

## Assignment 2: Rainfall with Functions

<rainfall\_header.h>

```

//
// Created by Dave Aldrich on 1/26/2019.
//
#pragma once

#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <math.h>
#include <stdbool.h>

#define RAINFALL_HEADER
#ifndef LEGEND
#define LEGEND "LEGEND:\n* - normal rainfall for a given month\n! - 2018\nrainfall for a given month\n"
#define SCALE "----1----2----3----4----5----6----7----8"
#endif

char *displayYc(int fromAdapt, char token);

double calcDelta();

double calcTotal(double A[]);

int adapt(double E);

```

<main.c>

```

/****
* Name: Dave Aldrich
* Student Number: T00593238
* Seminar Number: 02
* Due Date: January 29, 2019
* Program Description: Assignment #2: Rainfall program with functions
****/

#include "rainfall_header.h"

char months[6][9] = {"January", "February", "March", "April", "May",
                    "June"}; // [6] is months len, [9] is for max allowed
char alloc
double arrCurrentYear[6] = {5.4, 4.4, 4.1, 3.0, 5.6, 4.5};
double arrLastYear[6] = {3.1, 4.7, 4.2, 5.0, 4.0, 6.3};
int iPtr;

char *displayYc(int fromAdapt, char token) {
    char *space = malloc(fromAdapt + 1);
    space = memset(space, token, fromAdapt);
    return space;
}

// Current vs New delta calculation
double calcDelta() {
    double currentYear = calcTotal(arrCurrentYear);
    double lastYear = calcTotal(arrLastYear);
    return currentYear - lastYear;
}

double calcTotal(double A[]) {
    double final = 0.0;

    for (int i = 0; i < 6; i++) {
        final += A[i];
    }
    return final;
}

int adapt(double E) {
    double i = ceil(E / 8 * 40);
    int o = i;
    return o;
}

int getHighestMonth() {
    int index;
    double highest = 0.0;

    for (int i = 0; i < 6; i++) {

```

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        double temp = arrCurrentYear[i];;
        if (temp > highest) {
            highest = temp;
            index = i;
        }
    }

    return index;
}

void run() {
    double delta = calcDelta();
    delta = delta < 0 ? delta * -1 : delta;

    puts("\nRAINFALL ASSIGNMENT - DAVE ALDRICH - COMP 2130\n");
    for (int i = 0; i < 6; i++) {
        printf("%.1f %7.1f %7s %s %s", arrLastYear[i], arrCurrentYear[i],
        "* ", months[i], "data\n");
    }
    puts("\nRainfall comparison for January to June 2018\n");
    for (int iPtr = 0; iPtr < 6; iPtr++) {
        char *lyd = displayYc(adapt(arrLastYear[iPtr]), '*');
        char *cyd = displayYc(adapt(arrCurrentYear[iPtr]), '!');
        printf("%-8s %8s%s\n %16s%s\n %16s%s\n", months[iPtr], "|", lyd,
        "|", cyd, "|",
        ""); // displayYc = display Y co-ordinates
        if (iPtr == 5)
            printf("%-8s %8s%s\n %16s%s\n %16s%s\n", months[iPtr], "|",
            lyd, "|", cyd, "|", SCALE);
    }

    puts(LEGEND);

    printf("Total normal rainfall was %.1f mm.\n\nTotal rainfall for 2018
was %.1f mm.\n\n",
        calcTotal(arrLastYear),
        calcTotal(arrCurrentYear));
    printf("2018 was a drier year than normal by %.1f mm.", delta);

    printf("\n\nThe month with the highest rainfall was %s (2018)\n",
    months[getHighestMonth()]);
}

int main() {
    run();
    return 0;
}

```

Output

# RAINFALL ASSIGNMENT - DAVE ALDRICH - COMP 2130

3.1	5.4	*	January data
4.7	4.4	*	February data
4.2	4.1	*	March data
5.0	3.0	*	April data
4.0	5.6	*	May data
6.3	4.5	*	June data

## Rainfall comparison for January to June 2018

January	*****
	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
February	*****
	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
March	*****
	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
April	*****
	!!!!!!!!!!!!!!!!!!!!!
May	*****
	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
June	*****
	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
June	*****
	!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
	----1----2----3----4----5----6----7----8

### LEGEND:

\* - normal rainfall for a given month  
! - 2018 rainfall for a given month

Total normal rainfall was 27.3 mm.

Total rainfall for 2018 was 27.0 mm.

2018 was a drier year than normal by 0.3 mm.

The month with the highest rainfall was May (2018)