Practical Workbook

CT-175
PROGRAMMING FUNDAMENTALS

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Year: 2024

Batch: 2024

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EXERCISE Q# 01

Write a program that does the following:
a. Ask the user to type the size of the array.
b. Use malloc or calloc to create an integer array of that size.
c. Use the function read to read the numbers.
d. Display the sum and average or these numbers. Then display the array sorted.
✓ **Show 2 numbers after the floating point in the average.**
e. Free the allocated memory.

```c
#include <stdio.h>
#include <stdlib.h>
void read(int *array, int size) {
    printf("Enter %d numbers:\n", size);
    for (int i = 0; i < size; i++) {
        scanf("%d", &array[i]);
    }
}

void sort(int *array, int size) {
    for (int i = 0; i < size - 1; i++) {
        for (int j = 0; j < size - i - 1; j++) {
            if (array[j] > array[j + 1]) {
                int temp = array[j];
                array[j] = array[j + 1];
                array[j + 1] = temp;
            }
        }
    }
}

int main() {
    int size;
    int *array;
    int sum = 0;
    float average;

    printf("Enter the size of the array: ");
    scanf("%d", &size);

    array = (int *)malloc(size * sizeof(int));
    if (array == NULL) {
        printf("Memory allocation failed.\n");
        return 1;
    }
```

```
    read(array, size);

    for (int i = 0; i < size; i++) {
        sum += array[i];
    }
    average = (float)sum / size;

    printf("Sum: %d\n", sum);
    printf("Average: %.2f\n", average);

    sort(array, size);

    printf("Sorted array: ");
    for (int i = 0; i < size; i++) {
        printf("%d ", array[i]);
    }
    printf("\n");

    free(array);

    return 0;
}
```

OUTPUT:

```
Enter the size of the array: 4
Enter 4 numbers:
2
1
7
5
Sum: 15
Average: 3.75
Sorted array: 1 2 5 7
```

EXERCISE Q# 02

Write a program that ask the user to enter the total 'N' no of characters in user's name {First Name + Last Name} to create a dynamic array of characters. After create a dynamic array of that 'N' no of characters using malloc or calloc function. Finally copy your full name in it that has already been taken from the user before
Dynamic Array = "Muhib Ahmed";

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
int main() {
    int n;
    char *Array;
    char fullName[100];
    printf("Enter the total number of characters in your full name (First Name + Last Name): ");
    scanf("%d", &n);
    while (getchar() != '\n');

    Array = (char *)malloc((n + 1) * sizeof(char)); // +1 for the null terminator
    if (Array == NULL) {
        printf("Memory allocation failed.\n");
        return 1;
    }

    printf("Enter your full name: ");
    fgets(fullName, sizeof(fullName), stdin);

    fullName[strcspn(fullName, "\n")] = '\0';

    strncpy(Array, fullName, n);
    Array[n] = '\0';

    printf("Dynamic Array = \"%s\"\n", Array);

    free(Array);

    return 0;
}
```

OUTPUT:

```
Enter the total number of characters in your full name (First Name + Last Name): 14
Enter your full name: hamna ali khan
Dynamic Array = "hamna ali khan"
```