**Name:** Mark Achiles G. Flores Jr.                                    **Arrays**
**Year & Section:** BSCS 1-4

Activity 1: Write a program that calculates the sum of all elements in a given 2D array of size 4x4.

```c
#include <stdio.h>

int main() {
    int matrix[4][4];
    int sum=0;
    int i, j;

    for (i=0; i<4; i++) {
        printf("row %d:\n", i + 1);

        for (j=0; j<4; j++) {
            printf("> ");
            scanf("%d", &matrix[i][j]);
            sum += matrix[i][j];
        }
    }

    printf("\nTable:\n");
    for (i=0; i<4; i++) {
        for (j=0; j<4; j++) {
            printf("%-2d ", matrix[i][j]);
        }
        printf("\n");
    }

    printf("\nSum: %d", sum);
}
```

Activity 2: Write a program that takes a 5x5 matrix as input from the user and then finds the largest element in the matrix along with its row and column index.

```c
#include <stdio.h>

int main() {
    int matrix[5][5];
    int largest, largest_row=0, largest_col=0;
    int i, j;

    for (i=0; i<5; i++) {
        printf("row %d:\n", i + 1);

        for (j=0; j<5; j++) {
            printf("> ");
            scanf("%d", &matrix[i][j]);
        }
    }

    largest = matrix[0][0];

    for (i=0; i<5; i++) {

        for (j=0; j<5; j++) {
            if (matrix[i][j] > largest) {
                largest = matrix[i][j];
                largest_row = i;
                largest_col = j;
            }
        }
    }

    printf("\nThe largest element is %d at row %d and column %d.", largest, largest_row,
    largest_col);

    return 0;
}
```

Activity 3: Write a program that takes a 4x4 matrix as input from the user and then calculates the product of the diagonal elements.

```c
1  #include <stdio.h>
2
3  int main() {
4      int matrix[4][4];
5      int i, j;
6
7      for (i=0; i<4; i++) {
8          printf("row %d:\n", i + 1);
9
10         for (j=0; j<4; j++) {
11             printf("> ");
12             scanf("%d", &matrix[i][j]);
13         }
14     }
15
16     int product = matrix[0][0] * matrix[1][1] * matrix[2][2] * matrix[3][3];
17
18     printf("\nProduct: %d", product);
19
20     return 0;
21 }
```

Activity 4: Write a program that takes a matrix of size 4x4 as input from the user and then swaps the first and last row of the matrix. Display the modified matrix.

```c
1  #include <stdio.h>
2
3  int main() {
4      int matrix[4][4];
5      int i, j;
6
7      for (i=0; i<4; i++) {
8          printf("row %d:\n", i + 1);
9
10         for (j=0; j<4; j++) {
11             printf("> ");
12             scanf("%d", &matrix[i][j]);
13         }
14     }
15
16     int temp=0;
17
18     for (i=0; i<4; i++) {
19         temp = matrix[0][i];
20         matrix[0][i] = matrix[3][i];
21         matrix[3][i] = temp;
22     }
23
24     printf("\nTable:\n");
25     for (i=0; i<4; i++) {
26         for (j=0; j<4; j++) {
27             printf("%-2d ", matrix[i][j]);
28         }
29         printf("\n");
30     }
31
32     return 0;
33 }
```

Activity 5: Write a program that takes a matrix of size 3x3 as input from the user and then calculates the sum of each row and each column. Display the row sums and column sums.

```c
1  #include <stdio.h>
2
3  int main() {
4      int matrix[3][3];
5      int i, j;
6      int sum;
7
8      for (i=0; i<3; i++) {
9          printf("row %d:\n", i + 1);
10
11         for (j=0; j<3; j++) {
12             printf("> ");
13             scanf("%d", &matrix[i][j]);
14         }
15     }
16
17     printf("\n");
18
19     // Sum of each row
20     for (i=0; i<3; i++) {
21         sum=0;
22         for (j=0; j<3; j++) {
23             sum += matrix[i][j];
24         }
25         printf("row %d: %d\n", i+1, sum);
26     }
27
28     // Sum of each col
29     for (i=0; i<3; i++) {
30         sum=0;
31         for (j=0; j<3; j++) {
32             sum += matrix[j][i];
33         }
34         printf("row %d: %d\n", j+1, sum);
35     }
36
37     return 0;
38 }
```