

BLG 252E – Object Oriented Programming

FINAL EXAM

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Question 1 (30 Points)

Stars are spread out through space at many different distances from our own Sun and from each other. In this problem, you will calculate the distances between some familiar stars using the 3-dimensional distance formula in Cartesian coordinates. Our own Sun is at the origin of this coordinate system, and all distances are given in lightyears.

Table 1 is taken from NASA I.M.A.G.E Satellite Program

Star	Distance from Sun	X	Y	Z	Distance from Polaris
Sun		0.0	0.0	0.0	
Sirius		-3.4	-3.1	7.3	
Alpha Centauri		-1.8	0.0	3.9	
Wolf 359		4.0	4.3	5.1	
Procyon		-0.9	5.6	-9.9	
Polaris		99.6	28.2	376.0	0.0
Arcturus		32.8	9.1	11.8	
Tau Ceti		-6.9	-8.6	2.5	
HD 209458		-94.1	-120.5	5.2	
Zubenelgenubi		64.6	-22.0	23.0	

Write a C# program which can do the following tasks;

- ☐ You can develop either the Windows Form Application or the Console Application.
- ☐ You **must** define a class to represent the types in your application, and then you create objects as instances of this class.
- ☐ You **must** write at least one function.

Question 2 (10 Points)

Using for loops, print the Christmas Tree with asterisks (*). You can generate any shape and size you want.

Write a C# program which can do the following tasks;

- ☐ You can develop either the Windows Form Application or the Console Application.
- ☐ You **must** write at least one function.

Question 3 (100 Points) [OPTION 1]

Imagine you started as the only software developer in a small local company. This company only sells Christmas decorations and, as a matter of principle, the customers of this company are only able to come to the office and buy the product by registering. By law, memberships can be deactivated but cannot be deleted from the database within 5 years. There is no need to open a new membership for every purchase. New purchases can be made through existing memberships.

As a result, you need to develop an application that can log in with the administrator's username and password, create new memberships, disable existing members, change and view profile and order history information of members. The database should not be reset when the application is closed and opened.

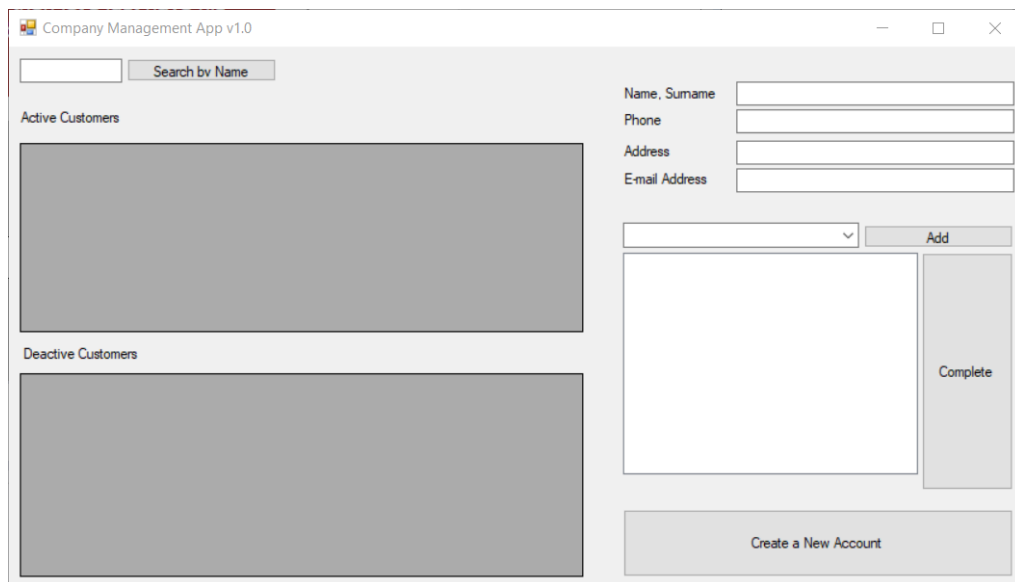


Figure 1 Example GUI with the WinForms

Write a C# program which can do the following tasks;

- ☐ You can develop either the Windows Form Application or the Console Application.
- ☐ You **must** define a base class which is Customer class with name, phone, address, order history, etc.) and then you create objects as instances of these classes.
- ☐ You **must** define derived classes that inherit from Customer class for deactivated and activated customers.
- ☐ I recommend that you read and overwrite memberships from a text file.
- ☐ The application will not open without the administrator's username and password.
- ☐ Customers can be filtered by name.
- ☐ You **must** write at least one function.

Question 4 (100 Points) [OPTION 2]

Context

The Lord of the Rings is a film series consisting of three high fantasy adventure films directed by Peter Jackson. They are based on the novel The Lord of the Rings by J. R. R. Tolkien. The films are subtitled The Fellowship of the Ring (2001), The Two Towers (2002) and The Return of the King (2003).

Source: [https://en.wikipedia.org/wiki/The_Lord_of_the_Rings_\(film_series\)](https://en.wikipedia.org/wiki/The_Lord_of_the_Rings_(film_series))

Content

lotr_scripts.csv -- Scripts from the LOTR movies

lotr_characters.csv -- Descriptions of Characters from the LOTR movies

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The above description and dataset, taken from the Kaggle. P. Mooney, "Lord of the Rings Data" 24-Dec-2019. [Online]. Available: <https://www.kaggle.com/paultimothymooney/lord-of-the-rings-data>.

You have 2 different CSV files (lotr_scripts.csv and lotr_characters.csv). The main purpose is to identify the dialogues that the selected characters say after each other. When finding them, you should pay attention to the order of the lines in the file and the corresponding movie. The two selected characters can have different dialogs one after the other and you must show them in random or sequential order. You can parse lotr_scripts.csv file to find the above.

In lotr_characters.csv file, you can take a deep look into the world of Lord of the Rings. The file is not well documented but you can easily find what you are looking for. If the selected characters are in the list below, you must print the specifications of those characters in your GUI (or console).

The screenshot shows a WinForms application interface. At the top, there are two dropdown menus for 'Character 1' and 'Character 2'. 'Character 1' is set to 'GANDALF' and 'Character 2' is set to 'GIMLI'. Both have 'Select' buttons next to them. Below these is a 'Detect Dialogs' button. On the left, a box titled 'Character 1 Specifications' lists: Birth: Before the the Shaping of Arda, Death: January 253019, Battle of the Peak immortal, Gender: Male, Hair: Grey, later white, Name: Gandalf, Race: Maiar. On the right, a box titled 'Character 2 Specifications' lists: Birth: TA 2879, Death: Unknown (Departed to ,Aman ,FO 120.), Gender: Male, Hair: Auburn, Name: Gimli, Race: Dwarves. In the center, two dialogue boxes are displayed: a blue one with the text 'Be careful. Even in defeat, Saruman is dangerous.' and a red one with the text 'Well then let's just have his head and be done with it.'

Figure 2 Example GUI with the WinForms



List of characters whose properties will be printed and which may have been made with different spelling errors and different names (voiceover etc.) in the `lotr_scripts.csv` file:

GANDALF, GOLLUM, SAM (WISE GAMGEE), ARAGORN, ARWEN, ELROND, BILBO, BOROMIR, SARUMAN, FRODO, GIMLI, LEGOLAS, MERRY, PIPPIN

Write a C# program which can do the following tasks;

- ☐ You can develop either the Windows Form Application or the Console Application.
- ☐ Read the `lotr_scripts.csv` files.
- ☐ Allow the user to select characters without typing their name.
- ☐ Find dialogs between the selected characters and show.
- ☐ Make it possible for the user to see the different dialogs between the selected characters.
- ☐ Read the `lotr_characters.csv` files.
- ☐ Print specifications if the selected characters are one of the above character lists.
- ☐ You **must** define the class to represent the types in your application, and then you create objects as instances of this class.
- ☐ You **must** write at least one function.

Guidelines & Rules

- The exam will take 3 hours.
- It can be taken a break at any time.
- Messaging platforms, e-mail services, file sharing platforms should not be used during the midterm. Other than that, you can do research on the Internet.
- The application should be written in the C# programming language.
- There should definitely be comments for the codes. (What algorithm was used? What's the point of this loop/statement? Etc.)
- Answers loaded after the exam end time will not be graded.
- You must make sure that your applications can be compiled.
- The signature paper must be signed when leaving the exam. The answers of those who have not signed will not be graded.
- You can solve exam questions only in the classroom.

Happy New Year and Good Luck