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Course: CS_162

Lab_3

Design changes

As a surprise, the final implementation of my Game class did not substantially differ from my original design. Initially I planned to create 4 functions but I ended up having one more duplicated (or 6). Also my main function ended up being very similar to the one I designed in Lab2. Essentially, these were the main design changes I had to implement:

1. I had to add a repeated member variable (one Player 1 and one for Player 2), in order to pass the value to Game class to display the type of die each player was playing with. I just made the mutators for these variables displayed this information to keep things simple. For example:

```
void Game::setDieType1(int typeOfDie1)
{
    dieType1 = typeOfDie1;
    if(dieType1 == 1)
    {
        cout << "Player 1 is using a regular die" << endl;
    }
    if(dieType1 == 2)
    {
        cout << "Warning: Player 1 is using a loaded die!! :)" << endl;
    }
}
```

1. Instead of creating new methods/functions to display the game score, I also used the mutators of the playerScore1 and playerScore2 member variables, respectively, in order to display the score that each Player got in each round/roll.

```
void Game::setPlayerScore1(unsigned rollScore1)
{
    playerScore1 = rollScore1;
    rollCounter1++;
    cout << "Player 1 scored "<<playerScore1<<"in round #
"<<rollCounter1<<". "<<endl;
}
```

1. In the main function, the only change/addition I made was to include an option menu that gave the "option" to the user to choose pair of Players:

```
"NORMAL die for Player 1 and a NORMAL die for Player 2."
"NORMAL die for Player 1 and a LOADED die for Player 2."
"LOADED die for Player 1 and a NORMAL die for Player 2."
"LOADED die for Player 1 and a LOADED die for Player 2."
```

On the contrary, the functions to display which Player won each round: roundWinner(), and to display which Player won the entire game: gameWinner(), were created exactly the same as I designed them in Lab2.

Analysis of results

1. *Test with the program received from some classmate:* As requested for this assignment, I first tested the new derived class (as product of the inheritance process we have to create in order to make our die class become the parent of loadedDie) with the test program received from some classmate. Although the program I received was simple, it was just enough to test the result of the inheritance classes. So this is sample of the results I got out of my testing:

Section to be tested	Input provided	Expected Output	Actual Output
Die class as a parent of LoadedDie class	<ul style="list-style-type: none"> • 6-side dice • 10 rolls 	Random values for each type of die. An accurate total score for each die.	<p>The value for die 1 roll # 1 is 6 The value for die 1 roll # 2 is 6 The value for die 1 roll # 3 is 3 The value for die 1 roll # 4 is 3 The value for die 1 roll # 5 is 6 The value for die 1 roll # 6 is 6 The value for die 1 roll # 7 is 5 The value for die 1 roll # 8 is 6 The value for die 1 roll # 9 is 1 The value for die 1 roll # 10 is 4</p> <p>Total for 10 rolls of die 1 is: 46</p> <p>The value for die 2 roll # 1 is 6 The value for die 2 roll # 2 is 6 The value for die 2 roll # 3 is 6 The value for die 2 roll # 4 is 6 The value for die 2 roll # 5 is 6 The value for die 2 roll # 6 is 6 The value for die 2 roll # 7 is 6 The value for die 2 roll # 8 is 6 The value for die 2 roll # 9 is 2 The value for die 2 roll # 10 is 6</p> <p>Total for 10 rolls of die 2 is: 56</p>
Die class as a parent of LoadedDie class	<ul style="list-style-type: none"> • 8-side dice • 5 rolls 	Random values for each type of die. An accurate total	<p>The value for die 1 roll # 1 is 2 The value for die 1 roll # 2 is 3 The value for die 1 roll # 3 is 4 The value for die 1 roll # 4 is 5 The value for die 1 roll # 5 is 3</p>

		score for each die.	<p>Total for 5 rolls of die 1 is: 17</p> <p>The value for die 2 roll # 1 is 4 The value for die 2 roll # 2 is 6 The value for die 2 roll # 3 is 8 The value for die 2 roll # 4 is 8 The value for die 2 roll # 5 is 6</p> <p>Total for 5 rolls of die 2 is: 32</p>
Die class as a parent of LoadedDie class	<ul style="list-style-type: none"> • 4-side dice • 5 rolls 	Random values for each type of die. An accurate total score for each die.	<p>The value for die 1 roll # 1 is 3 The value for die 1 roll # 2 is 1 The value for die 1 roll # 3 is 2 The value for die 1 roll # 4 is 3 The value for die 1 roll # 5 is 3</p> <p>Total for 5 rolls of die 1 is: 12</p> <p>The value for die 2 roll # 1 is 4 The value for die 2 roll # 2 is 2 The value for die 2 roll # 3 is 4 The value for die 2 roll # 4 is 4 The value for die 2 roll # 5 is 4</p> <p>Total for 5 rolls of die 2 is: 18</p>
Die class as a parent of LoadedDie class	<ul style="list-style-type: none"> • 8-side dice • 6 rolls 	Random values for each type of die. An accurate total score for each die.	<p>The value for die 1 roll # 1 is 5 The value for die 1 roll # 2 is 4 The value for die 1 roll # 3 is 4 The value for die 1 roll # 4 is 3 The value for die 1 roll # 5 is 6 The value for die 1 roll # 6 is 1</p> <p>Total for 6 rolls of die 1 is: 23</p> <p>The value for die 2 roll # 1 is 8 The value for die 2 roll # 2 is 8 The value for die 2 roll # 3 is 8 The value for die 2 roll # 4 is 6 The value for die 2 roll # 5 is 8 The value for die 2 roll # 6 is 2</p> <p>Total for 6 rolls of die 2 is: 40</p>
Die class as a parent of LoadedDie class	<ul style="list-style-type: none"> • 8-side dice • 6 rolls 	Random values for	<p>The value for die 1 roll # 1 is 5 The value for die 1 roll # 2 is 4</p>

class		each type of die. An accurate total score for each die.	<p>The value for die 1 roll # 3 is 4 The value for die 1 roll # 4 is 3 The value for die 1 roll # 5 is 6 The value for die 1 roll # 6 is 1</p> <p>Total for 6 rolls of die 1 is: 23</p> <p>The value for die 2 roll # 1 is 8 The value for die 2 roll # 2 is 8 The value for die 2 roll # 3 is 8 The value for die 2 roll # 4 is 6 The value for die 2 roll # 5 is 8 The value for die 2 roll # 6 is 2</p> <p>Total for 6 rolls of die 2 is: 40</p>
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1. *Test with my main from Lab1:* After creating the Game class, modifying my main option, putting the whole program together, and debugging; I started my testing. So I realized that I had a problem when both player were using the same type of die since both player were obtaining the exact same score. This is an example of that issue:

Section to be tested	Input provided	Expected Output	Actual Output
Main function that articulates the Die, LoadedDie, and Game classes.	<ul style="list-style-type: none"> • Player 1 with loaded die. • Player 2 with loaded die. 	Different die values for each Player.	<p>Player 1 is using a loaded dice. Player 1 got 4 in this round</p> <p>Player 1 is using a loaded dice. Player 1 got 6 in this round</p> <p>Player 2 is using a loaded dice. Player 2 got 4 in this round</p> <p>Player 2 is using a loaded dice. Player 2 got 6 in this round</p>

But after some thinking and debugging I finally understood what the problem was: I was setting the seed for the random-function call twice within the same loop. After that discovery I fixed the problem and the program worked as expected. The following is the test using different combinations of Die and LoadedDie (to simplify; only 8 combinations will be shown. Feel free to see more combinations when you run the program by yourself):

Section to be tested	Input provided	Expected Output	Actual Output
Main function that articulates the Die, LoadedDie, and Game classes.	<ul style="list-style-type: none"> • Player 1 with NORMAL die. • Player 2 with NORMAL die. • 6-side dice • 5 rolls 	Different die values for each Player and a final result about which player won the game or if there is a tie.	<p>Player 1 is using a regular die Player 1 scored 1 in round # 1. Player 2 is using a regular die Player 2 scored 2 in round # 1. ---> Player 2 wins round # 1.</p> <p>Player 1 is using a regular die Player 1 scored 2 in round # 2. Player 2 is using a regular die Player 2 scored 4 in round # 2. ---> Player 2 wins round # 2.</p> <p>Player 1 is using a regular die Player 1 scored 1 in round # 3. Player 2 is using a regular die Player 2 scored 6 in round # 3. ---> Player 2 wins round # 3.</p> <p>Player 1 is using a regular die Player 1 scored 4 in round # 4. Player 2 is using a regular die Player 2 scored 1 in round # 4. ---> Player 1 wins round # 4.</p> <p>Player 1 is using a regular die Player 1 scored 2 in round # 5. Player 2 is using a regular die Player 2 scored 1 in round # 5. ---> Player 1 wins round # 5.</p> <p>PLAYER 2 WON THE GAME!</p>
Main function that articulates the Die, LoadedDie, and Game classes.	<ul style="list-style-type: none"> • Player 1 with NORMAL die. • Player 2 with NORMAL die. • 8-side dice • 5 rolls 	Different die values for each Player and a final result about which player won the game or if there is a tie.	<p>Player 1 is using a regular die Player 1 scored 3 in round # 1. Player 2 is using a regular die Player 2 scored 6 in round # 1. ---> Player 2 wins round # 1.</p> <p>Player 1 is using a regular die Player 1 scored 8 in round # 2. Player 2 is using a regular die Player 2 scored 2 in round # 2. ---> Player 1 wins round # 2.</p>

			<p>Player 1 is using a regular die Player 1 scored 7 in round # 3. Player 2 is using a regular die Player 2 scored 8 in round # 3. ---> Player 2 wins round # 3.</p> <p>Player 1 is using a regular die Player 1 scored 2 in round # 4. Player 2 is using a regular die Player 2 scored 2 in round # 4. ---> It is a tie in round # 4.</p> <p>Player 1 is using a regular die Player 1 scored 6 in round # 5. Player 2 is using a regular die Player 2 scored 5 in round # 5. ---> Player 1 wins round # 5.</p> <p>IT IS A TIE!</p>
<p>Main function that articulates the Die, LoadedDie, and Game classes.</p>	<ul style="list-style-type: none"> • Player 1 with NORMAL die. • Player 2 with LOADED die. • 6-side dice • 5 rolls 	<p>Different die values for each Player and a final result about which player won the game or if there is a tie.</p>	<p>Player 1 is using a regular die Player 1 scored 3 in round # 1. Player 2 is using a loaded die Player 2 scored 4 in round # 1. ---> Player 2 wins round # 1.</p> <p>Player 1 is using a regular die Player 1 scored 3 in round # 2. Player 2 is using a loaded die Player 2 scored 6 in round # 2. ---> Player 2 wins round # 2.</p> <p>Player 1 is using a regular die Player 1 scored 6 in round # 3. Player 2 is using a loaded die Player 2 scored 4 in round # 3. ---> Player 1 wins round # 3.</p> <p>Player 1 is using a regular die Player 1 scored 1 in round # 4. Player 2 is using a loaded die Player 2 scored 2 in round # 4. ---> Player 2 wins round # 4.</p> <p>Player 1 is using a regular die</p>

			<p>Player 1 scored 1 in round # 5. Player 2 is using a loaded die Player 2 scored 6 in round # 5. ---> Player 2 wins round # 5.</p> <p>PLAYER 2 WON THE GAME!</p>
<p>Main function that articulates the Die, LoadedDie, and Game classes.</p>	<ul style="list-style-type: none"> • Player 1 with NORMAL die. • Player 2 with LOADED die. • 8-side dice • 5 rolls 	<p>Different die values for each Player and a final result about which player won the game or if there is a tie.</p>	<p>Player 1 is using a regular die Player 1 scored 1 in round # 1. Player 2 is using a loaded die Player 2 scored 8 in round # 1. ---> Player 2 wins round # 1.</p> <p>Player 1 is using a regular die Player 1 scored 5 in round # 2. Player 2 is using a loaded die Player 2 scored 2 in round # 2. ---> Player 1 wins round # 2.</p> <p>Player 1 is using a regular die Player 1 scored 6 in round # 3. Player 2 is using a loaded die Player 2 scored 8 in round # 3. ---> Player 2 wins round # 3.</p> <p>Player 1 is using a regular die Player 1 scored 3 in round # 4. Player 2 is using a loaded die Player 2 scored 6 in round # 4. ---> Player 2 wins round # 4.</p> <p>Player 1 is using a regular die Player 1 scored 1 in round # 5. Player 2 is using a loaded die Player 2 scored 8 in round # 5. ---> Player 2 wins round # 5.</p> <p>PLAYER 2 WON THE GAME!</p>
<p>Main function that articulates the Die, LoadedDie, and Game classes.</p>	<ul style="list-style-type: none"> • Player 1 with LOADED die. • Player 2 with NORMAL die. • 6-side dice 	<p>Different die values for each Player and a final result about which player won the</p>	<p>Player 1 is using a loaded die Player 1 scored 6 in round # 1. Player 2 is using a regular die Player 2 scored 4 in round # 1. ---> Player 1 wins round # 1.</p> <p>Player 1 is using a loaded die</p>

	<ul style="list-style-type: none"> • 5 rolls 	game or if there is a tie.	<p>Player 1 scored 2 in round # 2. Player 2 is using a regular die Player 2 scored 6 in round # 2. ---> Player 2 wins round # 2.</p> <p>Player 1 is using a loaded die Player 1 scored 6 in round # 3. Player 2 is using a regular die Player 2 scored 6 in round # 3. ---> It is a tie in round # 3.</p> <p>Player 1 is using a loaded die Player 1 scored 6 in round # 4. Player 2 is using a regular die Player 2 scored 3 in round # 4. ---> Player 1 wins round # 4.</p> <p>Player 1 is using a loaded die Player 1 scored 6 in round # 5. Player 2 is using a regular die Player 2 scored 2 in round # 5. ---> Player 1 wins round # 5.</p> <p>PLAYER 1 WON THE GAME!</p>
Main function that articulates the Die, LoadedDie, and Game classes.	<ul style="list-style-type: none"> • Player 1 with LOADED die. • Player 2 with NORMAL die. • 8-side dice • 5 rolls 	Different die values for each Player and a final result about which player won the game or if there is a tie.	<p>Player 1 is using a loaded die Player 1 scored 8 in round # 1. Player 2 is using a regular die Player 2 scored 5 in round # 1. ---> Player 1 wins round # 1.</p> <p>Player 1 is using a loaded die Player 1 scored 8 in round # 2. Player 2 is using a regular die Player 2 scored 4 in round # 2. ---> Player 1 wins round # 2.</p> <p>Player 1 is using a loaded die Player 1 scored 8 in round # 3. Player 2 is using a regular die Player 2 scored 5 in round # 3. ---> Player 1 wins round # 3.</p> <p>Player 1 is using a loaded die Player 1 scored 8 in round # 4. Player 2 is using a regular die</p>

			<p>Player 2 scored 1 in round # 4. ---> Player 1 wins round # 4.</p> <p>Player 1 is using a loaded die Player 1 scored 8 in round # 5. Player 2 is using a regular die Player 2 scored 2 in round # 5. ---> Player 1 wins round # 5.</p> <p>PLAYER 1 WON THE GAME!</p>
<p>Main function that articulates the Die, LoadedDie, and Game classes.</p>	<ul style="list-style-type: none"> • Player 1 with LOADED die. • Player 2 with LOADED die. • 6-side dice • 5 rolls 	<p>Different die values for each Player and a final result about which player won the game or if there is a tie.</p>	<p>Player 1 is using a loaded die Player 1 scored 2 in round # 1. Player 2 is using a loaded die Player 2 scored 6 in round # 1. ---> Player 2 wins round # 1.</p> <p>Player 1 is using a loaded die Player 1 scored 6 in round # 2. Player 2 is using a loaded die Player 2 scored 4 in round # 2. ---> Player 1 wins round # 2.</p> <p>Player 1 is using a loaded die Player 1 scored 2 in round # 3. Player 2 is using a loaded die Player 2 scored 6 in round # 3. ---> Player 2 wins round # 3.</p> <p>Player 1 is using a loaded die Player 1 scored 4 in round # 4. Player 2 is using a loaded die Player 2 scored 2 in round # 4. ---> Player 1 wins round # 4.</p> <p>Player 1 is using a loaded die Player 1 scored 6 in round # 5. Player 2 is using a loaded die Player 2 scored 2 in round # 5. ---> Player 1 wins round # 5.</p> <p>PLAYER 1 WON THE GAME!</p>
<p>Main function that articulates the Die, LoadedDie, and</p>	<p>Player 1 with LOADED die. Player 2 with</p>	<p>Different die values for each Player</p>	<p>Player 1 is using a loaded die Player 1 scored 2 in round # 1. Player 2 is using a loaded die</p>

Game classes.	LOADED die. 8-side dice 5 rolls	and a final result about which player won the game or if there is a tie.	<p>Player 2 scored 8 in round # 1. ---> Player 2 wins round # 1.</p> <p>Player 1 is using a loaded die Player 1 scored 4 in round # 2. Player 2 is using a loaded die Player 2 scored 4 in round # 2. ---> It is a tie in round # 2.</p> <p>Player 1 is using a loaded die Player 1 scored 8 in round # 3. Player 2 is using a loaded die Player 2 scored 2 in round # 3. ---> Player 1 wins round # 3.</p> <p>Player 1 is using a loaded die Player 1 scored 8 in round # 4. Player 2 is using a loaded die Player 2 scored 8 in round # 4. ---> It is a tie in round # 4.</p> <p>Player 1 is using a loaded die Player 1 scored 8 in round # 5. Player 2 is using a loaded die Player 2 scored 8 in round # 5. ---> It is a tie in round # 5.</p> <p>IT IS A TIE!</p>
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