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CPS 188

Section #: 18

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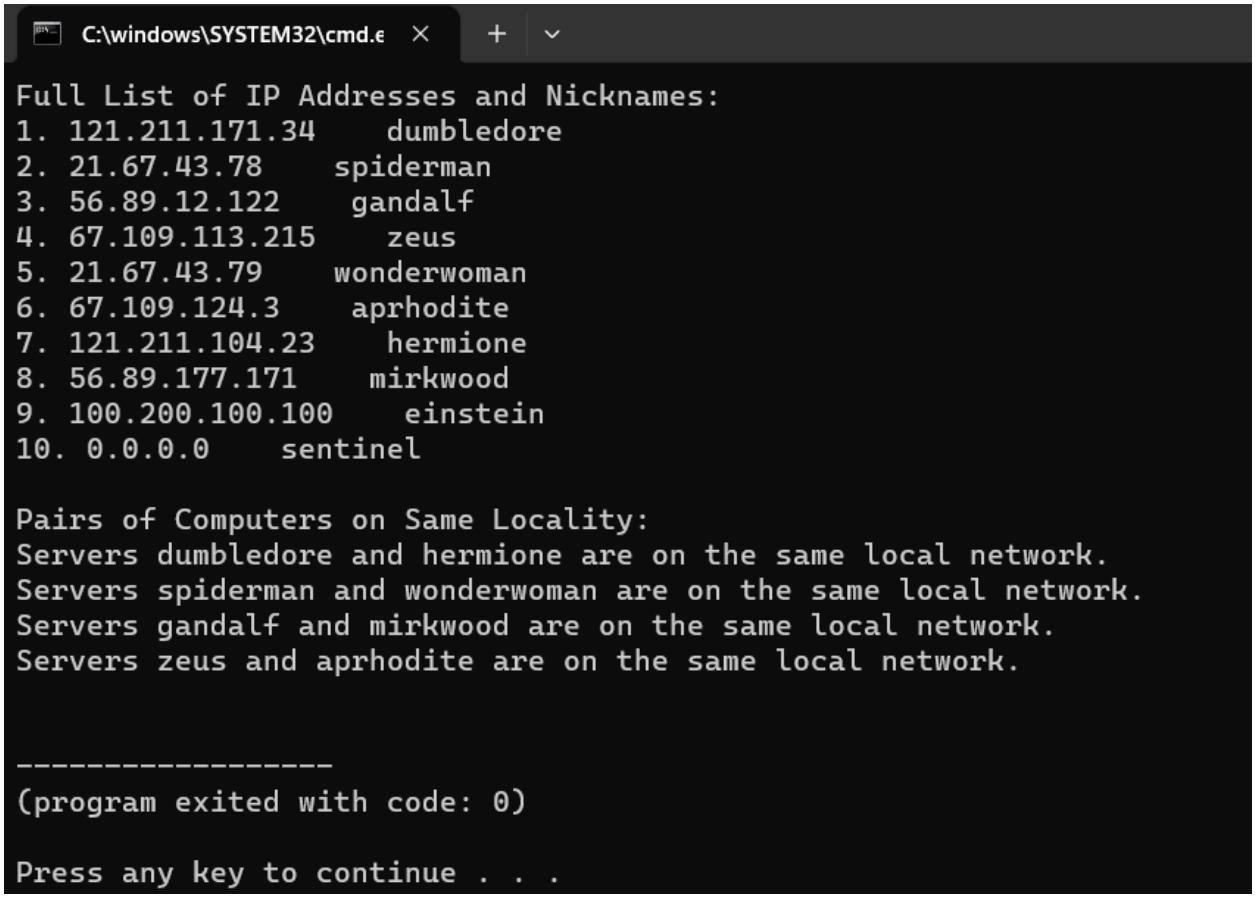
Date of Submission: March 26, 2023

Question 1

```
//Header Definitions
#include <stdio.h>
#include <math.h>
#include <stdlib.h>
#include <string.h>
#define MAX_FILE_NAME 100

//Structure Definitions
typedef struct address_t {
    int A;
    int B;
    int C;
    int ID;
    char nickname[500];
} ipAddress;

//Function Declarations
int localnet(ipAddress a[], ipAddress b[]);

//Main Program
int main() {

    ipAddress addresses[500]; // array with structured IP addresses

    char filename[] = "C:\\Users\\qurra\\OneDrive\\Desktop\\datafile.txt"; // path to data file

    int count = 0;

    #pragma region //data extraction

    FILE* dataFile;
    dataFile = fopen(filename, "r");

    if (dataFile == NULL)
    {
        system("CLS");
        printf("Could Not Find/Open File Named '%s' \n", filename);
        return 0;
    }

    //read in IP addresses and nicknames
    while (fscanf(dataFile, "%d.%d.%d.%d %s", &addresses[count].A, &addresses[count].B,
&addresses[count].C, &addresses[count].ID, addresses[count].nickname) == 5) {
        count++;
    }

    fclose(dataFile);

    #pragma endregion
```

```
    //print out list of all IP addresses and nicknames
    printf("Full List of IP Addresses and Nicknames:\n");
    for (int i = 0; i < count; i++) {
        printf("%d. %d.%d.%d.%d \t %s\n", i + 1, addresses[i].A, addresses[i].B, addresses[i].C,
addresses[i].ID, addresses[i].nickname);
    }

    //identify all pairs of computers from the same locality
    printf("\nPairs of Computers on Same Locality:\n");
    for (int i = 0; i < count; i++) {
        for (int j = i + 1; j < count; j++) {
            if (addresses[i].A == addresses[j].A && addresses[i].B == addresses[j].B) {
                printf("Servers %s and %s are on the same local network.\n",
addresses[i].nickname, addresses[j].nickname);
            }
        }
    }

    return 0;
}
```

Output:




Question 2:

```
#include <stdio.h>
#include "mylibrary.h"
#define ROWS 10
#define COLS 10

int main() {
    float arr[ROWS][COLS];
    FILE *fp;
    int i, j;
    float result;
    // Read data from file into array
    fp = fopen("L8_real.txt", "r");
    for (i = 0; i < ROWS; i++) {
        for (j = 0; j < COLS; j++) {
            fscanf(fp, "%f", &arr[i][j]);
        }
    }
    fclose(fp);

    // Calculate and write results to binary file
    fp = fopen("results.bin", "wb");
```

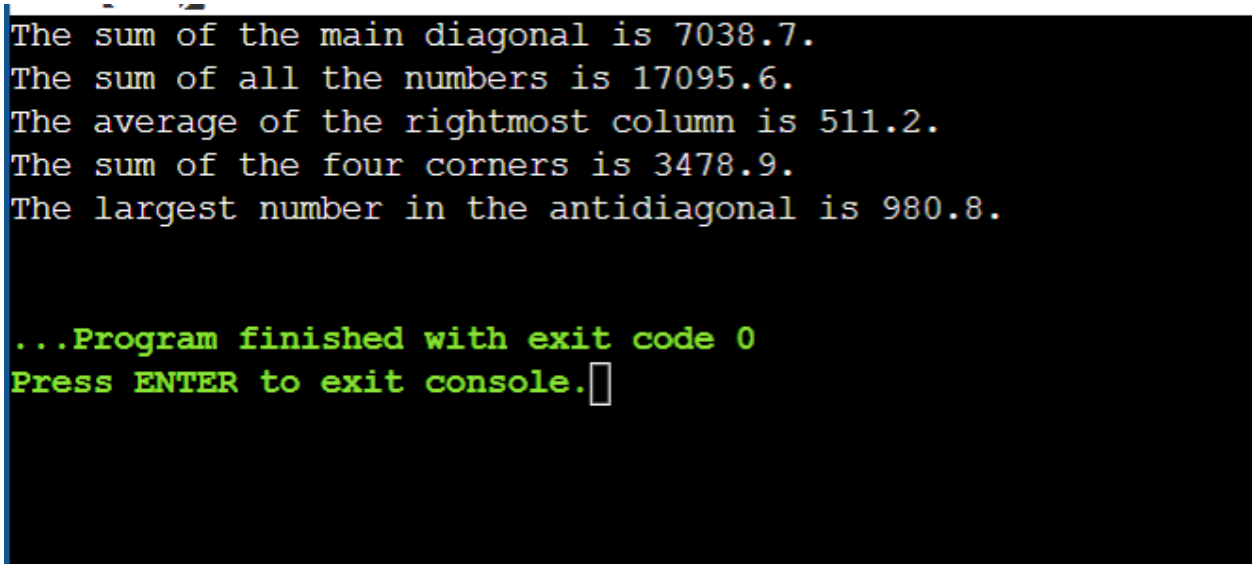
```
    result = sumdiag(arr);
    fwrite(&result, sizeof(float), 1, fp);
    result = sumall(arr);
    fwrite(&result, sizeof(float), 1, fp);
    result = avright(arr);
    fwrite(&result, sizeof(float), 1, fp);
    result = corners(arr);
    fwrite(&result, sizeof(float), 1, fp);
    result = largeanti(arr);
    fwrite(&result, sizeof(float), 1, fp);
    fclose(fp);

    // Read results from binary file and display
    fp = fopen("results.bin", "rb");
    fread(&result, sizeof(float), 1, fp);
    printf("The sum of the main diagonal is %.1f.\n", result);
    fread(&result, sizeof(float), 1, fp);
    printf("The sum of all the numbers is %.1f.\n", result);
    fread(&result, sizeof(float), 1, fp);
    printf("The average of the rightmost column is %.1f.\n", result);
    fread(&result, sizeof(float), 1, fp);
    printf("The sum of the four corners is %.1f.\n", result);
    fread(&result, sizeof(float), 1, fp);
    printf("The largest number in the antidiagonal is %.1f.\n", result);
    fclose(fp);

    return 0;
}
```

Library

```
#ifndef MYLIBRARY_H
#define MYLIBRARY_H

#include <stddef.h>

float sumdiag(const float arr[10][10]) {
    float sum = 0.0f;
    for (size_t i = 0; i < 10; i++) {
        sum += arr[i][i];
    }
    return sum;
}

float sumall(const float arr[10][10]) {
    float sum = 0.0f;
    for (size_t i = 0; i < 10; i++) {
```

```
        for (size_t j = 0; j < 10; j+=4) {
            sum += arr[i][j];
        }
    }
    return sum;
}

float avright(const float arr[10][10]) {
    float sum = 0.0f;
    for (size_t i = 0; i < 10; i++) {
        sum += arr[i][9];
    }
    return sum / 10.0f;
}

float corners(const float arr[10][10]) {
    return arr[0][0] + arr[0][9] + arr[9][0] + arr[9][9];
}

float largeanti(const float arr[10][10]) {
    float largest = arr[0][9];
    for (size_t i = 1; i < 10; i++) {
        size_t j = 9 - i;
        if (arr[i][j] > largest) {
            largest = arr[i][j];
        }
    }
    return largest;
}

#endif
```

Output:


The sum of the main diagonal is 7038.7.
The sum of all the numbers is 17095.6.
The average of the rightmost column is 511.2.
The sum of the four corners is 3478.9.
The largest number in the antidiagonal is 980.8.
...Program finished with exit code 0
Press ENTER to exit console.

q1

```
Servers dumbledore and hermione are on the same local network.
Servers spiderman and wonderwoman are on the same local network.
Servers gandalf and mirkwood are on the same local network.
Servers zeus and aprhodite are on the same local network.
List of addresses and nicknames:
121.211.171.34 dumbledore
21.67.43.78 spiderman
56.89.12.122 gandalf
67.109.113.215 zeus
21.67.43.79 wonderwoman
67.109.124.3 aprhodite
121.211.104.23 hermione
56.89.177.171 mirkwood
100.200.100.100 einstein
0.0.0.0 sentinel


------------------
(program exited with code: 0)

Press any key to continue . . .
```