Software Engineering and Programming Basics - WS2021/22
Assignment 4

TECHNISCHE UNIVERSITÄT
CHEMNITZ

Professorship of Software Engineering

11| 2021

Organisational

Deadline

06.12.2021 - 23:59

Submission

To submit your answers, please use the Task item titled 'Submission' in the menu of the Assignment 04. You can upload your /.java files here. There are sample files shown in Samples section highlighted.

Please remember that package name is the name of assignment, i.e. assignment4. And class name is the name of task, such as Task1 and Task 2.

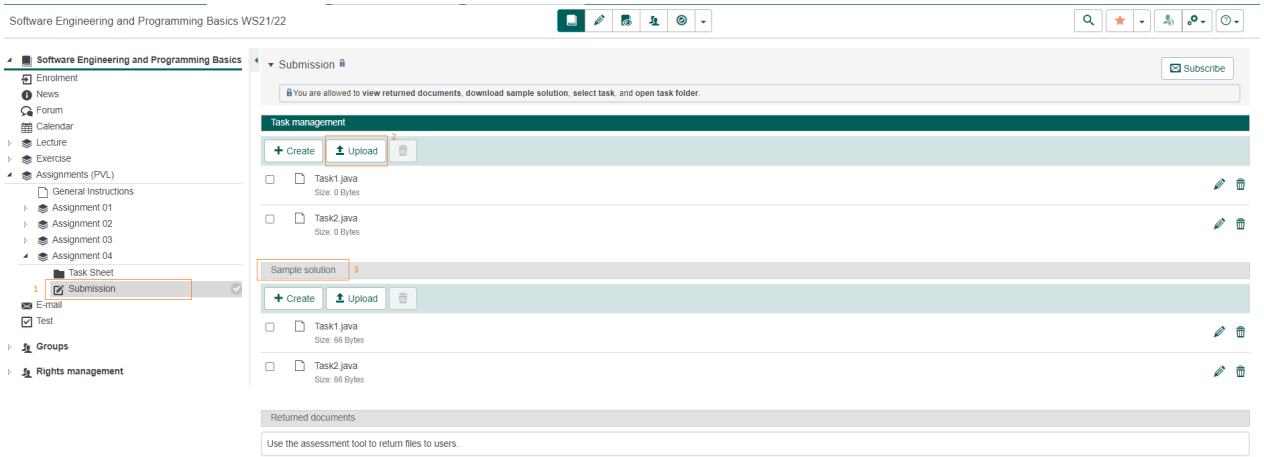
Make sure your files are correctly named: Package, class and function names should be exact same of what is mentioned in the Task Sheet in order to get grades.

This is an automated checking system. If the uploaded files have wrong names then your code will not be graded.

You also need to adhere to the General Assignment Instructions.

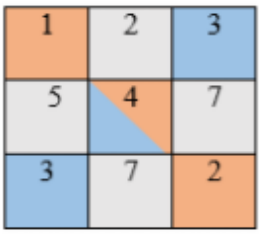
Questions

Since this is a PVL, it is important that all students are able to access all necessary information. Therefore, if you have any questions, please ask them in the course forum in the thread
'Assignment 4: Questions'.



Task 1

Write a method **productDiagonals**. The method should take two parameters: 1) a two dimensional array of type int and 2) the size of array. Find the product of the elements of the principal diagonal and secondary diagonal elements of the matrix. Divide the answer by the middle element if the matrix is of odd size. Return the answer.



Output: 72
Explanation:
Product of left diagonal = 1 * 4* 2 = 8
Product of right diagonal = 3 * 4 * 3 = 36
But we have a common element 4 in this case so
Total product = (36* 8)/4 = 72

Output: 9408
Explanation:
Product of left diagonal = 1 * 4 * 6 * 1 = 24
Product of right diagonal = 4 * 7 * 7 * 2 = 392
Total product = 24 * 392 = 9408

Output: 7680
Explanation:
Product of left diagonal = 1 * 4 * 6 * 1* 1= 24
Product of right diagonal = 5 * 8 * 4 * 2 * 2 = 640
But we have a common element 4 in this case so
Total product = (24 * 640)/4 = 3840

Task 2

We have four groups of students in a mathematics classroom. The students took an exam and are now sitting in such a manner that every row and column is sorted in increasing order of the students' marks. The teacher has to find the student with x marks.

Consider the classroom as a matrix. Write a method **search**, the method should take three parameters: 1) a two dimensional array, 2) the size of the array and 3) x number to be found. Find and return as an array the position of student with "x" marks if present in the class. Otherwise, return an empty array.


```
Input: mat[4][4] =  { {10, 20, 30, 40},
                      {15, 25, 35, 45},
                      {27, 29, 37, 48},
                      {32, 33, 39, 50}};
                x = 29
Output: Found at (2, 1)
Explanation: Element at (2,1) is 29
```


```
Input: mat[5][5] = { {10, 20, 30, 40, 50},
                     {15, 25, 35, 45,52},
                     {27, 29, 37, 48,55},
                     {32, 33, 39, 50, 56},
                     {32, 33, 39, 50,60}};
              x = 100
Output: Element not found
Explanation: Element 100 is not found
```