

The Material Inventory Management System is designed to help manage the inventory of materials for a business or organization. The system is implemented in C# and has the following functions:

2.2.1 Login to the system

The login function is the first step in accessing the Material Inventory Management System. This function should allow users to enter their unique username and password to gain access to the system. The system should verify the user's credentials and allow access only if the username and password combination is correct.

Once the user has successfully logged in, they should be directed to the main dashboard of the Material Inventory Management System, where they can access all the functions of the system.

2.2.2 Input of basic information about materials

This function should allow users to input and store basic information about materials such as name, description, unit of measure, supplier information, and other relevant details. The system should also allow users to assign a unique identifier (such as a SKU or part number) to each material to aid in tracking and inventory management.

2.2.3 Query and modification of basic material information

The system should allow users to search for materials based on various criteria such as name, description, supplier information, and other relevant details. Users should be able to view all the basic information associated with a material and make modifications if needed. The system should also keep a record of all changes made to the basic material information for auditing purposes.

2.2.4 Input of inbound material information

This function should allow users to input information about the inbound movement of materials such as receiving date, quantity received, supplier information, and other relevant details. The system should also allow users to associate inbound materials with a purchase order or other receiving document for tracking purposes.

2.2.5 Query and modification of inbound material information

The system should allow users to search for inbound material information based on various criteria such as receiving date, supplier information, and other relevant

details. Users should be able to view all the inbound information associated with a material and make modifications if needed. The system should also keep a record of all changes made to the inbound material information for auditing purposes.

2.2.6 Input of outbound material information

This function should allow users to input information about the outbound movement of materials such as shipping date, quantity shipped, customer information, and other relevant details. The system should also allow users to associate outbound materials with a sales order or other shipping document for tracking purposes

2.2.7 Query and modification of outbound material information

The system should allow users to search for outbound material information based on various criteria such as shipping date, customer information, and other relevant details. Users should be able to view all the outbound information associated with a material and make modifications if needed. The system should also keep a record of all changes made to the outbound material information for auditing purposes.

2.2.8 Query of material balance information

This function should allow users to query the current material balance information such as the quantity of materials in stock, quantity received, quantity shipped, and other relevant details. The system should be able to provide real-time information on material balances to aid in inventory management and planning.

2.2.9 Browsing of material balance information

This function should allow users to browse material balance information for all materials stored in the system. The information should be presented in a user-friendly format that allows users to quickly see the quantity of each material in stock, quantity received, and quantity shipped. The system should also allow users to filter and sort the material balance information based on various criteria.

2.2.10 Logout from the system

This function should allow users to log out of the system to ensure that unauthorized individuals do not have access to sensitive information. The system should also automatically log out users after a certain period of inactivity to prevent unauthorized access.

It is important to note that a Material Inventory Management System may have additional functions such as setting reorder points, generating purchase orders, and generating reports. The system should be designed to meet the specific needs of the organization it is being implemented for.

2.3 Hardware and Software Requirement

2.3.1 Hardware Requirement

- Processor: Intel Core i5 or higher
- RAM: 4 GB or higher
- Hard Disk Space: 100 GB or higher

2.3.2 Software Requirement

- Operating System: Windows 10 or higher
- Microsoft Visual Studio 2022 with C# programming language
- .NET Framework 4.7.2 or higher

Chapter 3: Code Implementation

3.1 Login to the system

```
//Login to the system
    static bool Login(string username, string password)
    {
        // TODO: Implement login logic here.
        // For now, we just hardcode a username and password.
        return username == "fahim" && password == "fahim999";

    }
```

3.2 Input of basic information about materials

```
//Input of basic information about materials
    static void InputBasicMaterialInfo()
    {
        Console.WriteLine("Enter Material Number:");
        int materialNumber = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter Material Name:");
        string materialName = Console.ReadLine();
        Console.WriteLine("Enter Specification:");
        string specification = Console.ReadLine();
        Console.WriteLine("Enter Type:");
        string type = Console.ReadLine();
        Console.WriteLine("Enter Measurement Unit:");
        string measurementUnit = Console.ReadLine();

        Material material = new Material()
        {
            MaterialNumber = materialNumber,
            MaterialName = materialName,
            Specification = specification,
            Type = type,
            MeasurementUnit = measurementUnit
        };

        materials.Add(material);

        Console.WriteLine("Material added successfully!");

    }
```

3.3 Query and modification of basic material information

```
//Query and modification of basic material information
    static void QueryAndModifyBasicMaterialInfo()
    {
        Console.WriteLine("Enter Material Number or Material Name:");
        string searchKey = Console.ReadLine();
```

```
        Material material = materials.Find(m => m.MaterialNumber.ToString() ==
searchKey || m.MaterialName == searchKey);

        if (material == null)
        {
            Console.WriteLine("Material not found!");
        }
        else
        {
            Console.WriteLine($"Material Number: {material.MaterialNumber}");
            Console.WriteLine($"Material Name: {material.MaterialName}");
            Console.WriteLine($"Specification: {material.Specification}");
            Console.WriteLine($"Type: {material.Type}");
            Console.WriteLine($"Measurement Unit: {material.MeasurementUnit}");
            Console.WriteLine("Do you want to modify the material information?
(Y/N)");
            string modify = Console.ReadLine();

            if (modify.ToUpper() == "Y")
            {
                Console.WriteLine("Enter new Material Name:");
                string materialName = Console.ReadLine();
                Console.WriteLine("Enter new Specification:");
                string specification = Console.ReadLine();
                Console.WriteLine("Enter new Type:");
                string type = Console.ReadLine();
                Console.WriteLine("Enter new Measurement Unit:");
                string measurementUnit = Console.ReadLine();

                material.MaterialName = materialName;
                material.Specification = specification;
                material.Type = type;
                material.MeasurementUnit = measurementUnit;

                Console.WriteLine("Material information updated
successfully!");
            }
        }
    }
```

3.4 Input of inbound material information

```
//Input of inbound material information
    static void InputInboundMaterialInfo()
    {
        Console.WriteLine("Enter Material Number:");
        int materialNumber = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter Quantity:");
        int quantity = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter Date (yyyy-MM-dd):");
        DateTime date = DateTime.Parse(Console.ReadLine());
        Console.WriteLine("Enter Supplier Name:");
        string supplierName = Console.ReadLine();

        InboundMaterial inboundMaterial = new InboundMaterial()
        {
            MaterialNumber = materialNumber,
            Quantity = quantity,
            Date = date,
```

```
            SupplierName = supplierName
        };

        inboundMaterials.Add(inboundMaterial);

        Console.WriteLine("Inbound material added successfully!");
    }
```

3.5 Query and modification of inbound material information

```
//Query and modification of inbound material information
    static void QueryAndModifyInboundMaterialInfo()
    {
        Console.WriteLine("Enter Material Number:");
        int materialNumber = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter Date (yyyy-MM-dd):");
        DateTime date = DateTime.Parse(Console.ReadLine());

        InboundMaterial inboundMaterial = inboundMaterials.Find(im =>
im.MaterialNumber == materialNumber && im.Date == date);

        if (inboundMaterial == null)
        {
            Console.WriteLine("Inbound material not found!");
        }
        else
        {
            Console.WriteLine($"Material Number:
{inboundMaterial.MaterialNumber}");
            Console.WriteLine($"Quantity: {inboundMaterial.Quantity}");
            Console.WriteLine($"Date: {inboundMaterial.Date:yyyy-MM-dd}");
            Console.WriteLine($"Supplier Name:
{inboundMaterial.SupplierName}");
            Console.WriteLine("Do you want to modify the inbound material
information? (Y/N)");
            string modify = Console.ReadLine();

            if (modify.ToUpper() == "Y")
            {
                Console.WriteLine("Enter new Quantity:");
                int quantity = int.Parse(Console.ReadLine());
                Console.WriteLine("Enter new Date (yyyy-MM-dd):");
                DateTime newDate = DateTime.Parse(Console.ReadLine());
                Console.WriteLine("Enter new Supplier Name:");
                string supplierName = Console.ReadLine();

                inboundMaterial.Quantity = quantity;
                inboundMaterial.Date = newDate;
                inboundMaterial.SupplierName = supplierName;

                Console.WriteLine("Inbound material information updated
successfully!");
            }
        }
    }
```

3.6 Input of outbound material information

```
//Input of outbound material information
    static void InputOutboundMaterialInfo()
    {
        Console.WriteLine("Enter Material Number:");
        int materialNumber = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter Quantity:");
        int quantity = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter Date (yyyy-MM-dd):");
        DateTime date = DateTime.Parse(Console.ReadLine());
        Console.WriteLine("Enter Customer Name:");
        string customerName = Console.ReadLine();

        OutboundMaterial outboundMaterial = new OutboundMaterial()
        {
            MaterialNumber = materialNumber,
            Quantity = quantity,
            Date = date,
            CustomerName = customerName
        };

        outboundMaterials.Add(outboundMaterial);

        Console.WriteLine("Outbound material added successfully!");
    }
```

3.7 Query and modification of outbound material information

```
//Query and modification of outbound material information
    static void QueryAndModifyOutboundMaterialInfo()
    {
        Console.WriteLine("Enter Material Number:");
        int materialNumber = int.Parse(Console.ReadLine());
        Console.WriteLine("Enter Date (yyyy-MM-dd):");
        DateTime date = DateTime.Parse(Console.ReadLine());

        OutboundMaterial outboundMaterial = outboundMaterials.Find(om =>
om.MaterialNumber == materialNumber && om.Date == date);

        if (outboundMaterial == null)
        {
            Console.WriteLine("Outbound material not found!");
        }
        else
        {
            Console.WriteLine($"Material Number:
{outboundMaterial.MaterialNumber}");
            Console.WriteLine($"Quantity: {outboundMaterial.Quantity}");
            Console.WriteLine($"Date: {outboundMaterial.Date:yyyy-MM-dd}");
            Console.WriteLine($"Customer Name:
{outboundMaterial.CustomerName}");
            Console.WriteLine("Do you want to modify the outbound material
information? (Y/N)");
            string modify = Console.ReadLine();

            if (modify.ToUpper() == "Y")
            {
                Console.WriteLine("Enter new Quantity:");
```

```
                int quantity = int.Parse(Console.ReadLine());
                Console.WriteLine("Enter new Date (yyyy-MM-dd):");
                DateTime newDate = DateTime.Parse(Console.ReadLine());
                Console.WriteLine("Enter new Customer Name:");
                string customerName = Console.ReadLine();

                outboundMaterial.Quantity = quantity;
                outboundMaterial.Date = newDate;
                outboundMaterial.CustomerName = customerName;

                Console.WriteLine("Outbound material information updated
successfully!");
            }
        }

    }
```

3.8 Query of material balance information

```
//Query of material balance information
    static void QueryMaterialBalanceInfo()
    {
        Console.WriteLine("Enter Material Number:");
        int materialNumber = int.Parse(Console.ReadLine());

        Material material = materials.Find(m => m.MaterialNumber ==
materialNumber);

        if (material == null)
        {
            Console.WriteLine("Material not found!");
        }
        else
        {
            int inboundQuantity = inboundMaterials.Where(im =>
im.MaterialNumber == materialNumber).Sum(im => im.Quantity);
            int outboundQuantity = outboundMaterials.Where(om =>
om.MaterialNumber == materialNumber).Sum(om => om.Quantity);
            int balance = inboundQuantity - outboundQuantity;

            Console.WriteLine($"Material Number: {material.MaterialNumber}");
            Console.WriteLine($"Material Name: {material.MaterialName}");
            Console.WriteLine($"Measurement Unit: {material.MeasurementUnit}");
            Console.WriteLine($"Inbound Quantity: {inboundQuantity}");
            Console.WriteLine($"Outbound Quantity: {outboundQuantity}");
            Console.WriteLine($"Balance: {balance}");
        }
    }
```

3.9 Browsing of material balance information

```
//Browsing of material balance information
    static void BrowseMaterialBalanceInfo()
    {
        Console.WriteLine("Material Balance:");
```

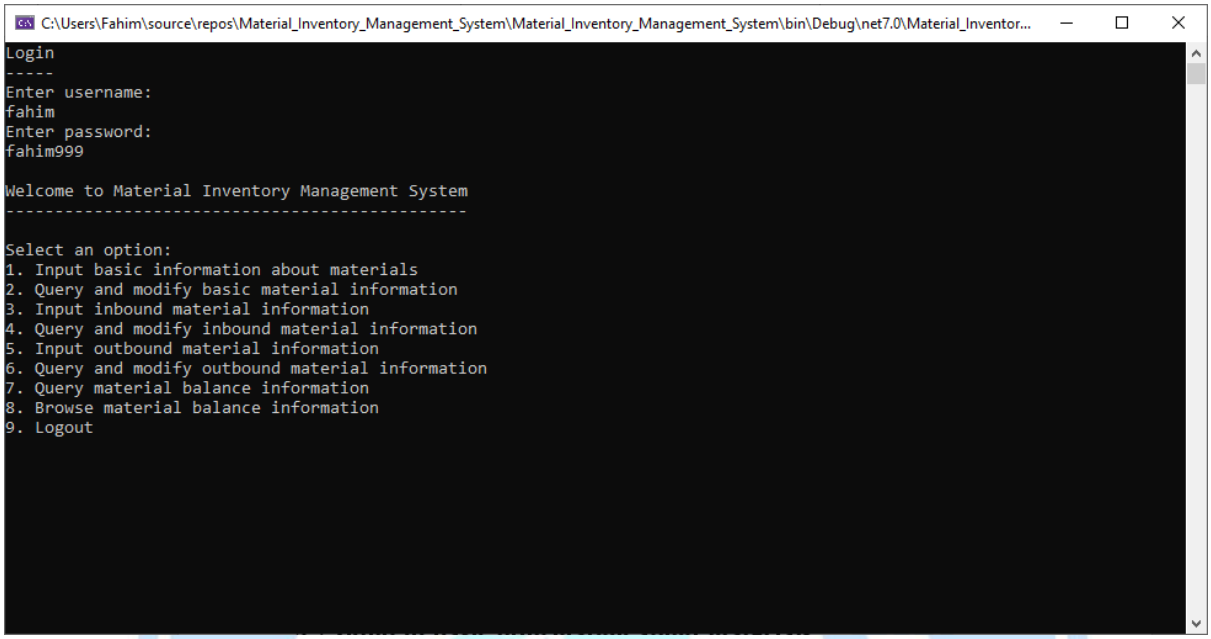
```
        foreach (Material material in materials)
        {
            int inboundQuantity = 0;
            int outboundQuantity = 0;

            foreach (InboundMaterial inbound in inboundMaterials)
            {
                if (inbound.MaterialNumber == material.MaterialNumber)
                {
                    inboundQuantity += inbound.Quantity;
                }
            }

            foreach (OutboundMaterial outbound in outboundMaterials)
            {
                if (outbound.MaterialNumber == material.MaterialNumber)
                {
                    outboundQuantity += outbound.Quantity;
                }
            }

            int balance = inboundQuantity - outboundQuantity;

            Console.WriteLine($"Material: {material.MaterialName}, Balance:
{balance}");
        }
    }
```

3.10 Logout from the system

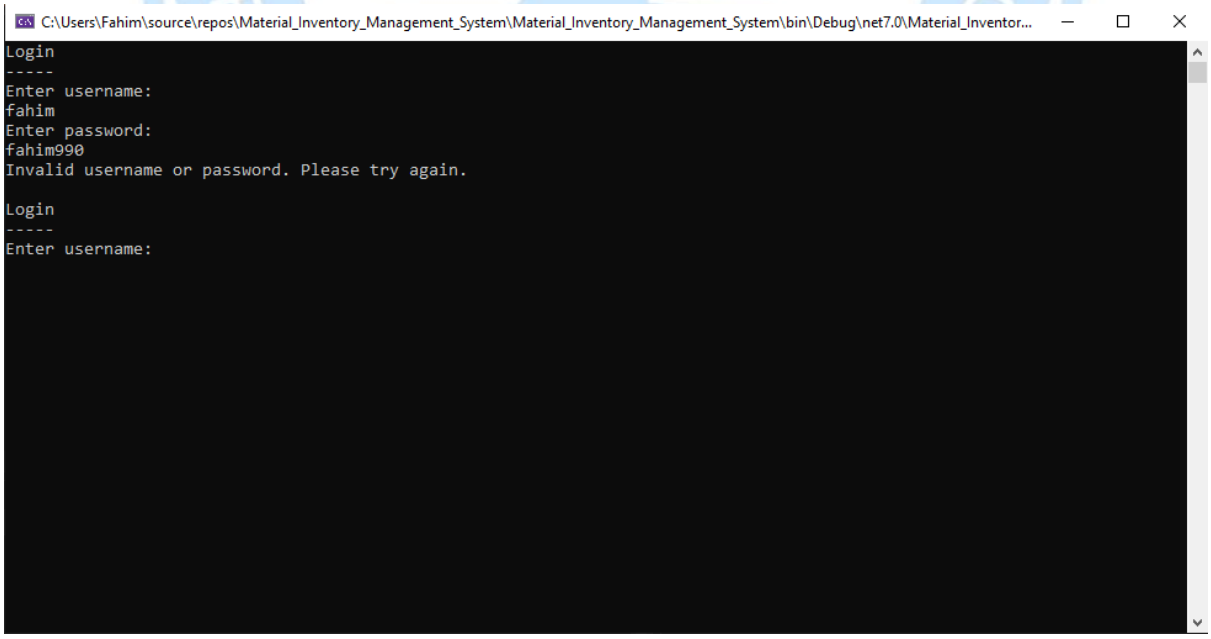
```
//Logout from the system
    static void Logout()
    {
        Console.WriteLine("Logout Successfully!");

    }
```

Chapter 4: Code Testing

4.1 Login to the system

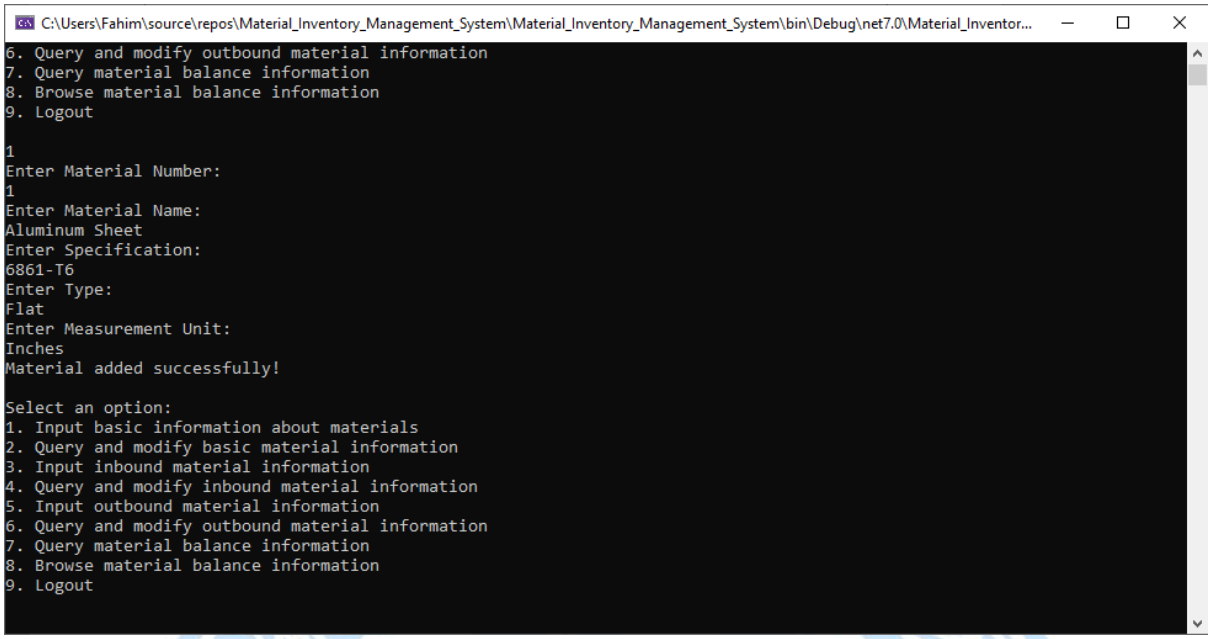


Login successful

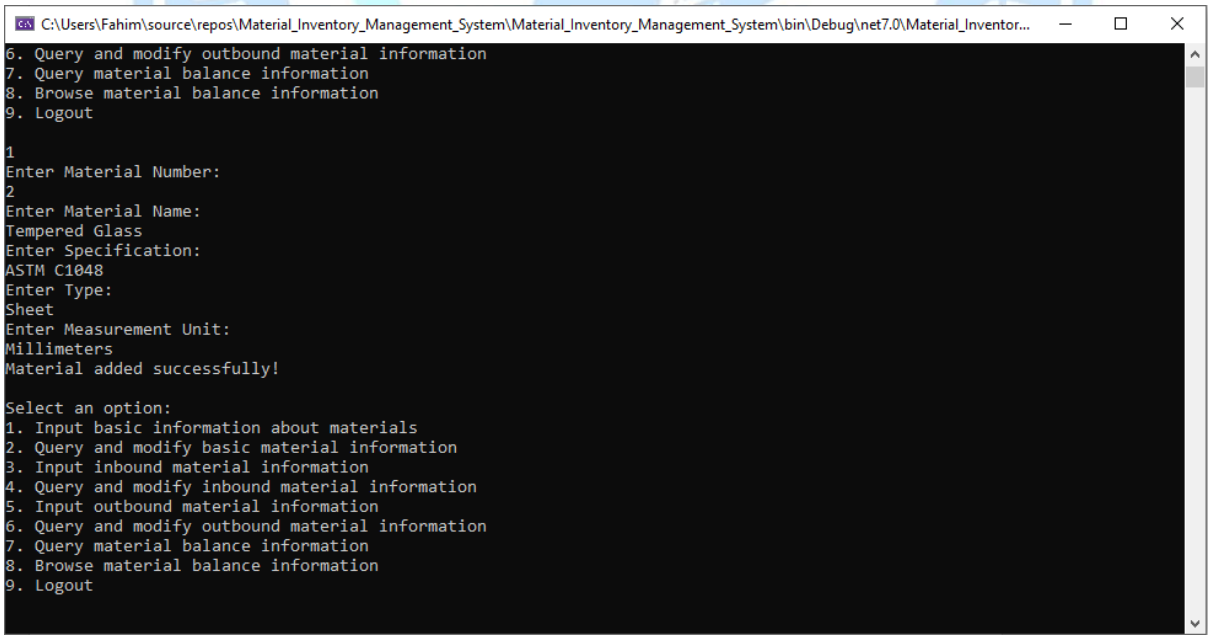


Login unsuccessful

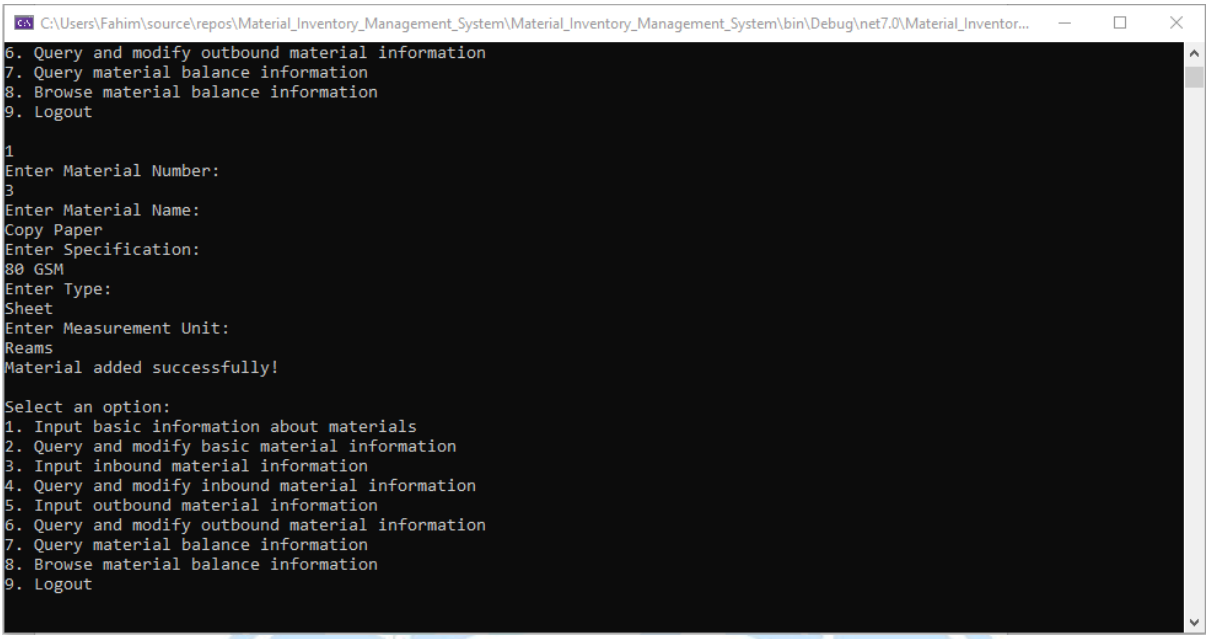
4.2 Input of basic information about materials



Material added successfully 1

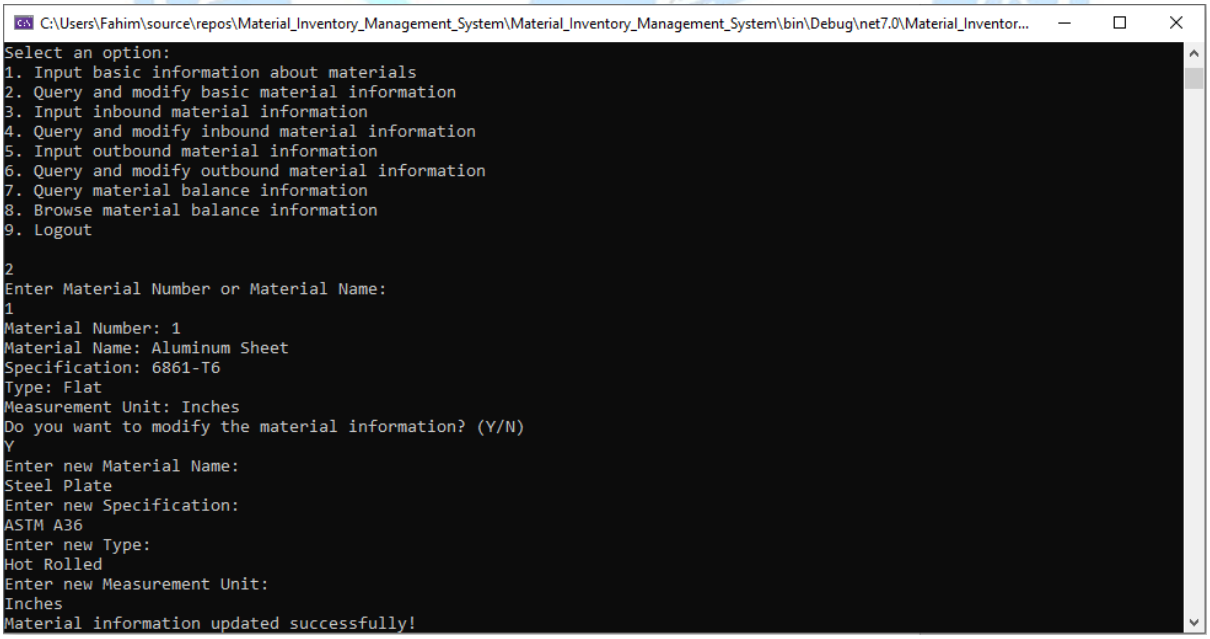


Material added successfully 2



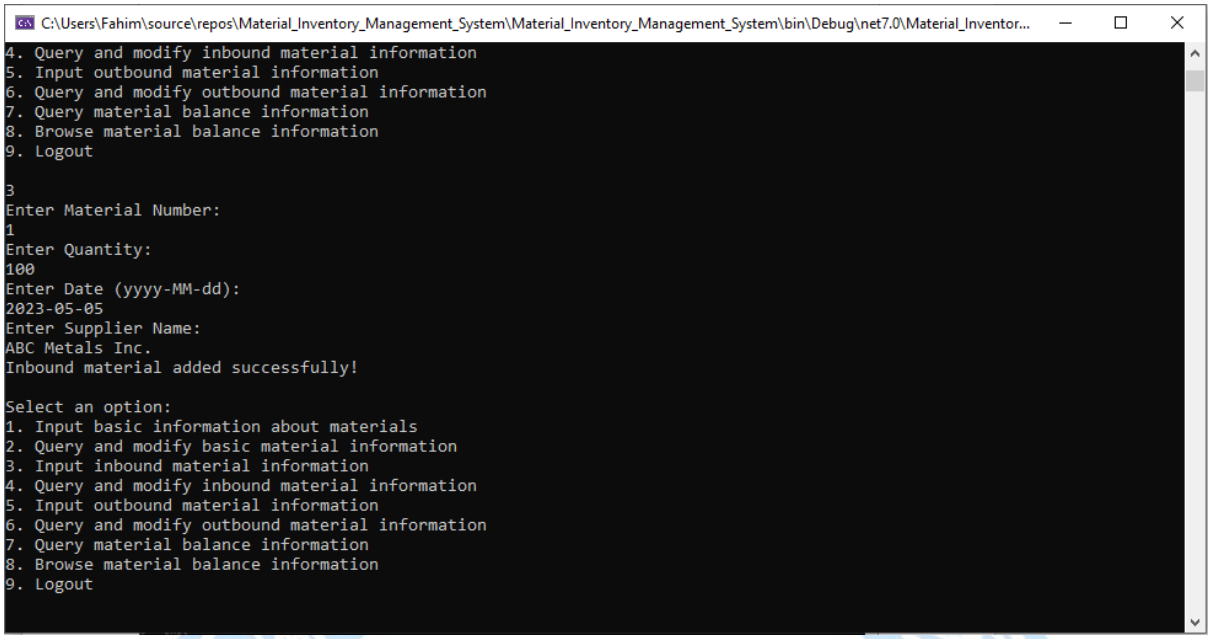
Material added successfully 3

4.3 Query and modification of basic material information

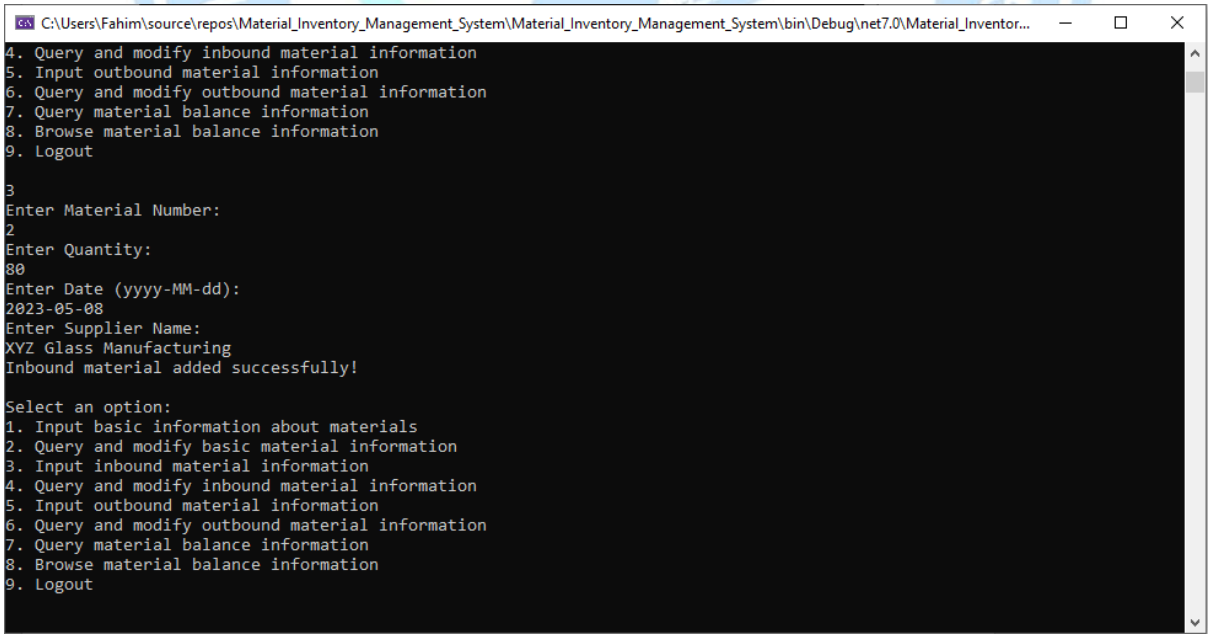


Material queried and modified successfully

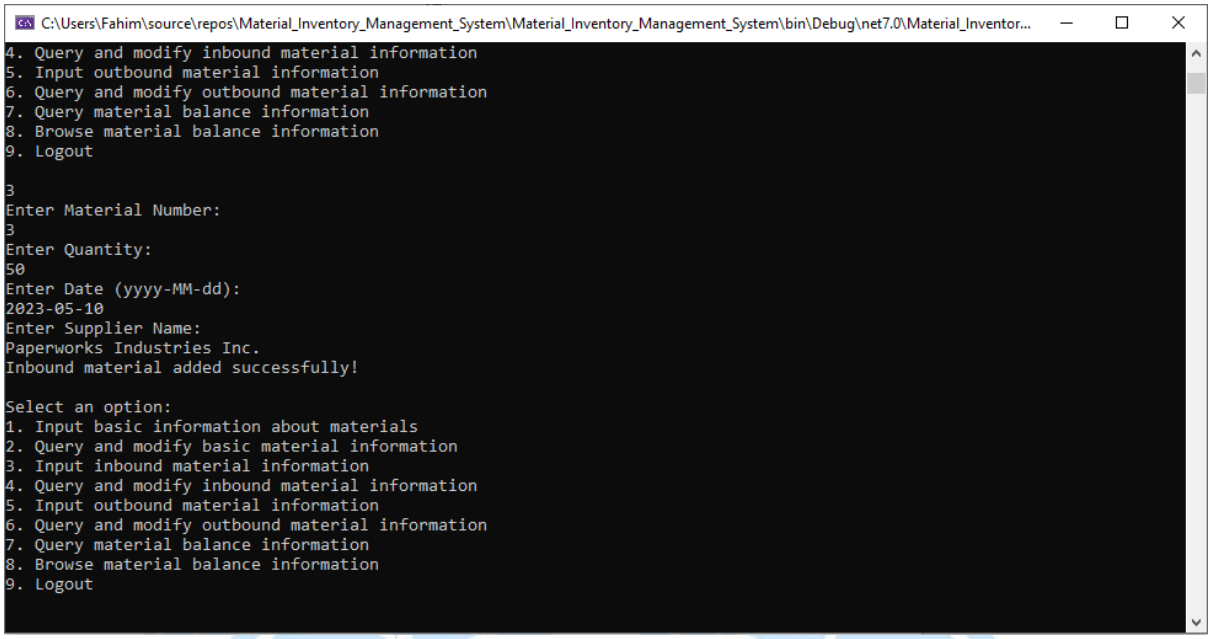
4.4 Input of inbound material information



Inbound material added successfully 1

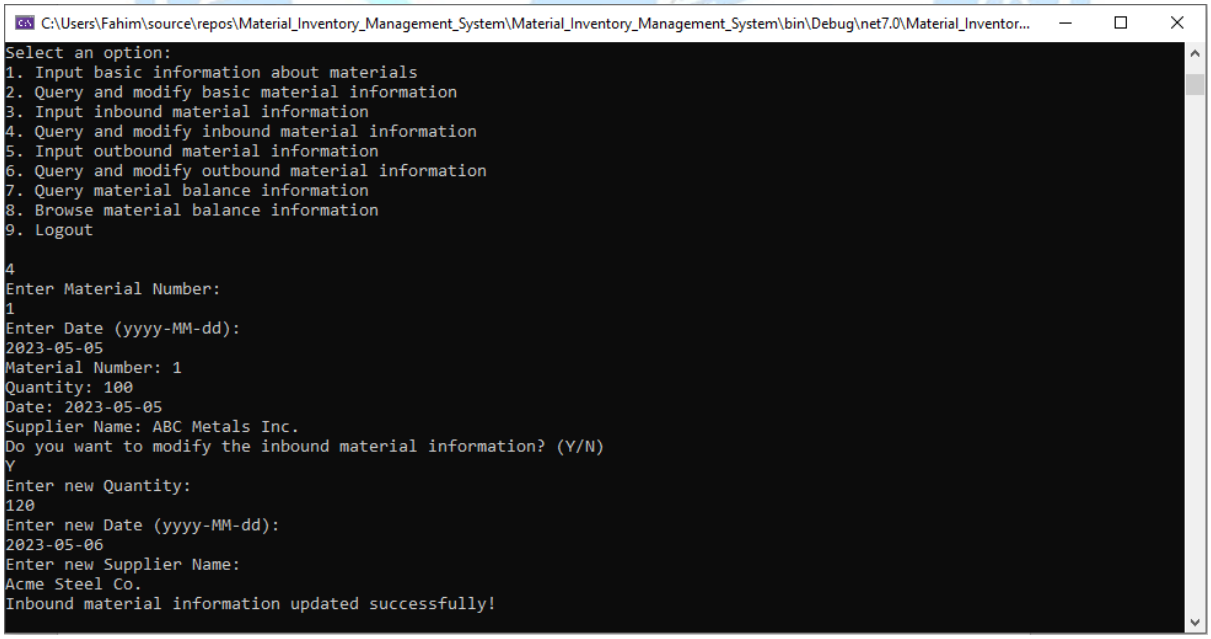


Inbound material added successfully 2



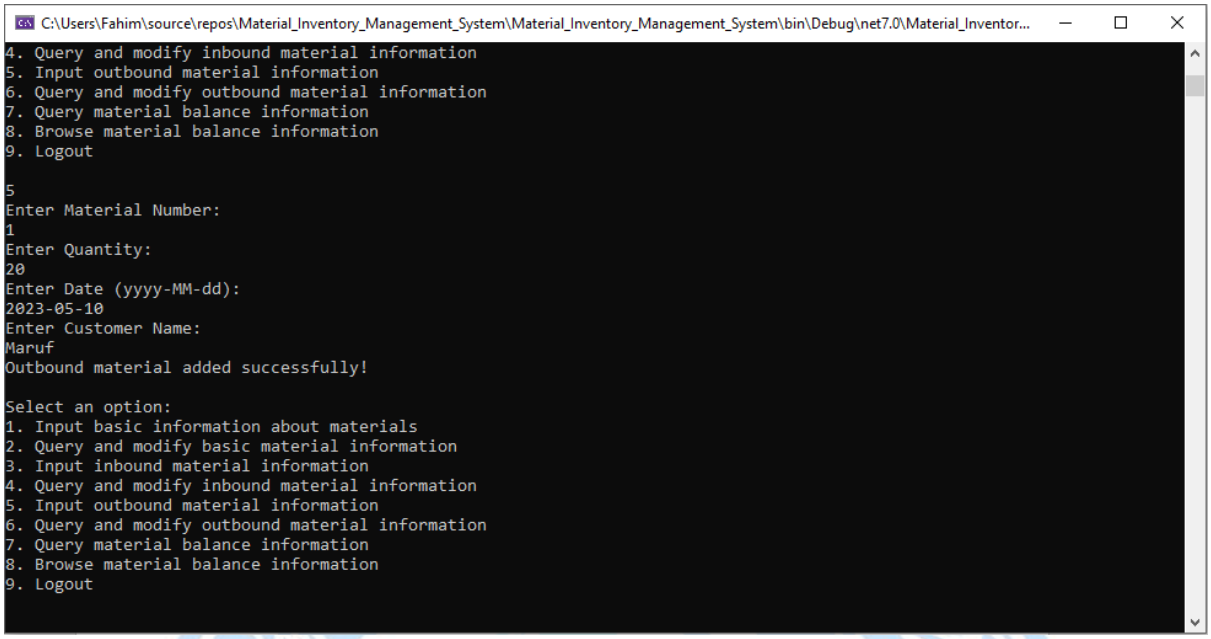
Inbound material added successfully 3

4.5 Query and modification of inbound material information

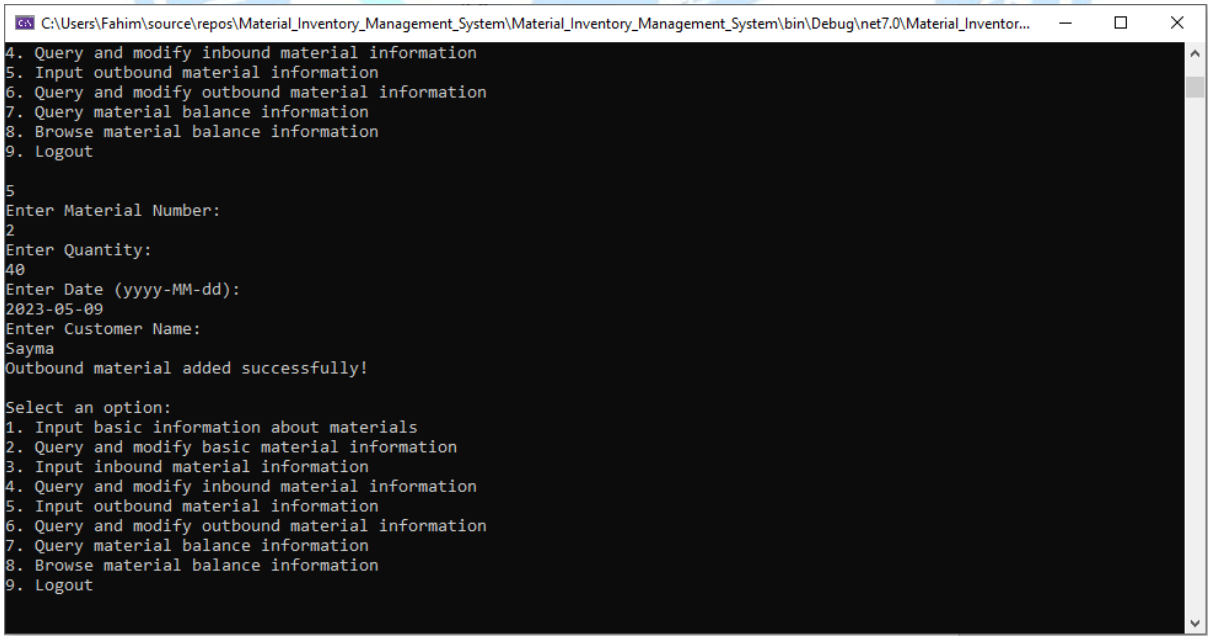


Inbound material queried and modified successfully

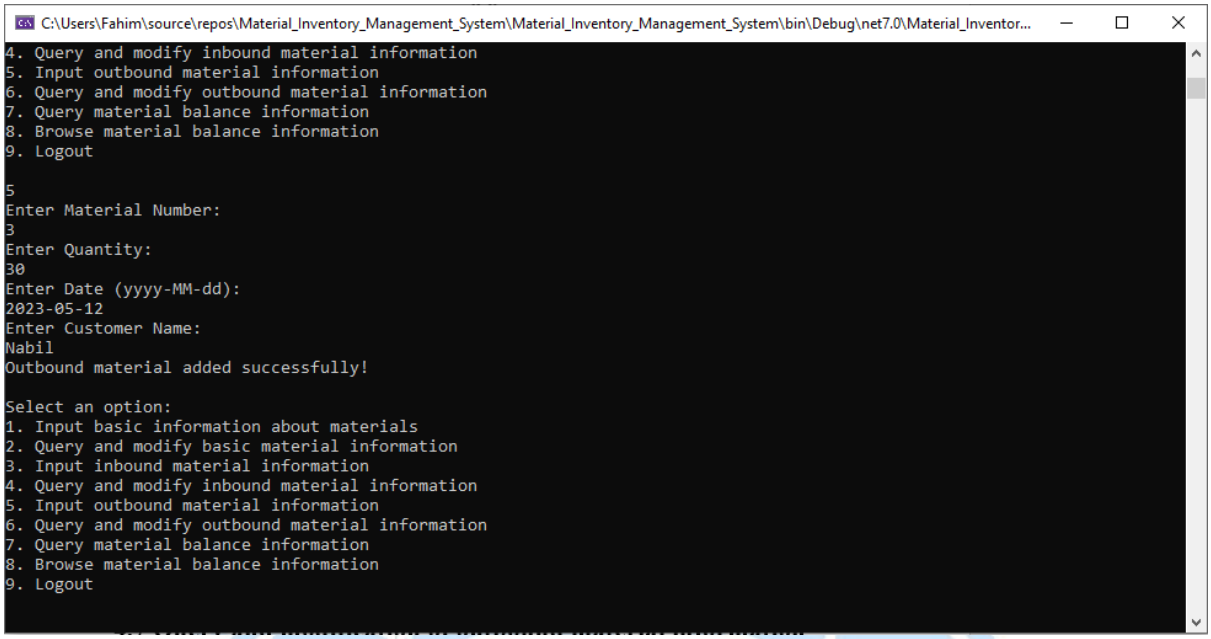
4.6 Input of outbound material information



Outbound material added successfully 1

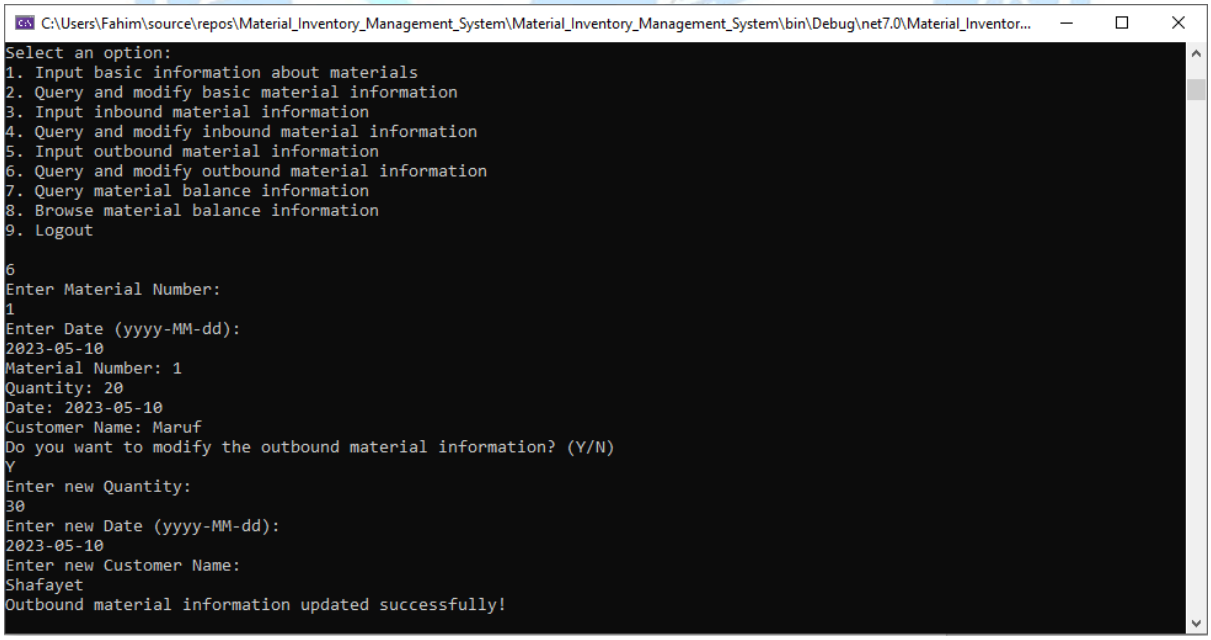


Outbound material added successfully 2



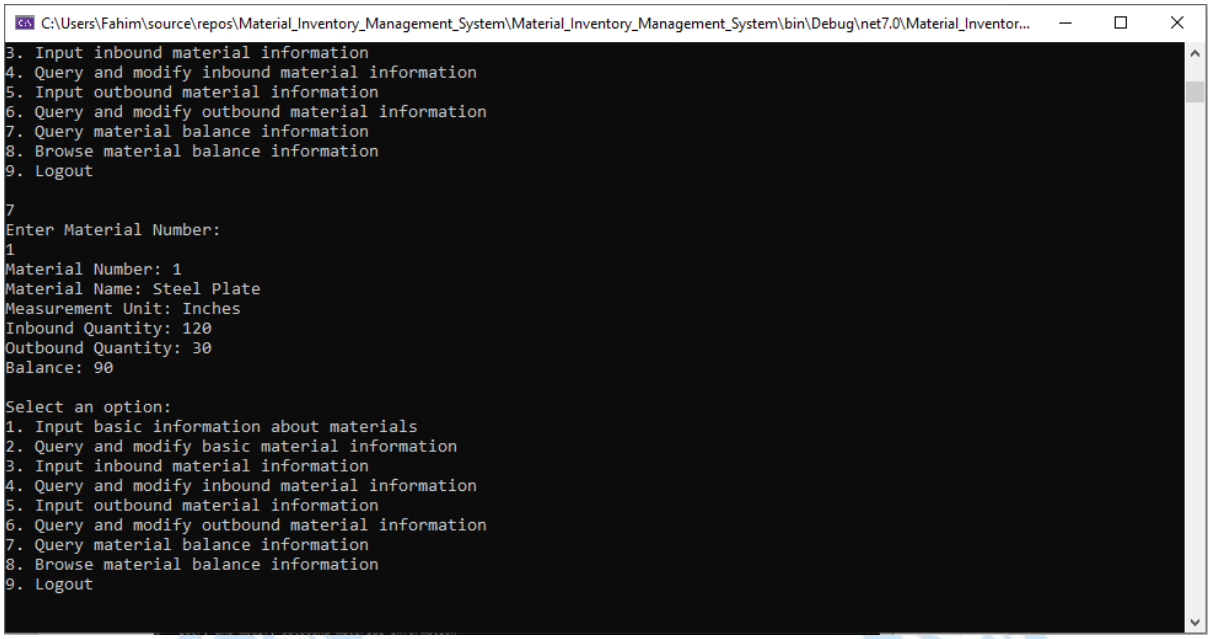
Outbound material added successfully 3

4.7 Query and modification of outbound material information

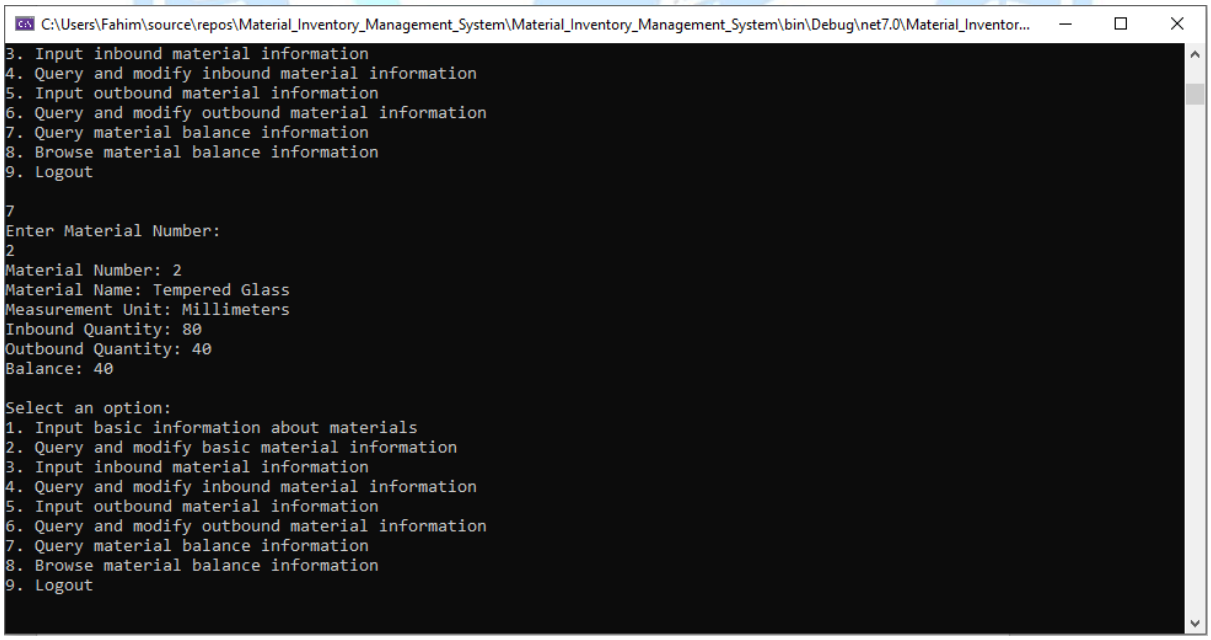


Outbound material queried and modified successfully

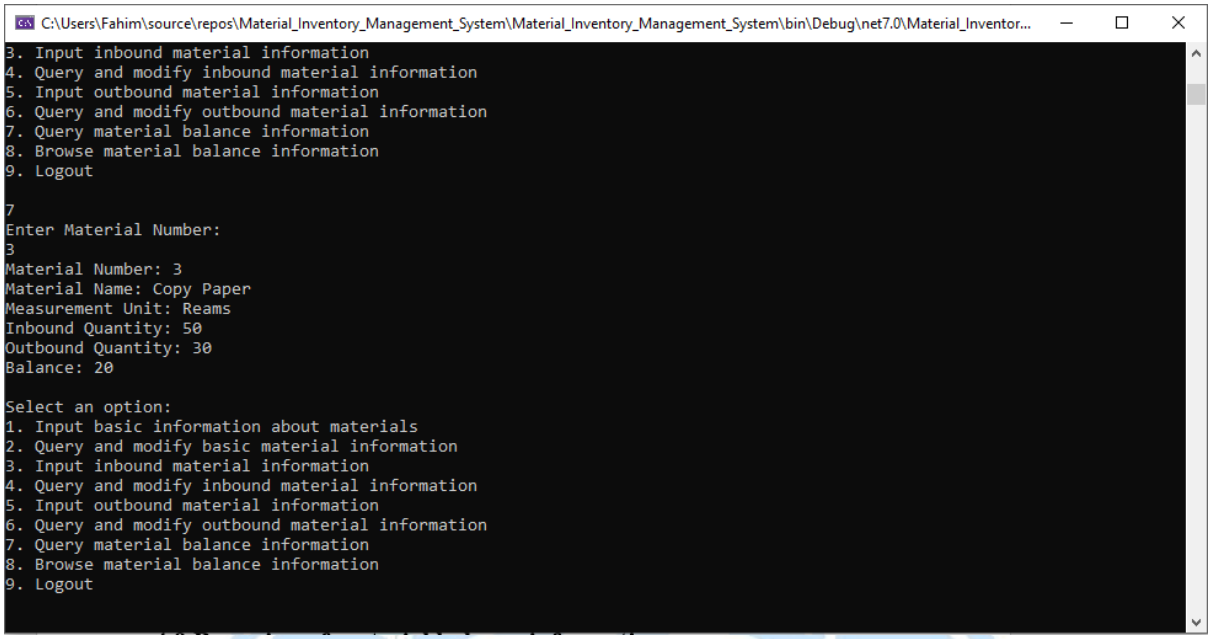
4.8 Query of material balance information



Material balance queried successfully 1

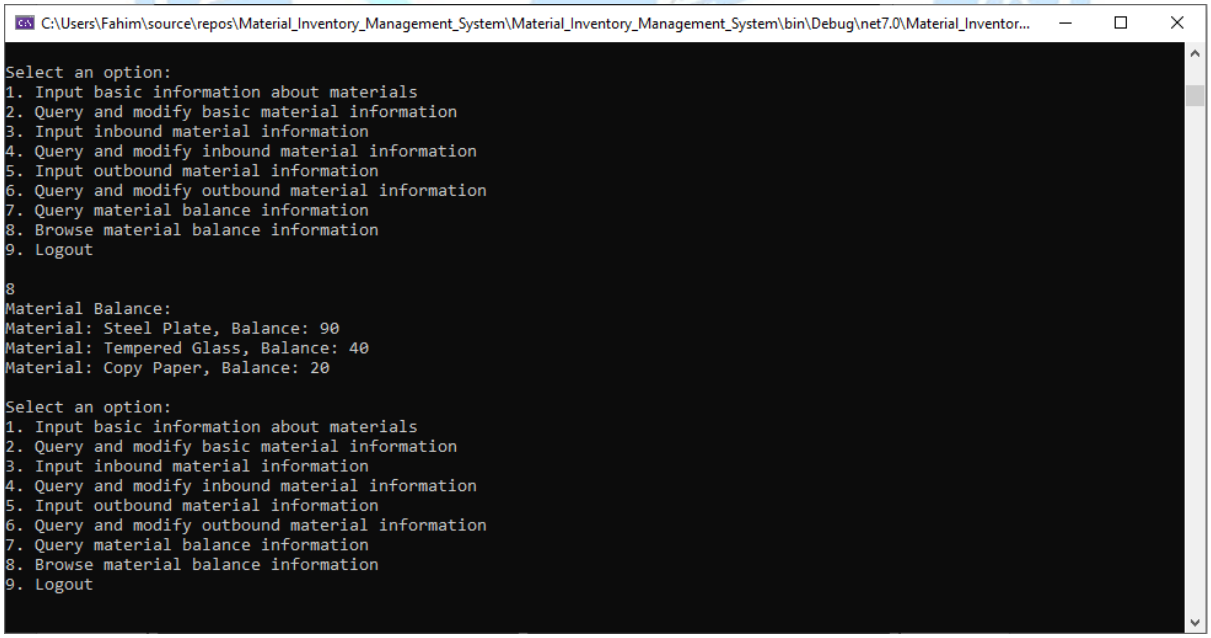


Material balance queried successfully 2



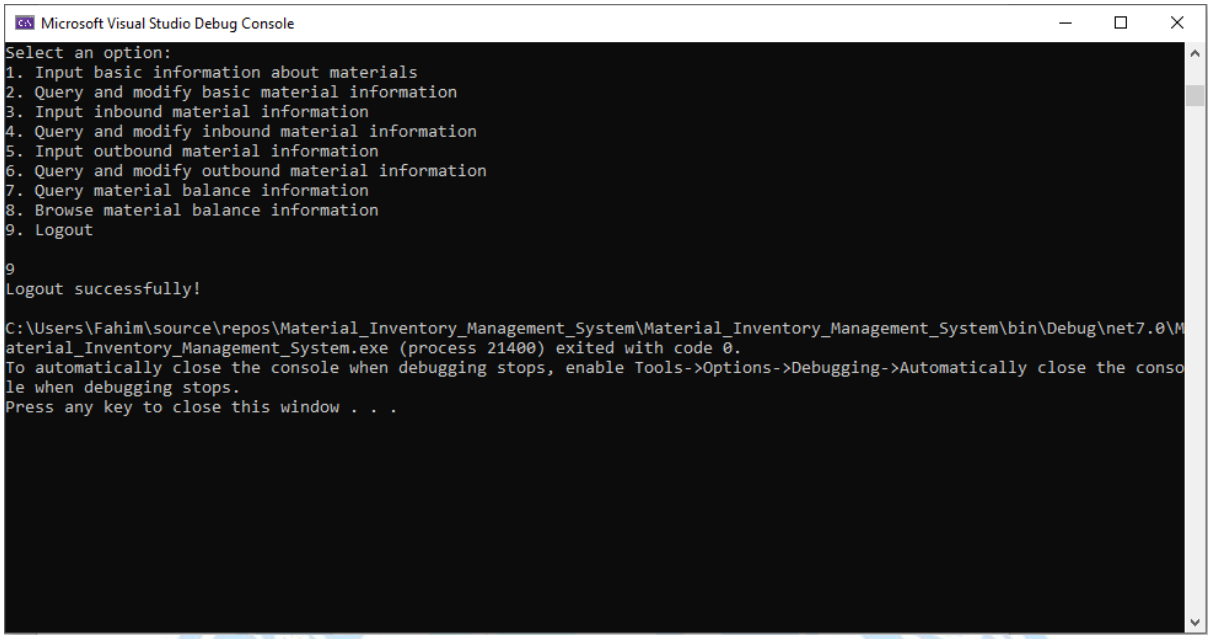
Material balance queried successfully 3

4.9 Browsing of material balance information



Browsing material balance

4.10 Logout from the system



Logout successful

Chapter 5: Conclusion

Inventory management is a crucial aspect of any business that deals with physical goods or products. It ensures that the right amount of inventory is available at the right time to meet the demands of customers while minimizing costs and maximizing profits. In this paper, we have explored the concept of Material Inventory Management System and its importance in modern-day business operations.

The main findings of this paper include the following:

- Material Inventory Management System involves the use of software and hardware tools to manage inventory levels, track products, and monitor supply chain activities.
- The system can be used to automate various inventory-related processes such as ordering, receiving, storing, and shipping products.
- It helps businesses to reduce the cost of carrying excess inventory, prevent stockouts, and improve customer satisfaction.
- Material Inventory Management System can be integrated with other business software systems such as Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) to enhance operational efficiency and streamline business processes.

This paper also provides valuable insights into the specific values and alternative perspectives of Material Inventory Management System for understanding the subject matter. For instance, we have shown that the system is not a one-size-fits-all solution and that its effectiveness depends on factors such as the type of business, product characteristics, and supply chain complexity. We have also highlighted the importance of data accuracy and the need for continuous improvement and adaptation to changing market conditions.

Furthermore, this paper highlights the relevance of Material Inventory Management System to the current business environment and future possibilities. With the increasing competition and market uncertainty, businesses need to adopt efficient and effective inventory management practices to remain competitive and profitable. Material Inventory Management System provides a viable solution that can help businesses to achieve this goal. Additionally, advancements in technology such as Artificial Intelligence (AI), Internet of Things (IoT), and Blockchain are expected to revolutionize inventory management and enhance the capabilities of Material Inventory Management System in the future.

Material Inventory Management System is a critical tool for businesses that seek to optimize inventory levels, reduce costs, and improve customer satisfaction. This paper has provided a comprehensive overview of the concept and its importance in modern-day business operations. We have highlighted the main findings, valuable insights, and relevance of the system to the current and future business environment. It is recommended that businesses explore and adopt Material Inventory Management System to enhance their competitiveness and achieve their strategic goals.