LAB 5

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1. A description of the objectives/concepts explored in this assignment including why you think they are important to this course and a career in CS and/or Engineering.

The object/concept of this lab is to practice and examine C++ templates and exception handling. Templates are important and interesting to explore since their purpose is to make us code and use the same classes as well as functions to work effectively in the same way on different data types. Also, templates help us to save the compile time, fewer lines of code, and can apply the same algorithms for different types of data. For the exception part, practice handling error or syntax errors are a practical way to get in the professional world. There will be a time that we are going to throw bunch of exceptions and pray for it work nicely, so practice with just a few exceptions right now will help us as students prepare for the later future.

2. Sections from each task indicated:

Task 1: A description of how you created add and remove methods:

For the add method, we created a void function named addGame(BoardGame board) take a parameter of BoardGame class. First it will check if the spot on the game array is empty or has surpassed the array size of not, if not increase the i variable by 1, if has surpass the array size, print out the message which was "Shelf is full", if self is not full take the game title and description of each game as well as increase the number of game (numGames) on the shelf by 1.

For the remove method, we created a BoardGame removeGame function take 1 integer pos parameter. First, we created BoardGame temp, a temporary variable to hold the removed game at a specified index in the game array, then we set its title and description to empty, decrease the number of games on the shelf by 1 and return the temp variable as a result for that function.

Task 2: Screenshot of output:

```
Welcom to the Game Shelves

---------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: ab

Please enter your game description:
    bc

---------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: ab

Please enter your game description:
    bc

---------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.
```

```
Your input: 3

Number of Games currently on shelf: 2
1. ab
     Description: bc
2. ab
     Description: bc
3.
     Description:
4.
     Description:
5.
     Description:
6.
     Description:
7.
     Description:
8.
     Description:
9.
     Description:
10.
     Description:
-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 2

Number of Games currently on shelf: 2
1. ° ab
     Description: bc
2. ab
     Description: bc
3.
     Description:
```

```
4.
    Description:
5.
    Description:
6.
    Description:
7.
    Description:
8.
    Description:
9.
    Description:
10.
    Description:
Which game would you like to delete from 1 to 10?
1

Your game has been removed!
-----------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 3

Number of Games currently on shelf: 1
1.
    Description:
2. ab
    Description: bc
3. .
    Description:
4.
    Description:
5.
    Description:
6.
    Description:
7.
    Description:
8.
    Description:
9.
    Description:
10.
    Description:
-----------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 4
```

Task 3: A discussion of the advantages of trapping the error in the class versus the calling method, also includes screenshot of output:

The advantage of trapping the error in the class versus the calling method would be the reporting errors is much more grateful than simply aborting the program. Then any code that uses the customized exception class will then simply need to have a catch block to handle the fullsize exception or the emptyshelf exception. Also, handling error by exception would be better than if-else since if-else would not be able to handle much complex code, for some case the error appears, and we handled it by if-else the error would then turn out to be wrong.

```
Welcom to the Game Shelves

-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: a

Please enter your game description:
    b

-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: c

Please enter your game description:
    d

-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
    .
```

```
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: a

Please enter your game description:
    b


-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: r

Please enter your game description:
    d

-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1
    .
```

```
Please enter your game title: r

Please enter your game description:
    d


-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: e

Please enter your game description:
    f


-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: e

Please enter your game description:
    d
```

```
--------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: c

Please enter your game description:
    q

--------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: l

Please enter your game description:
    p

--------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.
```

```
Your input: 3

Number of Games currently on shelf: 8
1. a
    Description: b
2. c
    Description: d
3. a
    Description: b
4. r
    Description: d
5. e
    Description: f
6. e
    Description: d
7. c
    Description: q
8. l
    Description: p
9.
    Description:
10.
    Description:
------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1
```

```
Please enter your game title: e

Please enter your game description:
    t


-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: d

Please enter your game description:
    f


-------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 1

Please enter your game title: r

Please enter your game description:
    e

Shelf is full, please remove a game before adding a new one.
-------------------------------------------
```

```
Welcom to the Game Shelves

------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 2

Number of Games currently on shelf: 0
1.
    Description:
2.
    Description:
3.
    Description:
4.
    Description:
5.
    Description:
6.
    Description:
7.
    Description:
8.
    Description:
9.
    Description:
10.
    Description:
Which game would you like to delete from 1 to 10?
3 .
  °
```

```
Shelf is Empty, please add a game before trying to remove one
------------------------------------------

Press 1 to add a board game to the shelf.
Press 2 to remove a board game from the shelf.
Press 3 to see how many board games are currently on the shelf.
Press 4 to quit.

Your input: 4
```

Task 4: A discussion of the advantage of using template over the specific types, also include screenshots of output:

Template is useful as we stated above that template would have save us the compile time and fewer lines of code. However, when we applied it into task 4, we found that it is more troublesome, retrofitting an already existing function to be template compatible comes with a lot of challenges. Turning out, we basically rewrote most of our codes in Shelf and main and added another class for VideoGame.

```
Welcome to the Video Game Collection!

-------------------------------------------

Press 1 to add a video game to the collection.
Press 2 to remove a video game from the collection.
Press 3 to see how many video games are currently on the collection.
Press 4 to quit.

Your input: 1

Enter the difficulty: 12

Enter the Number of Players: 3

Enter the Score: 30

Game has been added to the collection.

---.-------------------------------------------
   °
Press 1 to add a video game to the collection.
Press 2 to remove a video game from the collection.
Press 3 to see how many video games are currently on the collection.
Press 4 to quit.

Your input: 1

Enter the difficulty: 78

Enter the Number of Players: 5

Enter the Score: 100
```

```
Game has been added to the collection.

------------------------------------------

Press 1 to add a video game to the collection.
Press 2 to remove a video game from the collection.
Press 3 to see how many video games are currently on the collection.
Press 4 to quit.

Your input: 3

What Game would you like to view? (1-10):
1

Difficuly: 12
Number of Players: 3
Score: 30

Current games on the board: 2

------------------------------------------

Press 1 to add a video game to the collection.
Press 2 to remove a video game from the collection.
Press 3 to see how many video games are currently on the collection.
Press 4 to quit.

Your input: 3

What Game would you like to view? (1-10):
5

Difficuly: 0
Number of Players: 0
Score: 0
```

```
Current games on the board: 2


----------------------------------------

Press 1 to add a video game to the collection.
Press 2 to remove a video game from the collection.
Press 3 to see how many video games are currently on the collection.
Press 4 to quit.

Your input: 2

The following game with these attributes has been removed:

Difficuly: 78
Number of Players: 5
Score: 100

Current games on the board: 1

----------------------------------------

Press 1 to add a video game to the collection.
Press 2 to remove a video game from the collection.
Press 3 to see how many video games are currently on the collection.
Press 4 to quit.

Your input: 4
```

THE WHOLE PROGRAM WAS EXECUTED AND CODED ON REPLIT.