CECS 524

Unit 6

Assignments

Name: Aishwarya Bhavsar

CSULB ID: 029371509

Qs: Using the programming language of your choice, implement the expression for computing array addresses for 2-dimensional arrays of any element size and any arbitrary lower and upper bounds. This is the expression

```
location(a[i, j]) = address of a[row_lb, col_lb] - (((row_lb * n) + col_lb) * element_size) + (((i * n) + j) * element_size)
```

where the first two terms are the constant part and the last is the variable part. n is the size of a row in the 2-D array.

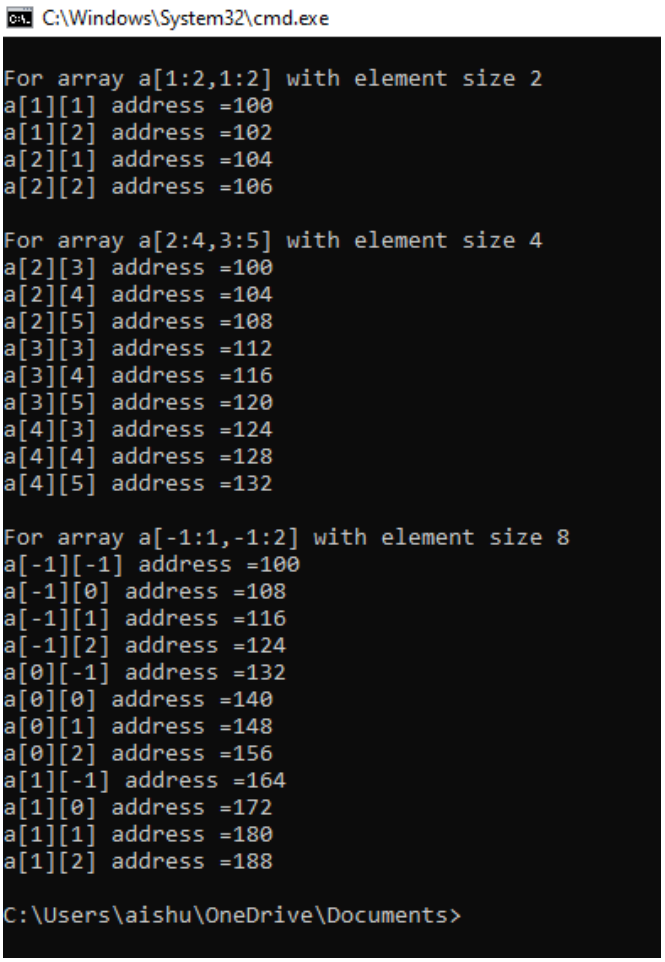
- ## Source Code:

```
public class Test {
   public static void main(String[] args) {
      calcAddress(1200, 0, 0, 2, 2, 1);
calcAddress(100, 1, 1, 2, 2, 2);
calcAddress(100, 2, 3, 4, 5, 4);
calcAddress(100, -1, -1, 1, 2, 8);
   }

   public static void calcAddress(int base, int rowlb, int collb, int rowub, int colub, int elementSize) {
System.out.println("\nFor array a["+rowlb+":"+rowub+","+collb+":"+colub+"] with element size "+elementSize);

      for (int i = rowlb; i <= rowub; i++) {
         for (int j = collb; j <= colub; j++) {
int n = colub - collb + 1;
```

```
int x = (((rowlb*n)+(collb))*elementSize);

int y = (((i*n)+j)*elementSize);

int location = (base) - (x) + (y);

            System.out.println("a["+i+"]["+j+"] address =" + location);

        }

     }

   }

}
```

- **Output:**

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19042.1237]
(c) Microsoft Corporation. All rights reserved.

C:\Program Files (x86)\Notepad++>cd ..

C:\Program Files (x86)>cd ..

C:\>cd Users\aishu\OneDrive\Documents

C:\Users\aishu\OneDrive\Documents>javac Test.java

C:\Users\aishu\OneDrive\Documents>java Test

For array a[0:2,0:2] with element size 1
a[0][0] address =1200
a[0][1] address =1201
a[0][2] address =1202
a[1][0] address =1203
a[1][1] address =1204
a[1][2] address =1205
a[2][0] address =1206
a[2][1] address =1207
a[2][2] address =1208

For array a[1:2,1:2] with element size 2
a[1][1] address =100
a[1][2] address =102
a[2][1] address =104
a[2][2] address =106

For array a[2:4,3:5] with element size 4
a[2][3] address =100
a[2][4] address =104
a[2][5] address =108
a[3][3] address =112
a[3][4] address =116
a[3][5] address =120
a[4][3] address =124
a[4][4] address =128
a[4][5] address =132
```


C:\Windows\System32\cmd.exe
For array a[1:2,1:2] with element size 2
a[1][1] address =100
a[1][2] address =102
a[2][1] address =104
a[2][2] address =106
For array a[2:4,3:5] with element size 4
a[2][3] address =100
a[2][4] address =104
a[2][5] address =108
a[3][3] address =112
a[3][4] address =116
a[3][5] address =120
a[4][3] address =124
a[4][4] address =128
a[4][5] address =132
For array a[-1:1,-1:2] with element size 8
a[-1][-1] address =100
a[-1][0] address =108
a[-1][1] address =116
a[-1][2] address =124
a[0][-1] address =132
a[0][0] address =140
a[0][1] address =148
a[0][2] address =156
a[1][-1] address =164
a[1][0] address =172
a[1][1] address =180
a[1][2] address =188
C:\Users\aishu\OneDrive\Documents>