K. J. Somaiya College of Engineering, Mumbai-77

(A Constituent College of Somaiya Vidyavihar University)

Name: Chandana Ramesh Galgali
Batch: P3-3 Roll No.:16010422234
Experiment / ~~assignment~~ / ~~tutorial~~ No. 7
Grade: AA / AB / BB / BC / CC / CD /DD

Signature of the Staff In-charge with date

TITLE: Using virtual labs to understand the concept of matrix multiplication and call by reference

AIM: Use of virtual labs to understand the concept of matrix multiplication and call by reference, theory with examples and verify the same with practice questions.

Expected OUTCOME of Experiment: The first program inputs 2 matrices from the user, multiplies both the matrices and gives their product matrix as the output. The second program swaps two numbers, using the 'call by reference' method.

Books/ Journals/ Websites referred:

1. Programming in ANSI C, E. Balagurusamy, 7 th Edition, 2016, McGraw-Hill Education, India.
2. Structured Programming Approach, Pradeep Dey and Manas Ghosh, 1 st Edition, 2016, Oxford University Press, India.
3. Let Us C, Yashwant Kanetkar, 15th Edition, 2016, BPB Publications, India.

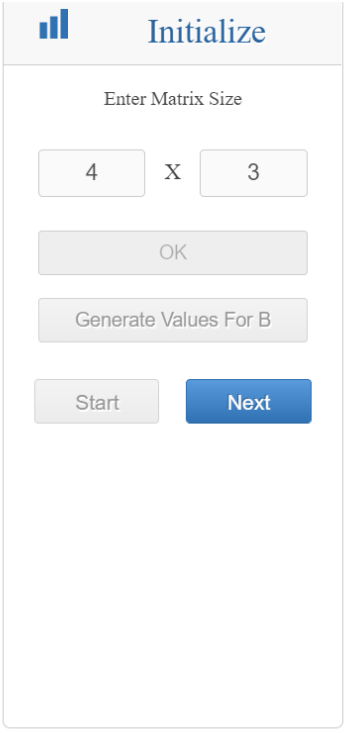
Problem Definition:

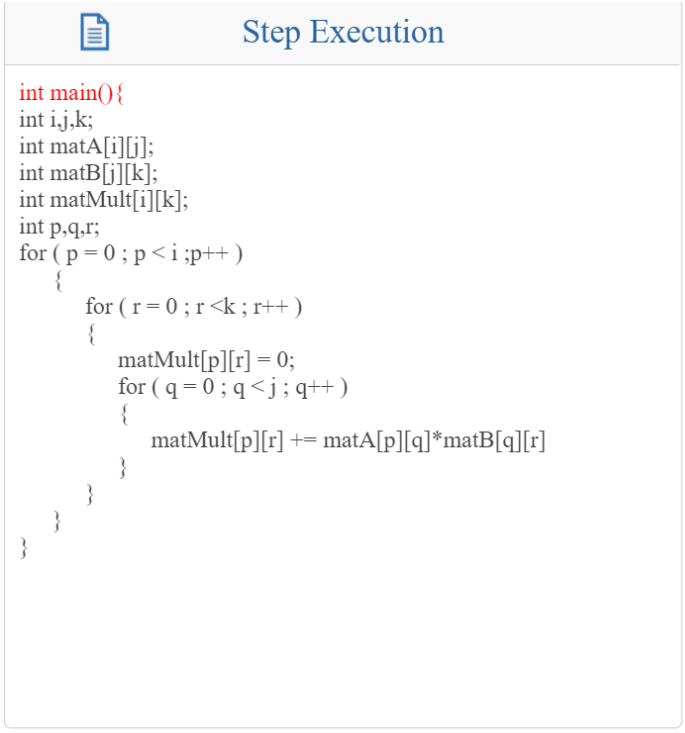
Virtual Lab experiment on matrix multiplication
https://cse02-iiith.vlabs.ac.in/exp/arrays/simulation.html
Program to multiply 2 matrices (2-dimensional arrays).

Virtual Lab experiment on Call by reference
https://cse02-iiith.vlabs.ac.in/exp/pointers/procedure.html
Program to swap two numbers without using a third variable but by using 'call by reference'.

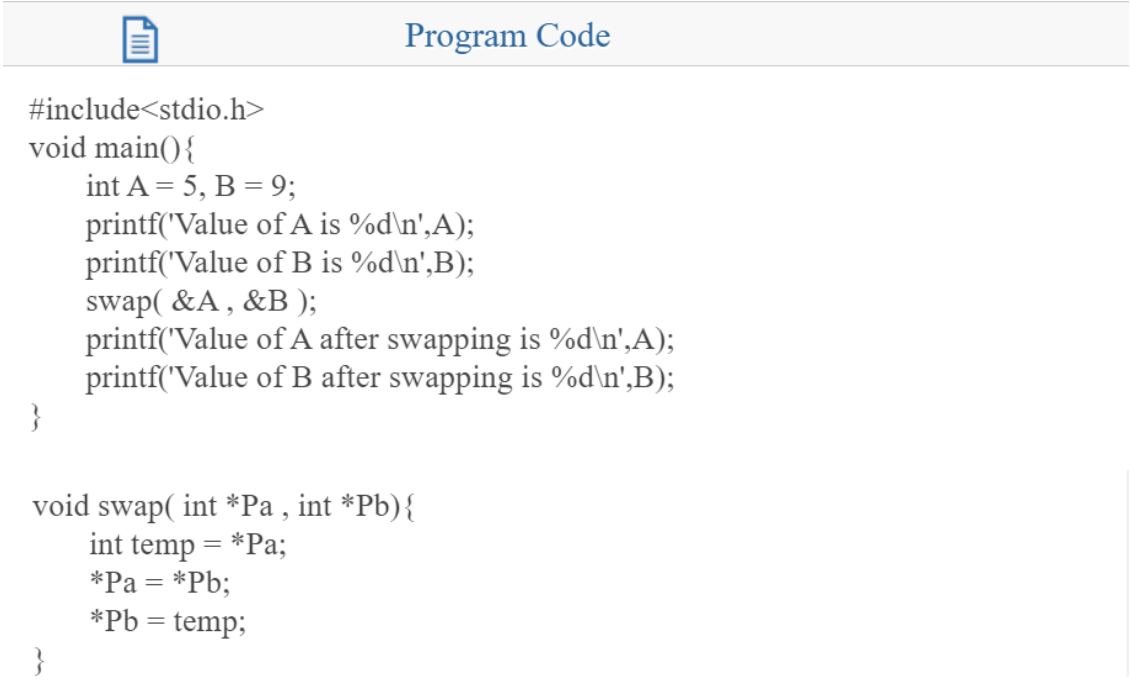
Simulation screenshots:

For program 1:



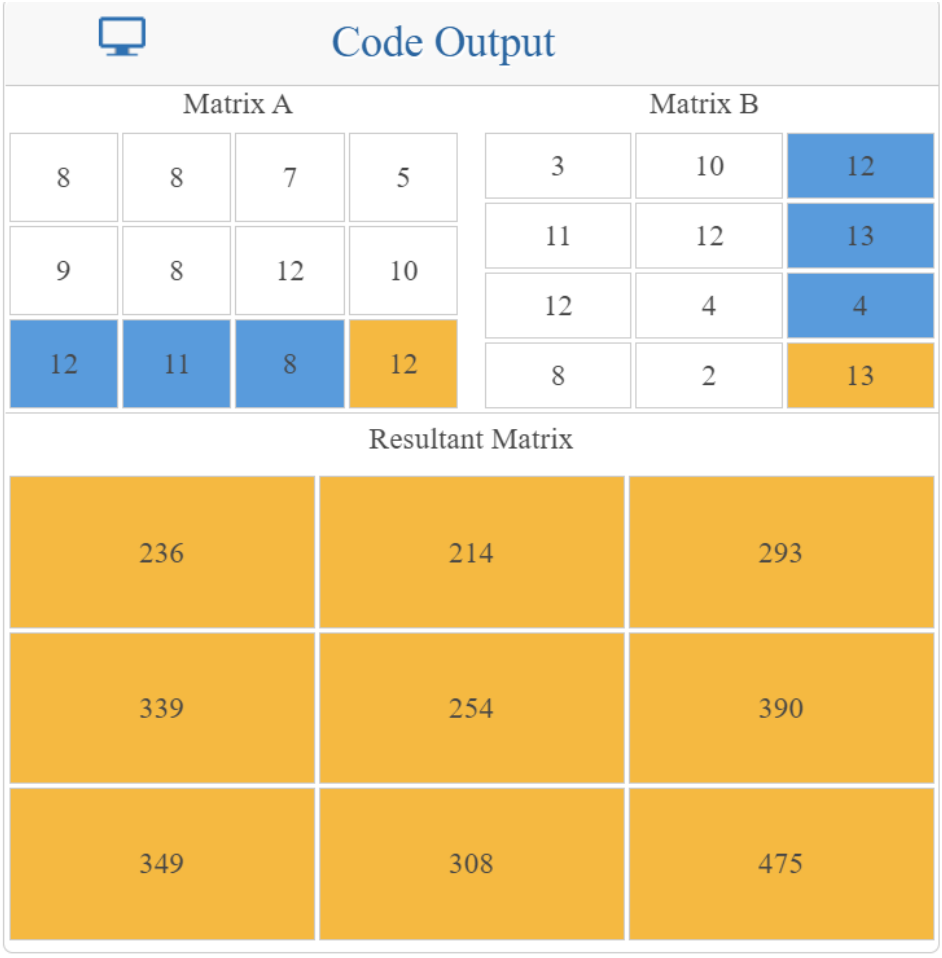


For program 2:



Post-test Screenshots:

For program 1:



For program 2:

Conclusion and your take away after performing the virtual lab experiment: -
In the first program, we can infer that operations, in this case multiplication, can thus be performed on matrices after considering them as 2-D arrays. In the second program, we could swap numbers using the 'call by reference' method.

Post Lab Descriptive Questions

1. **Differentiate between Call by Value and Call by Reference.**

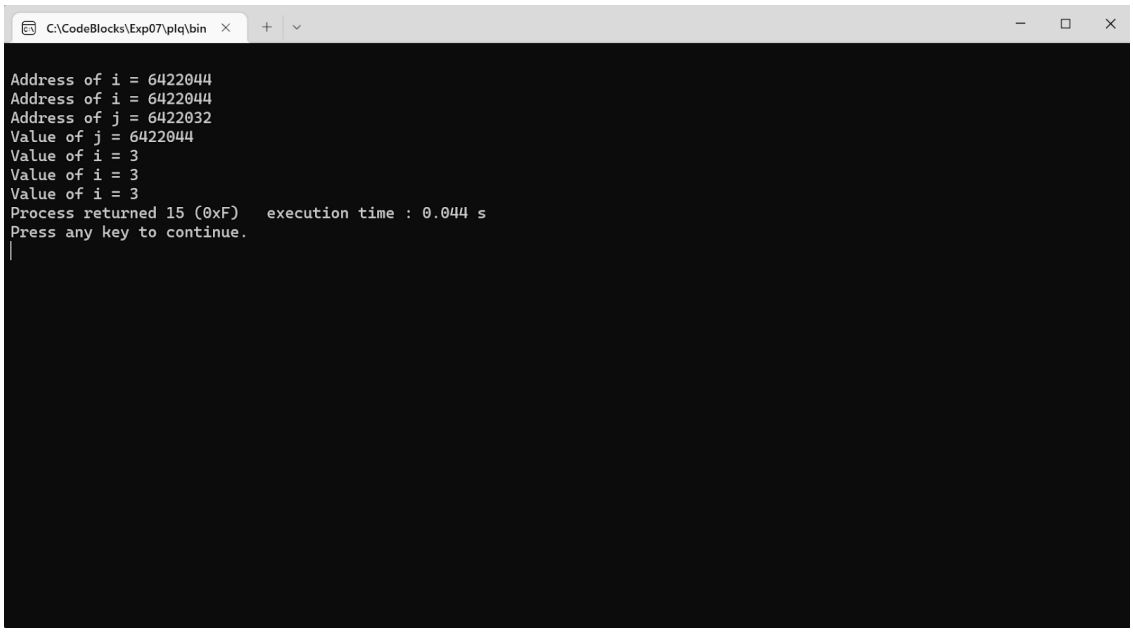
Ans:

S. No.	Call by Value	Call by Reference
1.	A copy of actual parameters is passed into formal parameters.	Reference of actual parameters is passed into formal parameters.
2.	Changes in formal parameters will not result in changes in actual parameters.	Changes in formal parameters will result in changes in actual parameters.
3.	Separate memory location is allocated for actual and formal parameters.	Same memory location is allocated for actual and formal parameters.

2. **Try to understand the working of pointers by running the following code and noting down the output.**

```
main( )
{
int i = 3 ;
int *j ;
j = &i ;
printf ( "\nAddress of i = %u", &i ) ;
printf ( "\nAddress of i = %u", j ) ;
printf ( "\nAddress of j = %u", &j ) ;
printf ( "\nValue of j = %u", j ) ;
printf ( "\nValue of i = %d", i ) ;
printf ( "\nValue of i = %d", *( &i ) ) ;
printf ( "\nValue of i = %d", *j ) ;
}
```

Output:



Date: _____ **Signature of faculty in-charge**