Library 5: Book logic

Core project: Book class

Properties

Update your properties and constructors to enforce the following access rules, validation rules, and business rules.

Enforce the validation and business rules in any constructors when initializing the properties. If any parameter is invalid, throw an appropriate type of ArgumentException.

Also enforce the validation rules in the public set block of the relevant properties. Only assign the given value to the backing field if the value is valid. If the given value is invalid, do nothing.

Access rules to enforce

- Id can never change after initialization
- Title, Author, and PageCount can be set from outside the class, but they require validation
- TimesBorrowed, Borrower, BorrowDate, and DueDate cannot be set from outside the class (external code can only change these indirectly by calling public action methods)

Validation rules to enforce

- Title and Author can never be null or empty
- PageCount can never be negative
- TimesBorrowed can never be negative

Business rules to enforce

- If Borrower is null, then BorrowDate and DueDate must be null
- If Borrower is not null, then BorrowDate and DueDate must not be null
- If BorrowDate and DueDate are not null, BorrowDate must be before DueDate

Getter methods

Implement the following calculated getter methods:

- public bool IsOverdue();
- public TimeSpan GetTimeOverdue();
- public decimal GetLateFee();

Business rules to enforce

- A book is overdue if and only if there is a due date and the due date is in the past
- If the book is not overdue, then the time overdue should be equal to 0
- If the book is overdue, then the time overdue should be equal to the duration from the due date until the present moment
- Late fee per minute overdue: $10
- Max late fee: $50

Borrow action method

- public void Borrow(string borrower);

Business rules to enforce

- A book can be borrowed successfully only if it is currently available (not currently borrowed)
- When a book is successfully borrowed, TimesBorrowed should increment by 1
- When a book is successfully borrowed, Borrower, BorrowDate, and DueDate should all become non-null
- While a book is borrowed, Borrower should be equal to the name of the client who borrowed the book
- While a book is borrowed, BorrowDate should be equal to the time when it was borrowed
- While a book is borrowed, DueDate should be 30 seconds later than BorrowDate
  (borrow duration is 30 seconds)

Return action method

- public void Return(string borrower);

Business rules to enforce

- A book can be returned successfully only if it is currently borrowed
- A book can be returned successfully only if the borrower argument is not null and matches the Borrower property (a book cannot be returned by someone who is not the current borrower)
- When a book is successfully returned, Borrower, BorrowDate, and DueDate should all become null