Semester 1, 2018 Assignment 1

Magic Inventory System
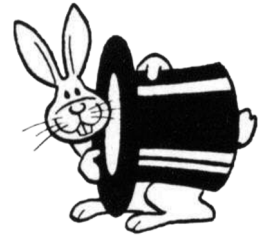
Due:	**08.04.2018 (11: 59 pm)**
Face2Face Demo:	**09.04.2018 – 13.04.2018**
Assignment Type:	**Individually or in a group of 2**
Total Marks:	**40 marks (10%)**

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Aim

You own a chain of Magic Supply Stores supplying stock to Melbourne's best magicians and the public. You decide to create a **Console Application** using **.NET Core 2.0** with **Visual Studio 2017** (*older versions are not allowed*) & **Microsoft SQL Server database** for your business.

Basic requirements of the application:
1. The code must be object-oriented, i.e. have more than one class.
2. Do not write bloated class or classes (i.e. a class with a lot of functionality).
3. Use robust exception handling.
4. All data must be stored inside SQL Server database.
5. Follow some common C# coding conventions:
   https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/inside-a-program/coding-conventions

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Scenario & Business Requirements

You have franchises in five locations around Melbourne. One in Melbourne CBD and 4 other locations in Melbourne servicing the North, East, South and West areas of Melbourne. Each store sells to both retail (the public) and wholesale to registered Magicians.

The system must accommodate three types of users: Owner (You), Franchise Owner (for each store), and Customers (Wholesale / Retail).

The Owner is responsible for supplying the Franchise Stores with stock when requested.

The Franchise Owner should be able to check their inventory and request stock replenishment. Each store can carry distinct products selected from the owner's inventory.

Stock for both your main inventory and for the individual stores is stored in a SQL Server database. **Some SQL scripts are provided for a recommended structure and data seeding; however, it is not mandatory to use the provided schema.**

The Retail Customer can purchase products. There will be **no prices** involved when purchasing products in this assignment. The only way a purchase can fail is if the item being purchased has an insufficient stock level for the quantity requested.
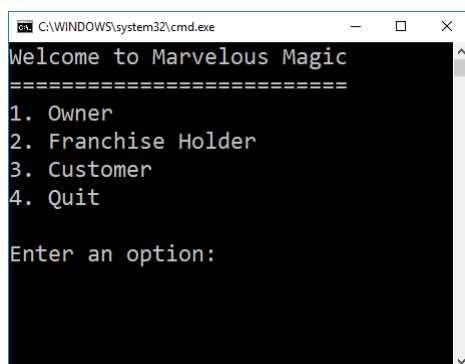
Tasks

Complete the requirements as set out below. Make sure you familiarise yourself with the scenario and business requirements section, failure to do so may incur marking penalties. **ALL THE DATA MUST BE STORED IN SQL SERVER DATABASE USING ADO.NET**

Main Menu (Driver Class)

Implement the driver class (the class with the `Main()` method). The driver class should display the main menu. The main menu is numbered, with the user selecting an option by entering the number that corresponds to the sub menu that will be displayed.

The menu may look like the following:

```
C:\WINDOWS\system32\cmd.exe                    —    □    ×
Welcome to Marvelous Magic
==========================
1. Owner
2. Franchise Holder
3. Customer
4. Quit

Enter an option:
```
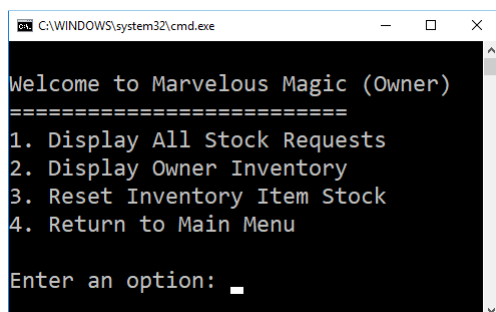
If the number is outside of that range a small error message is displayed and the menu repeats.

When a valid option is entered the program displays the next menu specific to the option chosen.

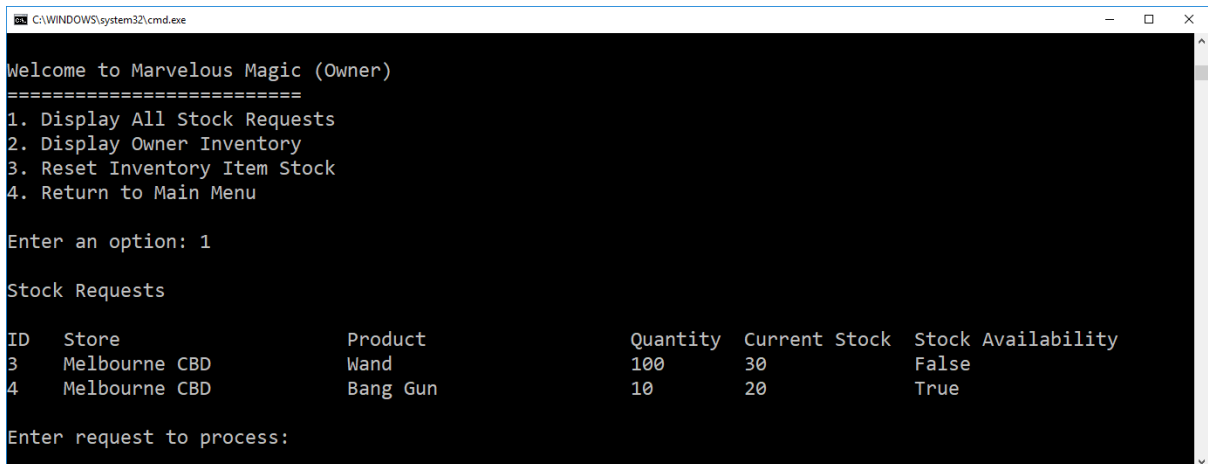Each sub menu has an option to return to the main menu.

1. Owner Menu

When option 1 is chosen from the main menu the following menu is be displayed:

```
C:\WINDOWS\system32\cmd.exe                    —    □    ×
Welcome to Marvelous Magic (Owner)
==========================
1. Display All Stock Requests
2. Display Owner Inventory
3. Reset Inventory Item Stock
4. Return to Main Menu

Enter an option: _
```

Display All Stock Requests

A list is displayed that shows the following details:
ID, Store, Product, Quantity, Current Stock, Stock Availability

```
C:\WINDOWS\system32\cmd.exe                                                    —   □   ×

Welcome to Marvelous Magic (Owner)
==========================
1. Display All Stock Requests
2. Display Owner Inventory
3. Reset Inventory Item Stock
4. Return to Main Menu

Enter an option: 1

Stock Requests

ID   Store                    Product              Quantity  Current Stock  Stock Availability
3    Melbourne CBD            Wand                 100       30             False
4    Melbourne CBD            Bang Gun             10        20             True

Enter request to process:
```
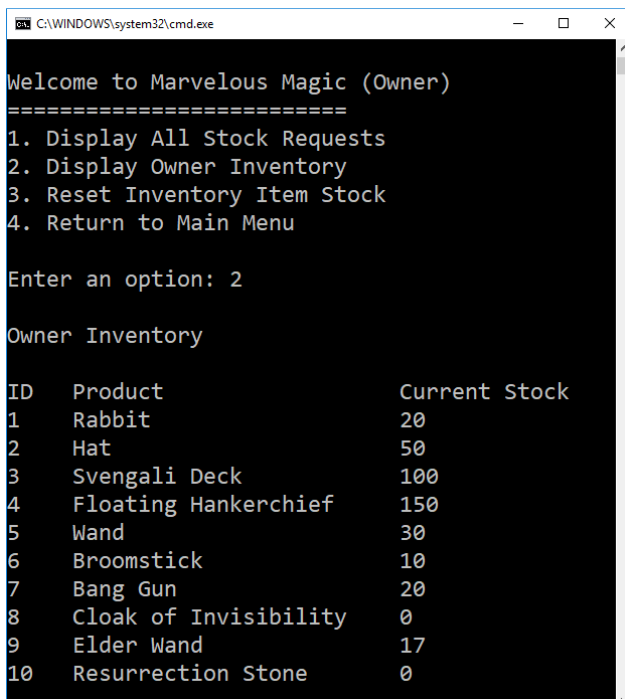
Stock Availability is true if the current stock is greater than or equal to the quantity requested, otherwise its false.

When an entry is selected the database is updated to reflect the changes in stock for both the owner and store inventory (and the stock request is deleted).

If the user selects an item that displays **False** for stock availability, then no updates are made, and a message is displayed indicating that you do not have enough stock to fulfil the request.

Display Owner Inventory

A list of all the products you carry are displayed with their current stock level:

```
C:\WINDOWS\system32\cmd.exe                       —   □   ×

Welcome to Marvelous Magic (Owner)
==========================
1. Display All Stock Requests
2. Display Owner Inventory
3. Reset Inventory Item Stock
4. Return to Main Menu

Enter an option: 2

Owner Inventory

ID    Product              Current Stock
1     Rabbit               20
2     Hat                  50
3     Svengali Deck        100
4     Floating Hankerchief 150
5     Wand                 30
6     Broomstick           10
7     Bang Gun             20
8     Cloak of Invisibility 0
9     Elder Wand           17
10    Resurrection Stone   0
```

Reset Inventory Item Stock

Allows a product ID to be entered and resets its stock level to 20. If the current stock level of the product selected is already 20 or above, then no action is taken.

```
C:\WINDOWS\system32\cmd.exe                    —   □   ×
Welcome to Marvelous Magic (Owner)
==========================
1. Display All Stock Requests
2. Display Owner Inventory
3. Reset Inventory Item Stock
4. Return to Main Menu

Enter an option: 3

Reset Stock
Product stock will be reset to 20.

ID    Product                Current Stock
1     Rabbit                 20
2     Hat                    50
3     Svengali Deck          100
4     Floating Hankerchief   150
5     Wand                   30
6     Broomstick             10
7     Bang Gun               20
8     Cloak of Invisibility  0
9     Elder Wand             17
10    Resurrection Stone     0

Enter product ID to reset: 6

Broomstick stock level has been reset to 20.
```

```
C:\WINDOWS\system32\cmd.exe                    —   □   ×
Welcome to Marvelous Magic (Owner)
==========================
1. Display All Stock Requests
2. Display Owner Inventory
3. Reset Inventory Item Stock
4. Return to Main Menu

Enter an option: 3

Reset Stock
Product stock will be reset to 20.

ID    Product                Current Stock
1     Rabbit                 20
2     Hat                    50
3     Svengali Deck          100
4     Floating Hankerchief   150
5     Wand                   30
6     Broomstick             10
7     Bang Gun               20
8     Cloak of Invisibility  0
9     Elder Wand             17
10    Resurrection Stone     0

Enter product ID to reset: 1

Rabbit already has enough stock.
```

Return to Main Menu

All sub menus only stop when "Return to Main Menu" is selected. The main menu only stops when "Quit" is selected (which in turn will end the program).

Additionally, empty input (i.e., pressing only enter) within any option returns the user to the menu, for example:

```
C:\WINDOWS\system32\cmd.exe                                    —    □    ×
Welcome to Marvelous Magic (Owner)
=========================
1. Display All Stock Requests
2. Display Owner Inventory
3. Reset Inventory Item Stock
4. Return to Main Menu

Enter an option: 3

Reset Stock
Product stock will be reset to 20.

ID    Product                  Current Stock
1     Rabbit                   20
2     Hat                      50
3     Svengali Deck            100
4     Floating Hankerchief     150
5     Wand                     30
6     Broomstick               20
7     Bang Gun                 20
8     Cloak of Invisibility    0
9     Elder Wand               17
10    Resurrection Stone       0

Enter product ID to reset:   ⇦   empty input

Welcome to Marvelous Magic (Owner)
=========================
1. Display All Stock Requests
2. Display Owner Inventory
3. Reset Inventory Item Stock
4. Return to Main Menu

Enter an option:
```

2. Franchise Holder Menu

When option 2 is chosen from the main menu the user is prompted for the store ID and the following menu is displayed:

```
C:\WINDOWS\system32\cmd.exe                              —    □    ×
Welcome to Marvelous Magic
==========================
1. Owner
2. Franchise Holder
3. Customer
4. Quit

Enter an option: 2

Stores

ID        Name
1         Melbourne CBD
2         North Melbourne
3         East Melbourne
4         South Melbourne
5         West Melbourne
Enter the store to use: 1

Welcome to Marvelous Magic (Franchise Holder - Melbourne CBD)
==========================
1. Display Inventory
2. Stock Request (Threshold)
3. Add New Inventory Item
4. Return to Main Menu

Enter an option:
```

Display Inventory

A list of all the products the store carries are displayed with their current stock level:

```
C:\WINDOWS\system32\cmd.exe                              —    □    ×
Welcome to Marvelous Magic (Franchise Holder - Melbourne CBD)
==========================
1. Display Inventory
2. Stock Request (Threshold)
3. Add New Inventory Item
4. Return to Main Menu

Enter an option: 1

Inventory

ID    Product                 Current Stock
1     Rabbit                  13
2     Hat                     10
3     Svengali Deck           5
4     Floating Hankerchief    5
5     Wand                    15
6     Broomstick              5
7     Bang Gun                5
8     Cloak of Invisibility   1
9     Elder Wand              4
10    Resurrection Stone      1
```

Stock Request (Threshold)

The user is prompted to enter a number that determines the threshold for re-stocking.
A filtered list of store products with a stock level below the provided threshold are displayed:

When a product ID from the list is entered a new stock request is created with its quantity set to the threshold entered.

The owner can later action this stock request:

Add New Inventory Item

A list of products from the owner's inventory that are not part of the store's inventory should be displayed:

```
C:\WINDOWS\system32\cmd.exe                              –  □  ×
Welcome to Marvelous Magic (Franchise Holder - Melbourne CBD)
===========================
1. Display Inventory
2. Stock Request (Threshold)
3. Add New Inventory Item
4. Return to Main Menu

Enter an option: 3

Inventory

No new products available.
```

```
C:\WINDOWS\system32\cmd.exe                              –  □  ×
Welcome to Marvelous Magic (Franchise Holder - North Melbourne)
===========================
1. Display Inventory
2. Stock Request (Threshold)
3. Add New Inventory Item
4. Return to Main Menu

Enter an option: 3

Inventory

ID    Product                  Current Stock
2     Hat                      50
3     Svengali Deck            100
4     Floating Hankerchief     150
5     Wand                     30
6     Broomstick               20
7     Bang Gun                 20
8     Cloak of Invisibility    15
9     Elder Wand               17
10    Resurrection Stone       0

Enter product to add:
```

When a product ID from the list is entered a new stock request is created with its quantity set to 1.

Once the owner processes this stock request the store will then have this new product in its inventory.

3. Customer Menu

When option 3 is chosen from the main menu the user is prompted for the store ID and the following menu is displayed:

```
C:\WINDOWS\system32\cmd.exe                          —    □    ×
Welcome to Marvelous Magic
==========================
1. Owner
2. Franchise Holder
3. Customer
4. Quit

Enter an option: 3

Stores

ID        Name
1         Melbourne CBD
2         North Melbourne
3         East Melbourne
4         South Melbourne
5         West Melbourne
Enter the store to use: 1

Welcome to Marvelous Magic (Retail - Melbourne CBD)
==========================
1. Display Products
2. Return to Main Menu

Enter an option: _
```

Display Products

A list of the store products is displayed. The list should be paged so that only 3 products are displayed at a time. The user is prompted to enter their purchase choice, 'N' for next page or 'R' to return to the menu.

```
C:\WINDOWS\system32\cmd.exe                          —    □    ×
Welcome to Marvelous Magic (Retail - Melbourne CBD)
==========================
1. Display Products
2. Return to Main Menu

Enter an option: 1

Inventory

ID    Product                 Current Stock
1     Rabbit                  13
2     Hat                     10
3     Svengali Deck           5

[Legend: 'N' Next Page | 'R' Return to Menu]

Enter product ID to purchase or function:
```

The purchase choice includes the product ID and quantity. If the stock level is sufficient the database is updated to reflect the transaction, otherwise an error message is displayed.

```
C:\WINDOWS\system32\cmd.exe                        —   □   ×
Welcome to Marvelous Magic (Retail - Melbourne CBD)
===========================
1. Display Products
2. Return to Main Menu

Enter an option: 1

Inventory

ID    Product                 Current Stock
1     Rabbit                  13
2     Hat                     10
3     Svengali Deck           5

[Legend: 'N' Next Page | 'R' Return to Menu]

Enter product ID to purchase or function: 3

Enter quantity to purchase: 6

Svengali Deck doesn't have enough stock to fulfil the purchase.
```

```
C:\WINDOWS\system32\cmd.exe                        —   □   ×
Welcome to Marvelous Magic (Retail - Melbourne CBD)
===========================
1. Display Products
2. Return to Main Menu

Enter an option: 1

Inventory

ID    Product                 Current Stock
1     Rabbit                  13
2     Hat                     10
3     Svengali Deck           5

[Legend: 'N' Next Page | 'R' Return to Menu]

Enter product ID to purchase or function: N

Inventory

ID    Product                 Current Stock
4     Floating Hankerchief    3
5     Wand                    15
6     Broomstick              5

[Legend: 'N' Next Page | 'R' Return to Menu]

Enter product ID to purchase or function: 4

Enter quantity to purchase: 2

Purchased 2 of Floating Hankerchief.
```

Marking Guide

1.	Owner	13.0 marks

a.	Main Menu (Driver Class)	(1.0)
b.	Quit	(1.0)
c.	Owner Menu	(1.0)
d.	Display All Stock Requests	(4.0)
e.	Display Owner Inventory	(2.0)
f.	Reset Inventory Item Stock	(3.0)
g.	Return to Main Menu	(1.0)

2.	Franchise Holder	9.0 marks

a.	Franchise Holder Menu	(1.0)
b.	Display Inventory	(2.0)
c.	Stock Request (Threshold)	(3.0)
d.	Add New Inventory Item	(2.0)
e.	Return to Main Menu	(1.0)

3.	Customer	8.0 marks

a.	Customer Menu	(1.0)
b.	Display Products	(2.0)
c.	Display Products (Paged)	(2.0)
d.	Purchase Product	(2.0)
e.	Return to Main Menu	(1.0)

4.	Code Quality	10.0 marks

a.	Validation*	(0.5)
b.	Exception handling**	(2.0)
c.	Code commenting (class / method / inline)	(0.5)
d.	C# coding conventions	(0.5)
e.	Ability to explain the code and choices made	(0.5)
f.	Encapsulation	(0.5)
g.	Cohesion	(1.5)
h.	Coupling	(1.5)
i.	Code repetition	(1.0)
j.	Useability (avoid unnecessary prompting for user input)	(0.5)
k.	Readability of console output	(1.0)

* Validation:

Check user input including proper format and type. Ensure that business rules are not violated.

** Exception handling:

Your program should not crash under normal usage. For example, entering user input "abc" when a number is expected should not crash the program.

This can be done via exception handling and/or by defensive programming (i.e., avoiding exceptions from occurring in the first place).

Late Submissions and Extension:

Late submissions are handled as per usual RMIT regulations - 10% deduction (4 marks) per day. You are only allowed to have 5 late days maximum.

Please email shekhar.kalra@rmit.edu.au for extension-related queries.

Submission Instructions

You are free to refer to textbooks and notes, and discuss the design issues (and associated general solutions) with your fellow students on Canvas; however, the assignment should be your own individual work.

Where you do make use of other references, please cite them in your work. Note that you will only be assessed on your own work, so the use of third party code or packages is discouraged.

The source code for this assignment (i.e., complete compiled Visual Studio project) should be submitted as a .zip file by the due date to the Canvas system.

You may submit your assignment more than once; the last submission will be the one used for assessment review.

Please register your group via positively by 18.03.2018 at https://goo.gl/EbV1q6

You must attend a face to face demo to get the assignment 1 marked during week 6 (Apr. 9 ~ 13, 2018). A schedule will be published later. **NO DEMO == NO MARKS**

Consultation Sessions

Please bring assignment 1 questions to regular weekly consult every Tuesday 4- 5 pm @ 14.10.10a

A lot of extra consultation sessions will be held during week(s) 4, 5 and 6.