CSI 2372 – Lab Task 7

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vector and string in C++

Your task in this lab is to get yourself familiarized with two powerful libraries of STL in C++. Your task in this lab is to use vector and string to create a crossword puzzle. Make sure you have C++ installed, and you are familiar with the header files, and coding files. If you need help, ask your TA to help you with this.
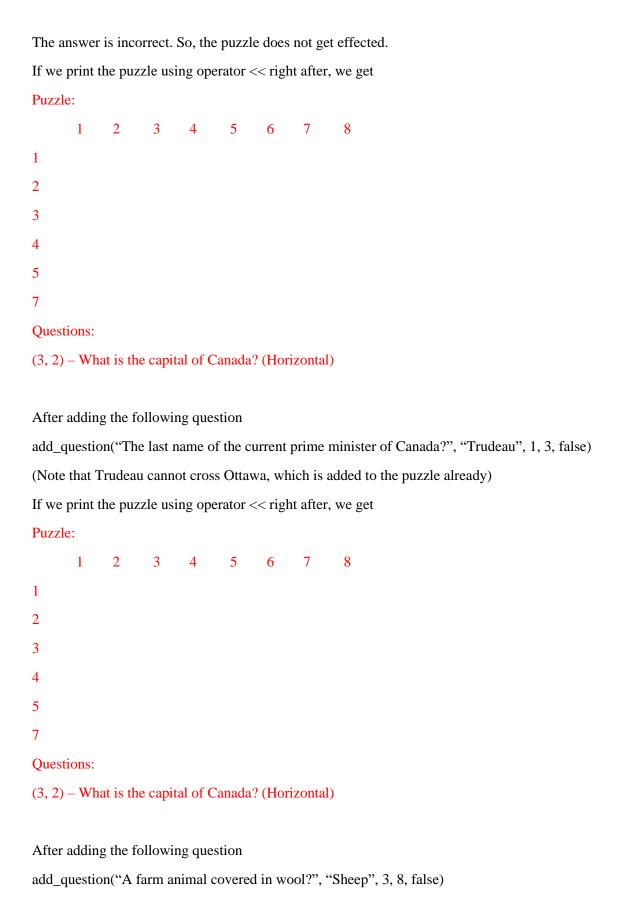
Then, you should do the following programming task. Each programming task in the lab is a design based on the subjects you learned during lectures. There is a test code that you can use to test your design. If you have questions, ask your TAs.
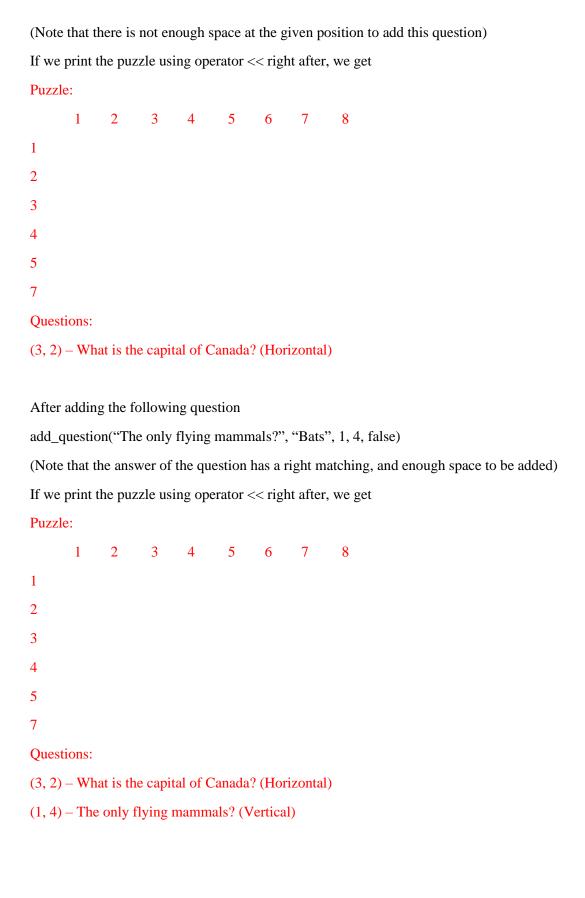
Your task is to create a crossword puzzle using a vector of strings. The class does not have a lot of methods but it should work correctly. A crossword puzzle is an array of strings. In the constructors, when you create the crossword puzzle, it is better if you feel all cells with space. You need to keep the list of questions and their answers, and those that are solved. Your class should have the following methods.
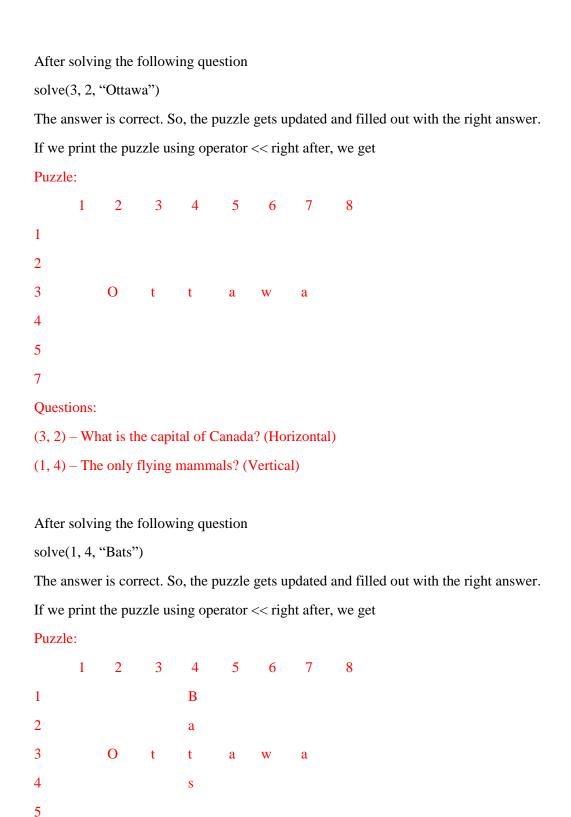
Class Crossword	
Method	**Description**
Crossword	Default constructor that creates a Crossword of 10 by 10
Crossword	User constructor that creates a Crossword of the given of n rows by m columns (n and m are given integers)
add_questions (Returns a boolean to show that the question is successfully added)	Takes 5 arguments, A string which is a question A string which is the answer to that question A row number and a column number (Together they show the position of the question in the puzzle) A boolean (false means the answer goes vertical, true means the answer goes horizontal) (You don't add the question if there is not enough space for it at the given place or if it does not match with what already added to the puzzle)
solve	Takes 3 arguments, A row number and a column number (They should match the position of a question) A string that is the answer to that question, it will be successfully added if it matches the correct answer
operator <<	For printing the crossword in the format shown below

Check the following examples for clarification.

Let's say in the main program, we start by creating a 7 x 8 puzzle.

If we print the puzzle using operator << right after, we get

After adding the following question

add_question("What is the capital of Canada?", "Ottawa", 3, 2, true)

(Note that the puzzle is 1-based index but vectors and strings are 0-based)

If we print the puzzle using operator << right after, we get

After solving the following question

solve(3, 2, "Toronto")

The answer is incorrect. So, the puzzle does not get effected.

If we print the puzzle using operator << right after, we get

After adding the following question

add_question("The last name of the current prime minister of Canada?", "Trudeau", 1, 3, false)

(Note that Trudeau cannot cross Ottawa, which is added to the puzzle already)

If we print the puzzle using operator << right after, we get

After adding the following question

add_question("A farm animal covered in wool?", "Sheep", 3, 8, false)

(Note that there is not enough space at the given position to add this question)

If we print the puzzle using operator << right after, we get

After adding the following question

add_question("The only flying mammals?", "Bats", 1, 4, false)

(Note that the answer of the question has a right matching, and enough space to be added)

If we print the puzzle using operator << right after, we get

After solving the following question

solve(3, 2, "Ottawa")

The answer is correct. So, the puzzle gets updated and filled out with the right answer.

If we print the puzzle using operator << right after, we get

Puzzle:

	1	2	3	4	5	6	7	8
1								
2								
3		O	t	t	a	w	a	
4								
5								
7								

Questions:

(3, 2) – What is the capital of Canada? (Horizontal)

(1, 4) – The only flying mammals? (Vertical)

After solving the following question

solve(1, 4, "Bats")

The answer is correct. So, the puzzle gets updated and filled out with the right answer.

If we print the puzzle using operator << right after, we get

Puzzle:

	1	2	3	4	5	6	7	8
1				B				
2				a				
3		O	t	t	a	w	a	
4				s				
5								
7								

Questions:

(3, 2) – What is the capital of Canada? (Horizontal)

Note that, lowercase and uppercase letters are the same and they are matched.