ANKARA UNIVERSITY
COM102B-COM120
Spring 2020
FINAL

01/06/2020 10:00

Submission Deadline: 01/06/2020 14:00

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1. (20p) You are given 102_120_Final1.cpp. Please **DO NOT** change main function, but will only use it during development of your **function templates. printUnionOfArrays** function displays the numbers that are in any array or both arrays (duplicates need to be eliminated). **printIntersectionOfArrays** function displays the numbers that are in both arrays. You need to provide required functions in same cpp file and will submit the completed file.

Sample Input:	**Sample Output:**
4 2 13 7 19 1.25 3.41 5.35 4.12 5 8 2 15 7 28 32 4.56 5.35 2.14	4 2 13 7 19 5 8 15 28 32 1.25 3.41 5.35 4.12 4.56 2.14 2 7 5.35

Submission: Name your source file as <StudentID>.cpp. For example, if your ID is 112603, then you will submit 112603.cpp file.

2. (20p) You are given 102_120_Final2.cpp. Please **DO NOT** change main function, but will only use it during development of your **Grid** class**.** You need to provide required functions in same cpp file and will submit the completed file.

Consider a square grid, with some cells empty and others containing an asterisk. Define two asterisks to be contiguous if they are adjacent to each other in the same row or in the same column. Now suppose that we define a blob as follows:

a) A blob contains at least one asterisk
b) If an asterisk is in a blob, then so is any asterisk that is contiguous to it.
c) If a blob has more than two asterisks, then each asterisk in it is contiguous to at least one other asterisk in the blob.

For example:

four blobs in the grid

*			*	*			*		*	*
							*		*	*

seven blobs in the grid

*		*		*				*	*	*
					*				*	
*				*						

one blob in the grid

		*	*	*		*	*	*		
				*		*		*		
				*	*	*				

The first number in input represents the number of asterisks in our grid. The other lines in input show the row index and the column index of asterisks. Display the square grid (Ignore the lines, just print asterisks in a matrix format, you may print space to indicate the cell is empty (does not have asterisk)). Additionaly, compute and print the number of blobs. In this question, the grid size is constant, the number of rows is 3 and the number of columns is 11.

Sample Input 1:	**Sample Output 1:**
9 0 0 0 3 0 4 0 7 0 9 0 10 1 7 1 9 1 10	* ** * ** * ** 4

Sample Input 2:	**Sample Output 2:**
10 0 0 0 2 0 4 0 8 0 9 0 10 1 5 1 9 2 0 2 4	* * * *** * * * * 7

Sample Input 3:	**Sample Output 3:**
12 0 2 0 3 0 4 0 6 0 7 0 8 1 4 1 6 1 8 2 4 2 5 2 6	*** *** * * * *** 1

Submission: Name your source file as <StudentID>.cpp. For example, if your ID is 112603, then you will submit 112603.cpp file.

3. (20p) You are given 102_120_Final3.cpp. Please **DO NOT** change main function and data members of **Square** class, but will only use them during development of your class (constructors and functions set, printSquare, operator+ and operator*). You need to provide required functions in same cpp file and will submit the completed file.

Sample Input:	**Sample Output:**
2 4 % &	*** *** *** %% %% &&&& &&&& &&&& &&&& %%%%%% %%%%%% %%%%%% %%%%%% %%%%%% %%%%%% &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&& &&&&&&&&&&&&

Submission: Name your source file as <StudentID>.cpp. For example, if your ID is 112603, then you will submit 112603.cpp file.

4. (20p) You are given 102_120_Final4.cpp. Complete the program that reads two three-digit integers and then displays their product in the following format.

Sample Input:	**Sample Output:**
652 436	652 x 436 --------- 3912 1956 2608 --------- 284272

Submission: Name your source file as <StudentID>.cpp. For example, if your ID is 112603, then you will submit 112603.cpp file.

5. (20p) You are given 102_120_Final5.cpp. Please **DO NOT** change main function and data members of classes, but will only use them during development of your **classes.** You need to provide required functions in same cpp file and will submit the completed file.

Sample Input:	**Sample Output:**
44 55 33 22	Constructor for A Constructor for A Constructor for C Constructor for B B C 33 22 A 44 A 33 22 A 33 22 A 44 A

Submission: Name your source file as <StudentID>.cpp. For example, if your ID is 112603, then you will submit 112603.cpp file.