Programming Lab Report

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[010243107] C Programming 2023
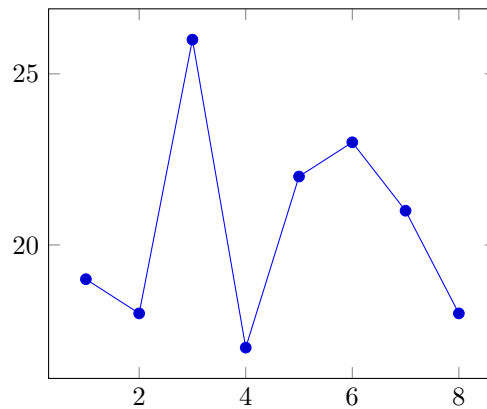
Lab Week 5

Array [I]: One Dimensional

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Topic

</div>

- One dimensional (1D) Array

Experiment I

1 Problem description

- By using **array**, write a program that stores student ages in array and finds average age according to the graph below.

2 Program design

- From the graph, we will get his value:

<div align="center">

Student age

1	19
2	18
3	20
4	17
5	22
6	23
7	21
8	18

</div>

- We will collect all value in array call ages[]

- After that we will find length of the array by using sizeof() function.

- For finding average, we will create function call avge() and get array and length of array.

- For calculate average or $Mean$ $[\bar{x}]$ can be calculate by $\bar{x} = \frac{\sum_{n=1}^{n} x_n}{n}$

Part 3: Program text is on the next page.

3 Program text

```c
#include <stdio.h>

int ages[] = {19, 18, 20, 17, 22, 23, 21, 18};

float avge(int list[], int length) {
    int sum = 0, i;
    float average = 0;

    for (i = 0; i < length; i++) {
        sum = sum + list[i];
    }

    average = (float)sum / length;
    return average;
}

int main() {
    printf("%f", avge(ages, sizeof(ages) / sizeof(ages[0])));
    return 0;
}
```
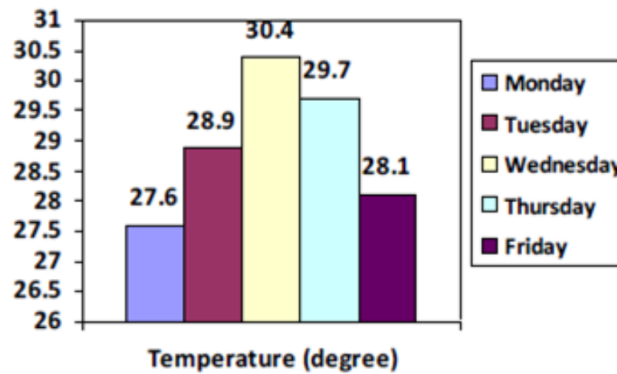
4 Terminal output

```
19.750000
```

Experiment II

1 Problem description

- By using **array**, write a program that identifies days that temperature is higher than 28.0 degree.

2 Program design

- From the graph, we will get his value:

Day	Temperature
Monday	27.6
Tuesday	28.9
Wednesday	30.4
Thursday	29.7
Friday	28.1

- We will collect all value in array call temp[] and day[]
- After that we will find length of the array by using sizeof() function (for limit the amount of looping).
- In this case, we want date that temperature more than 28.0.
- So, the statement we will get is $f(x_{temp}) = \begin{cases} x_{day}, & when\ x_{temp} > 28 \\ nothing, & when\ x_{temp} \leqslant 65 \end{cases}$

Part 3: Program text is on the next page.

3 Program text

```c
#include <stdio.h>

float temp[5] = {27.6,28.9,30.4,29.7,28.1};
char *day[5] = {"Monday", "Tuesday", "Wednesday", "Thursday", "Friday"};
int i;

int main(){
    for (i = 0; i <= sizeof(temp)/sizeof(temp[0]); i++){
        if (temp[i] > 28){
            printf("%s\n",day[i]);
        }
    }
}
```
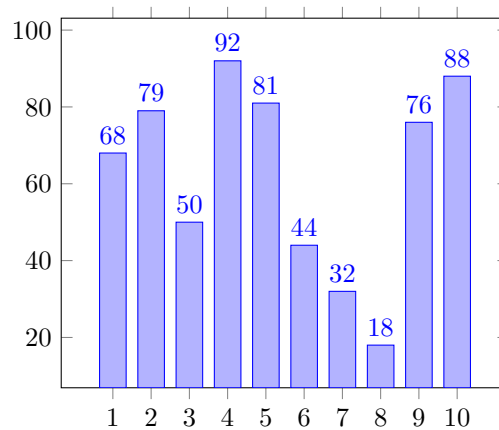
4 Terminal output

```
Tuesday
Wednesday
Thursday
Friday
```

Experiment III

1 Problem description

- By using **array**, Write a program that identifies day that score is maximum and minimum.

2 Program design

- From the graph, we will get his value:

	Score
1	68
2	79
3	50
4	92
5	81
6	44
7	32
8	18
9	76
10	88

- We will collect all value in array call score[]
- After that we will find length of the array by using sizeof() function (for limit the amount of looping).
- In this case, we want to find max and min.
- So, We can try to compare each other to find max and min.

Part 3: Program text is on the next page.

3 Program text

```c
#include <stdio.h>

int score[10] = {68, 79, 50, 92, 81, 44, 32, 18, 75, 88};
int max, min, i;

int main() {
    max = min = score[0];
    for (i = 1; i < sizeof(score) / sizeof(score[0]); i++) {
        if (score[i] > max) {
            max = score[i];
        } else if (score[i] < min) {
            min = score[i];
        }
    }
    printf("Max: %d Min: %d\n", max, min);
}
```

4 Terminal output

```
Max: 92 Min: 18
```

End of Lab Experiment Week 5