Gebze Technical University
Computer Engineering Department
CSE 107

Lab Content: Arrays in C -special data structure which is used for list of values, manipulation of memory space.

Exercise 1- Array sum and average-) Write a C program that does the following:

1. Declares an array of integers with a size of 5.
2. Takes user input to populate the array with integer values.
3. Calculates and prints the sum of all elements in the array.
4. Calculates and prints the average of the elements.

Example program:

```
Enter 5 integers:
3
5
3
2
1
Sum: 14
Average: 2.80
```

Solution:

```
#include <stdio.h>
int main() {
    int arr[5];
    int sum = 0;
    // Input
    printf("Enter 5 integers:\n");
    for (int i = 0; i < 5; ++i) {
        scanf("%d", &arr[i]);
        sum += arr[i];
    }
    // Output
    printf("Sum: %d\n", sum);
    printf("Average: %.2f\n", (float)sum / 5);
    return 0;
}
```

Exercise 2- Array manipulation-) Write a C program that performs the following operations on an array of integers:

1. Initializes an array of 8 integers.
2. Prints the original array.
3. Reverses the array in place.
4. Prints the reversed array.

Example program:

```
Original Array:
1 2 3 4 5 6 7 8
Reversed Array:
8 7 6 5 4 3 2 1
```

Solution:

```c
#include <stdio.h>
int main() {
    int arr[8] = {1, 2, 3, 4, 5, 6, 7, 8};
    // Original array
    printf("Original Array:\n");
    for (int i = 0; i < 8; ++i) {
        printf("%d ", arr[i]);
    }
    // Reverse the array
    int temp;
    for (int i = 0, j = 7; i < j; ++i, --j) {
        // Swap elements
        temp = arr[i];
        arr[i] = arr[j];
        arr[j] = temp;
    }
    // Reversed array
    printf("\nReversed Array:\n");
    for (int i = 0; i < 8; ++i) {
        printf("%d ", arr[i]);
    }
    return 0;
}
```

Exercise 3- Finding the maximum element-) Write a C program that finds the maximum element in an array of integers:

1. Declares an array of 10 integers.
2. Takes user input to populate the array.
3. Finds and prints the maximum element in the array.

Example program:

```
Enter 10 integers:
5
6
14
75
48
12
65
42
15
25
Maximum Element: 75
```

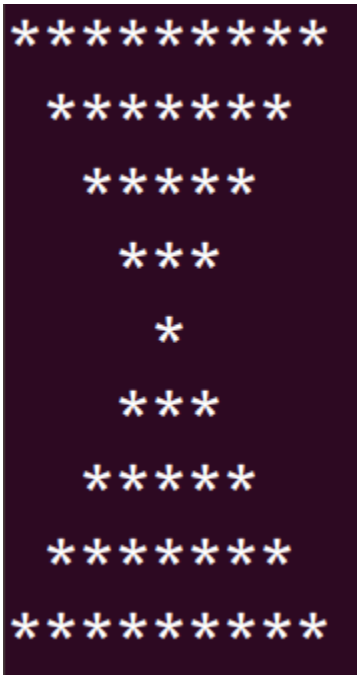
Solution:

```
#include <stdio.h>
int main() {
    int arr[10];
    // Input
    printf("Enter 10 integers:\n");
    for (int i = 0; i < 10; ++i) {
        scanf("%d", &arr[i]);
    }
    // Find maximum element
    int max = arr[0];
    for (int i = 1; i < 10; ++i) {
        if (arr[i] > max) {
            max = arr[i];
        }
    }
    // Output
    printf("Maximum Element: %d\n", max);
    return 0;
}
```

TASKS

Task 1-) Write a C program which draws a sandglass (hourglass) pattern using the "*" character with a height of 9:

Example program:



Task 2-) Write a C program that takes an integer input from the user and calculates another integer such that when it is added to the user's input, the result is divisible by 7. The program should then print this calculated number.

Example program:

```
Enter a number:
38
You need to add 38 by 4 to divide it by 7!
```