**Question**

A bookshelf is designed to store the books in a stack with LIFO (Last In First Out) operation.

Define a class Book with the following specifications:

Class name: Book  
Data members/instance variables:  
name[]: stores the names of the books.  
point: stores the index of the topmost book.  
max: stores the maximum capacity of the bookshelf.

Methods/Member functions:  
Book(int cap): constructor to initialize the data members max = cap and point = -1.  
void tell(): displays the name of the book which was last entered in the shelf. If there is no book left in the shelf, displays the message “SHELF EMPTY”  
void add(String v): adds the name of the book to the shelf if possible, otherwise displays the message “SHELF FULL”.  
void display(): displays all the names of the books available in the shelf.

Specify the class Book giving the details of only the functions void tell() and void add(String) .

**Algorithm**

1. Start

2. Define a class `Book` with the following instance variables:

- `name` of type `String[]` to store the names of the books.

- `point` of type `int` to store the index of the topmost book.

- `max` of type `int` to store the maximum capacity of the books.

3. Define a parameterized constructor for the class `Book`:

- Accept an integer `cap` as a parameter representing the maximum capacity.

- Initialize `max` with `cap`.

- Initialize `point` with `-1` to indicate an empty shelf.

- Initialize `name` with a new array of size `max`.

4. Define a method `add(String v)` to add a book to the shelf:

- Check if `point` is equal to `max - 1` (shelf is full).

- If true, print "SHELF FULL".

- If false, increment `point` by 1.

- Assign the value `v` to `name[point]`.

5. Define a method `tell()` to remove and display the last added book:

- Check if `point` is equal to `-1` (shelf is empty).

- If true, print "SHELF EMPTY".

- If false, store the value of `name[point]` in a variable `opt`.

- Decrement `point` by 1.

- Print "The last entered book is: " followed by `opt`.

6. Define a method `display()` to display all the books on the shelf:

- Check if `point` is equal to `-1` (shelf is empty).

- If true, print "No books on the shelf.".

- If false, print "The names of the books are:".

- Loop from `point` down to `0`:

- Print the name of each book `name[i]`.

7. In the `main` method:

- Create a `Scanner` object to read input from the user.

- Create an object of the class `Book` with a capacity of 5.

- Enter a loop to continuously prompt the user for book names:

- Print "Enter the name of the book (or 'exit' to stop):".

- Read the input into a variable `nameOfBook`.

- If `nameOfBook` is "exit" (case insensitive), break the loop.

- Otherwise, call the `add` method with `nameOfBook`.

- Call the `display` method to print all the books on the shelf.

- Call the `tell` method to remove and display the last added book.

- Close the `Scanner` object.

8. End

**Variable description**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Data type** | **Purpose** |
| name | int[] | To store names of books on the shelf |
| point | String | Pointer to topmost book on the shelf |
| max | int | Maximum capacity of the shelf |
| cap | int | Initialize max variable |
| v | String | Represents the name of the book to be added |
| nameOfBook | String | To store name of the book entered by the user |