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Course: COMP 3411

### Assignment 3

Write Java Code to perform multithreaded matrix multiplication.

#### Code structure:

- Multiplier class with the Runnable interface : implements matrix multiplication by assigning a thread to each resulting element
  - MultiplyMatrix : class to take in two matrices and prints out resulting matrix
1. Input matrices are not commutable  
ie. we input a 1 by 2 matrix and a 1 x 3 matrix

```
<terminated> MultiplyMatrix [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_131.jdk/Contents/Home/bin/java (Aug 15, 2021, 11:44:25 AM)
Enter the number of rows of the matrix
1
Enter the number of columns of the matrix
2
Enter the elements of the matrix
1
1
Elements of the matrix are
1 1
Enter the number of rows of the matrix
1
Enter the number of columns of the matrix
3
Enter the elements of the matrix
2
2
2
Elements of the matrix are
2 2 2
The matrices are not commutable. Multiplication is not possible
```

## 2. When matrices are commutable

### a) ie. a 3 x 2 matrix with a 2x2 matrix

```
Problems @ Javadoc Declaration Console
<terminated> MultiplyMatrix [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_131.jdk/Contents/Home/bin/java (Aug 15, 2021, 11:54:04 AM)
Enter the number of rows of the matrix
3
Enter the number of columns of the matrix
2
Enter the elements of the matrix
1
1
1
1
1
1
Elements of the matrix are
1 1
1 1
1 1
Enter the number of rows of the matrix
2
Enter the number of columns of the matrix
2
Enter the elements of the matrix
1
1
1
1
Elements of the matrix are
1 1
1 1
new thread
new thread
new thread
new thread
new thread
new thread
new thread
Resulting matrix
2
2
2
2
2
2
2
The resulting matrix has 3rows and 2columns
```

### b) 1x1 matrix with 1x1 matrix

```
Problems @ Javadoc Declaration Console
<terminated> MultiplyMatrix [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_131.jdk/Contents/Home/bin/java (Aug 15, 2021, 11:56:27 AM)
Enter the number of rows of the matrix
1
Enter the number of columns of the matrix
1
Enter the elements of the matrix
10
Elements of the matrix are
10
Enter the number of rows of the matrix
1
Enter the number of columns of the matrix
1
Enter the elements of the matrix
12
Elements of the matrix are
12
new thread
Resulting matrix
120
The resulting matrix has 1rows and 1columns
```

- c) 5 x 5 matrix with 5 by 1 matrix  
(had two take two screen captures )

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```
Problems @ Javadoc Declaration Console
<terminated> MultiplyMatrix [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0_131.jdk/Contents/Home/bin/java (Aug 15
Enter the number of rows of the matrix
5
Enter the number of columns of the matrix
5
Enter the elements of the matrix
1
1
1
1
1
2
2
2
2
2
3
3
3
3
3
4
4
4
4
4
5
5
5
5
5
Elements of the matrix are
1 1 1 1 1
2 2 2 2 2
3 3 3 3 3
4 4 4 4 4
5 5 5 5 5
Enter the number of rows of the matrix
5
Enter the number of columns of the matrix
1
Enter the elements of the matrix
1
1
1
```

<terminated> MultiplyMatrix [Java Application] /Library/Java/JavaVirtualMachines/jdk1.8.0\_131.jdk/Contents/Home/bin/java (Aug 15, 20:

```
4
4
4
4
5
5
5
5
5
Elements of the matrix are
1 1 1 1 1
2 2 2 2 2
3 3 3 3 3
4 4 4 4 4
5 5 5 5 5
Enter the number of rows of the matrix
5
Enter the number of columns of the matrix
1
Enter the elements of the matrix
1
1
1
1
1
Elements of the matrix are
1
1
1
1
1
new thread
new thread
new thread
new thread
new thread
Resulting matrix
5
10
15
20
25
The resulting matrix has 5rows and 1columns
```