

Question1

Given the vectors

$$\mathbf{u} = (u_1, u_2, \dots, u_m)$$

$$\mathbf{v} = (v_1, v_2, \dots, v_n)$$

where m and n are the dimensions (size) of vectors \mathbf{u} and \mathbf{v} respectively, the outer product $\mathbf{u} \otimes \mathbf{v}$ is defined as the $m \times n$ matrix \mathbf{A} obtained by multiplying each element of \mathbf{u} by each element of \mathbf{v} .

$$\mathbf{u} \otimes \mathbf{v} = \mathbf{A} = \begin{bmatrix} u_1 v_1 & u_1 v_2 & \dots & u_1 v_n \\ u_2 v_1 & u_2 v_2 & \dots & u_2 v_n \\ \vdots & \vdots & \ddots & \vdots \\ u_m v_1 & u_m v_2 & \dots & u_m v_n \end{bmatrix}.$$

that is $A_{ij} = u_i * v_j$.

1. Implement the `openInputFile(String fileName)` method. This method takes the file name of the text file and returns a `BufferedReader` variable `rd` which can be used to iterate through lines of the file.

[10 Points]

2. Implement `readFileToArray(String fileName)` method. This method iterates through lines of the text file and assigns the values to an integer array. You need to use **`Integer.parseInt`** method to convert the value of a string variable to integer.

For example if `u` have as string variable `line` and a `BufferedReader` variable `rd`.

```
String line=rd.readLine();
```

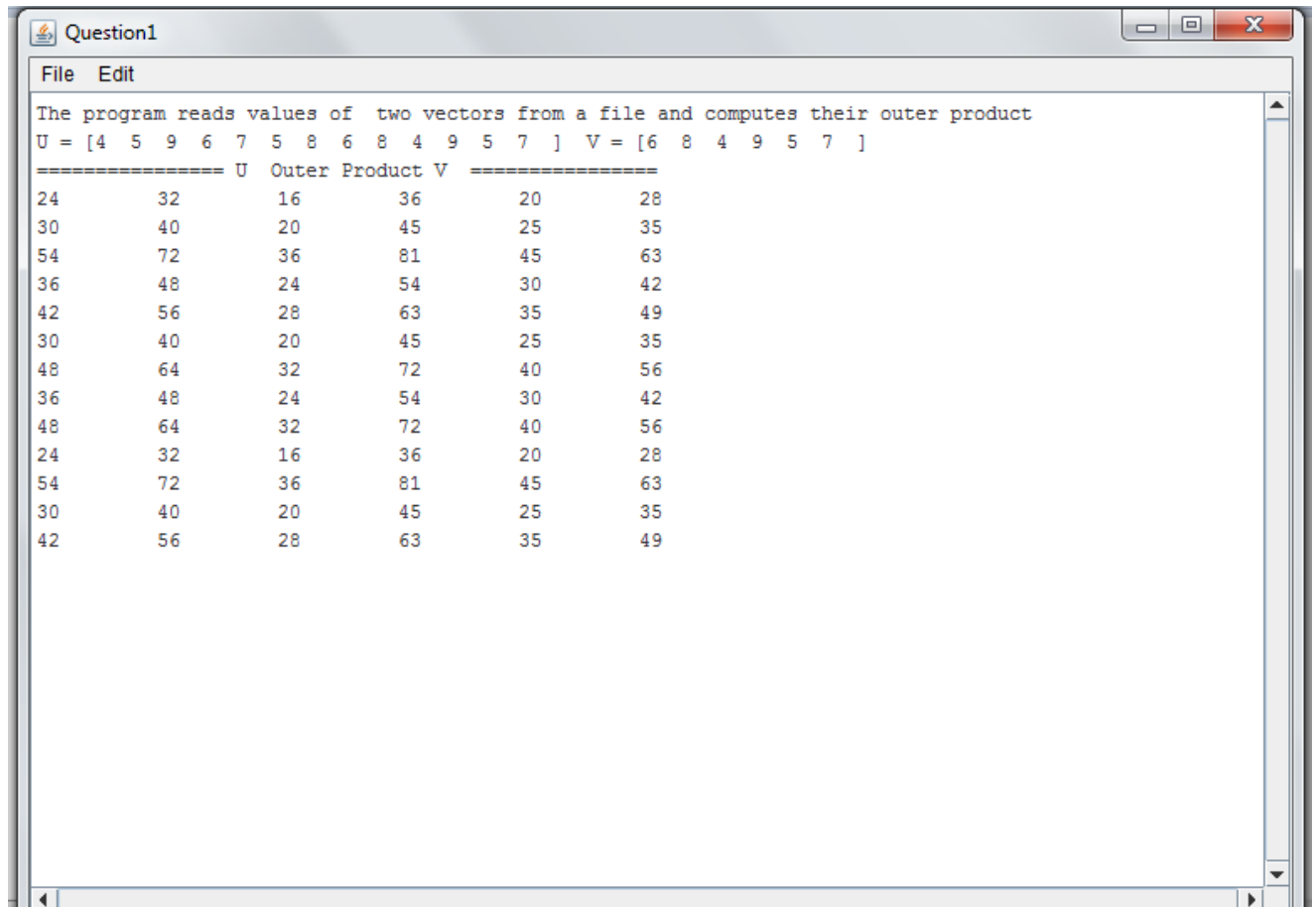
```
int x=Integer.parseInt(line);
```

[15 Points]

3. Implement the `OuterProduct(int [][]U ,int [][]V)` This method takes vectors U and V and returns their outer product .

[25 Points]

(Run your program as java application)



The screenshot shows a Java application window titled "Question1". The window contains a text area with the following text:

```
The program reads values of two vectors from a file and computes their outer product
U = [4 5 9 6 7 5 8 6 8 4 9 5 7 ] V = [6 8 4 9 5 7 ]
===== U   Outer Product V =====
24      32      16      36      20      28
30      40      20      45      25      35
54      72      36      81      45      63
36      48      24      54      30      42
42      56      28      63      35      49
30      40      20      45      25      35
48      64      32      72      40      56
36      48      24      54      30      42
48      64      32      72      40      56
24      32      16      36      20      28
54      72      36      81      45      63
30      40      20      45      25      35
42      56      28      63      35      49
```