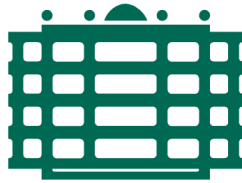


Software Engineering and Programming Basics - WS2021/22

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'.

The screenshot displays the Moodle LMS interface for 'Software Engineering and Programming Basics WS21/22'. The left sidebar shows the course menu with 'Assignment 04' selected, and 'Task Sheet' and 'Submission' highlighted. The main content area shows the 'Submission' task management interface. It includes a 'Task management' section with 'Create' and 'Upload' buttons, and a list of tasks: 'Task1.java' and 'Task2.java', both with a size of 0 Bytes. Below this is a 'Sample solution' section with a 'Create' button and a list of tasks: 'Task1.java' and 'Task2.java', both with a size of 66 Bytes. At the bottom, there is a 'Returned documents' section with a message: 'Use the assessment tool to return files to users.'

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.

1	2	3
5	4	7
3	7	2

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 = $(36 * 8) / 4 = 72$

1	2	3	4
5	6	7	8
9	7	4	2
2	2	2	1

Output: 9408

Explanation:

Product of left diagonal = $1 * 4 * 6 * 1 = 24$

Product of right diagonal = $4 * 7 * 7 * 2 = 392$

Total product = $24 * 392 = 9408$

1	2	3	4	5
5	6	7	8	6
9	7	4	2	7
2	2	2	1	8
2	4	2	1	1

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.




10	20	30	40
15	25	35	45
27	29	37	48
32	33	39	50

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



10	20	30	40	50
15	25	35	45	52
27	29	37	48	55
32	33	39	50	56
33	35	42	54	60

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