

## Task - 8 points

Library Implementation. Library holds information about Books that are available. Book contains such info as title, list of authors and publication date. Each Book can have multiple authors, therefore we will use special class for storing them (Authors class) – containing dynamically allocated array. Think especially about memory management – program cannot finish with any error.

Use new and delete operators for memory allocation.

Task should be solved stage by stage by uncommenting consecutive code fragments in main.cpp and other files – implementing missing methods.

### Stage\_1 (2 Pts)

At the beginning you have to implement Authors class. Implement constructor (with default parameters values) that takes array of authors and their count. Since we are using dynamic memory allocation remember about destructor. Moreover implement operator << to match example output.

### Stage\_2 (2 Pts)

Having Authors we can implement Book class. Implement two constructors - default one and specialized, that takes title, authors and publication date. Moreover implement operator << to match example output. Additionally implement appropriate copy constructor and assignment operator for Authors class.

### Stage\_3 (2 Pts)

Library should not contain duplicates. Implement appropriate comparison operators for Book and Authors classes. Books are considered equal when all their class fields are equal.

### Stage\_4 (2 Pts)

Implement parameterless constructor for Library class, that sets default values to all class members. You should be able to store book using AddBook method adding book to dynamically allocated array. Book in library cannot be duplicated, so when trying to add already existing book return false, otherwise perform addition and return true. When adding new book you should check if array is full or empty, in such case you should resize the array. All existing elements should not change their position in array, newly added book should be added to the end of the array. Using book count field will help with implementation. Since we are using dynamically allocated array remember about destructor. Moreover implement operator << to match example output.

## Example Output

```
----- STAGE 1 -----
Adam Mickiewicz
Henryk Sienkiewicz
Rene Goscinny, Jean-Jacques Sempe

----- STAGE 2 -----
Pan Tadeusz, Adam Mickiewicz, 1834
Potop, Henryk Sienkiewicz, 1886
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959
Krzyszacy, Henryk Sienkiewicz, 1900
Konrad Wallenrod, Adam Mickiewicz, 1828

----- STAGE 3 -----
Pan Tadeusz, Adam Mickiewicz, 1834 vs Potop, Henryk Sienkiewicz, 1886
NOT EQUAL (EXPECTED: NOT EQUAL)
Pan Tadeusz, Adam Mickiewicz, 1834 vs Potop, Henryk Sienkiewicz, 1886
NOT EQUAL (EXPECTED: NOT EQUAL)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959 vs Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959
EQUAL (EXPECTED: EQUAL)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959 vs Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959
EQUAL (EXPECTED: EQUAL)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959 vs Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959
EQUAL (EXPECTED: EQUAL)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959 vs Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959
EQUAL (EXPECTED: EQUAL)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959 vs Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1961
NOT EQUAL (EXPECTED: NOT EQUAL)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959 vs Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1961
NOT EQUAL (EXPECTED: NOT EQUAL)

----- STAGE 4 -----
Pan Tadeusz, Adam Mickiewicz, 1834 ADDED (EXPECTED: ADDED)
Potop, Henryk Sienkiewicz, 1886 ADDED (EXPECTED: ADDED)
Krzyszacy, Henryk Sienkiewicz, 1900 ADDED (EXPECTED: ADDED)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959 ADDED (EXPECTED: ADDED)
Konrad Wallenrod, Adam Mickiewicz, 1828 ADDED (EXPECTED: ADDED)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1961 ADDED (EXPECTED: ADDED)
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1961 NOT ADDED (EXPECTED: NOT ADDED)
Nasza szkap, Maria Konopnicka, 1890 ADDED (EXPECTED: ADDED)

Prints Library Resources - Count: 7
Pan Tadeusz, Adam Mickiewicz, 1834
Potop, Henryk Sienkiewicz, 1886
Krzyszacy, Henryk Sienkiewicz, 1900
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1959
Konrad Wallenrod, Adam Mickiewicz, 1828
Mikolajek, Rene Goscinny, Jean-Jacques Sempe, 1961
Nasza szkap, Maria Konopnicka, 1890

Program Should Not Display Any Error!
```