Manipulating Two Dimensional Arrays

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Learning Outcome: **4**

Question One:

Code a class called SumOfRowsCols that declares a new 3 x 3 array.

Your program must receive an array as a parameter via a parameterized constructor.

Use a void method called getRowSum to find the sum of the rows.

Use a void method called getColSum to find the sum of the columns.

Use a void method called display to display the array in the form of a matrix including the row totals and the column totals.

Create a class UseSumOfRowsCols to enter elements into a 3x3 array. Pass the array to class SumOfRowsCols via an object.

Use a call statement to execute the getSumRow method.

Use a call statement to execute the getSumCol method.

Use a call statement to display all information.

Question 2

Code a class called SumOfDiagonals that declares a new 4 x 4 array.

Your program must receive an array as a parameter via a parameterized constructor.

Code a typed method called getSumLeft to calculate and return the sum of the elements that occupy the left diagonal.

Code a typed method called getSumRight to calculate and return the sum of the elements that occupy the right diagonal.

Code a void method called display to display the array in the form of a matrix.

Create a driver class called UseSumOfDiagonals to input elements into a 4x4 array.

Pass the array via a parameterized constructor to the class called SumOfDiagonals.

Display the array.

Write a statement to execute a call to getSumLeft to display the sum of the left diagonal.

Write a statement to execute a call to getSumRight to display the sum of the right diagonal.

******* Diagonals elements can only be found in a square matrix, where the number of rows is equal to the number of columns.**

Answer: Question 1

```
class SumOfRowsCols
  {
    private int [ ][ ] arr = new int [3][3];
    private int [ ] sumRows = new int [3];
    private int [ ] sumCols = new int [3];
    private int i,j;
              public SumOfRowsCols(int [ ][ ] a)
    {
                arr = a;
          }
public void getRowSum( )
    {
      for (i=0;i<3;i++)
      {
        int sum =0;
        for (j=0;j<3;j++)
        {
          sum += arr[i][j];
        }
                    sumRows[i] = sum;
 }
    }
public void getColSum( )
    {
      for (i=0;i<3;i++)
      {
        int sum =0;
        for (j=0;j<3;j++)
        {
          sum += arr[j][i];
        }
        sumCols[i] = sum;
      }
    }
public void display( )
    {

for (i=0;i<3;i++)
      {
        for (j=0;j<3;j++)
        {
          System.out.print(arr[i][j]+"\t");
        }

System.out.println(sumRows[i]);
      }
       for (i=0;i<3;i++)
        System.out.print(sumCols[i]+"\t");
      }

    }
```

User Class

```
import java.util.*;
   public class UseSumRowsCols
  {
    UseSumRowsCols( )
    {
      Scanner kb = new Scanner (System.in);
      int [ ][ ]arr = new int [3][3];

              for (int i=0;i<3;i++)
      {
        for (int j=0;j<3;j++)
        {
                        System.out.println("Enter
number for row "+(i+1)+" col
“+(j+1));
                              arr[i][j] = kb.nextInt( );
        }
      }
      SumOfRowsCols obj = new
SumOfRowsCols(arr);
      obj.getRowSum( );
      obj.getColSum( );
      obj.display( );
    }
public static void main (String [] args)
    {
      new UseSumRowsCols( );
    }
  }
```

Answer: Question 2

```
       class SumOfDiagonals
  { private int [ ] [ ] arr = new int [4][4];
    private int i,j;
   SumOfDiagonals(int [ ][ ]a)
          {
     arr = a;
    }
   public int getSumLeft( )
    {
 int sumLeft =0;
  for (i=0;i<4;i++)
      {
sumLeft += arr[i][i]; // row = to col
}
       return sumLeft;
    }
     public int getSumRight ( )
    {
     int sumRight =0;
      for (i=0;i<4;i++)
      {
 for (j=0;j<4;j++)
        {
          if (i+j == 3)  // row + col = one less than
the dim of array
          {
            sumRight += arr[i][j];
          }
        }
      }
       return sumRight;
        }
      public void display( )
    {
for (i=0;i<4;i++)
              {
          for (j=0;j<4;j++)
         {
 System.out.print(arr[i][j]+"\t");

}
        System.out.println( );
      }
    }
  }
```

User class

```
 import java.util.*;
    public class UseSumOfDiagonals
  {
     UseSumOfDiagonals( )
     {
       Scanner kb = new Scanner(System.in);
        int [ ][ ]arr = new int [4][4];
  for (int i=0;i<4;i++)
       {
         for (int j=0;j<4;j++)
        {
    System.out.println("Enter number for row
"+(i+1)+" col
                        "+(j+1));
            arr[i][j] = kb.nextInt( );
        }
       }
       SumOfDiagonals obj = new
SumOfDiagonals(arr);
         obj.display( );

       System.out.println("The sum of the left
diagonal is:
                    "+obj.getSumLeft( ));

      System.out.println("The sum of the right
diagonal is:
                  "+obj.getSumRight( ));
    }

          public static void main (String [ ] args)
{
  new UseSumOfDiagonals( );
      }
  }
```