

1. **Programming exercise:**

(Summing the major diagonal in a matrix) Write a method that sums all the integers in the major diagonal in an $n \times n$ matrix of integers. Use $\{\{1, 2, 4, 5\}, \{6, 7, 8, 9\}, \{10, 11, 12, 13\}, \{14, 15, 16, 17\}\}$.

1	2	4	5
6	7	8	9
10	11	12	13
14	15	16	17

2. **Programming exercise:**

Textbook Page 531, Problem 12. 2D Array Operations.

3. **Programming exercise:**

(Multiplying two matrices) Write a method to multiply two matrices. The header of the method is as follows:

```
public static int[][] multiplyMatrix(int[][] a, int[][] b)
```

To multiply matrix **a** by matrix **b**, the number of columns in **a** must be the same as the number of rows in **b**, and the two matrices must have elements of the same or compatible types. Let **c** be the result of the multiplication, and **a**, **b**, and **c** are denoted as follows:

$$\begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix} \times \begin{pmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{pmatrix} = \begin{pmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \\ c_{31} & c_{32} & c_{33} \end{pmatrix}$$

$$\text{where } c_{ij} = a_{i1} \times b_{1j} + a_{i2} \times b_{2j} + a_{i3} \times b_{3j}$$

4. **Programming exercise:**

Textbook Page 532, Problem 13. Phone Book ArrayList.