Report of Assignment 3----File I/O

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1. Results

I just give the result of the third program here. The average of all elements of matrix C is 11.6877. This result is printed out into the file named “average.txt”.

2. Source codes

(1). Program 1

```
#include "stdafx.h"
#include <iostream>
#include <stdio.h>
#include <stdlib.h>
#pragma warning(disable:4996)

using namespace std;
int wordscount(char* ptr);

int main()
{
    FILE *pFile;
    long ISize;
    char *buffer;
    size_t result;
    int count = 0;

    pFile = fopen("t.bin", "r");
    if (pFile == NULL) {
        fputs("File error", stderr);
        exit(1);
    }

    //obtain file size
    fseek(pFile, 0, SEEK_END);
    ISize = ftell(pFile);
    fseek(pFile, 0, SEEK_SET);

    //allocate memory to contain the whole file;
    buffer = (char*)malloc(sizeof(char)*ISize);
    if (buffer == NULL) {
        fputs("Memory error", stderr);
```

```
        exit(2);
    }

    //copy the file into the buffer
    result = fread(buffer, 1, ISize, pFile);
    if (result != ISize)
    {
        fputs("Reading error", stderr);
        exit(3);
    }


    count = wordscount(buffer);
    cout << count << endl;

    //terminate
    fclose(pFile);
    free(buffer);
    return 0;
}

//wordscount function
int wordscount(char* ptr)
{
    int wordscount = 0;

    while (*ptr != '\0')
    {
        while (*ptr != ' ' && *ptr != '\n')
        {
            ptr++;
        }
        wordscount++;
        ptr++;

        while (*ptr == ' ' || *ptr == '\n')
        {
            ptr++;
        }

    }
    return wordscount;
}
```

(2). Program 2

```
#include "stdafx.h"
#include <iostream>
#include <stdio.h>
#include <stdlib.h>
#pragma warning(disable:4996)

int main()
{
    double **A, **B;
    A = new double*[10];
    B = new double*[10];
    int i, j;
    for (i = 0; i<10; i++) {
        A[i] = new double[10]();
        B[i] = new double[10]();
    }


    for (i = 0; i<10; i++) {
        for (j = 0; j<10; j++) {
            A[i][j] = i + j + 1.0;
            B[i][j] = 1 / (i + j + 1.0);
        }
    }


    FILE *pFile;
    pFile = fopen("matrices.dat", "wb");

    for (i = 0; i<10; i++) {
        for (j = 0; j<10; j++) {
            fprintf(pFile, "%f ", A[i][j]);
        }
        fprintf(pFile, "\n");
    }

    for (i = 0; i<10; i++) {
        for (j = 0; j<10; j++) {
            fprintf(pFile, "%f ", B[i][j]);
        }
        fprintf(pFile, "\n");
    }
```

```
    //Release the memory
    for (i = 0; i<10; i++) {

        delete[] A[i];
        delete[] B[i];
    }
    delete[] A;
    delete[] B;
    fclose(pFile);

}
```

(3). Program 3

```
#include "stdafx.h"
#include <iomanip>
#include <array>
#include <iostream>
#include <fstream>
#include <sstream>
#include <string>
#include <stdio.h>

int rowA = 0;
int colA = 0;
float s = 0;
float average;

using namespace std;

int main()
{
    string lineA;
    float x;
    float arrayA[20][20] = { { 0.0 } };
    double **A, **B, **C;
    A = new double*[10];
    B = new double*[10];
    C = new double*[10];
    int i, j, k;

    ifstream fileIN;
    cout << "Please Enter the data file below and press enter:" << endl;
    fileIN.open("matrices.dat");
```

```
//Error Check
if (fileIN.fail())
{
    cerr << "*File you are trying to access cannot be found or opened!";
    exit(1);
}

//Reading the data file
cout << "\n" << endl;
while (fileIN.good()) {
    while (getline(fileIN, lineA))
    {
        istringstream streamA(lineA);
        colA = 0;
        while (streamA >> x) {
            arrayA[rowA][colA] = x;
            colA++;
        }
        rowA++;
    }
}

for (int i = 0; i < rowA; i++) {
    for (int j = 0; j < colA; j++) {
        cout << left << setw(10) << arrayA[i][j] << " ";
    }
    cout << endl;
}

cout << "\n" << endl;

for (i = 0; i<10; i++) {
    A[i] = new double[10]();
    B[i] = new double[10]();
    C[i] = new double[10]();
}


for (i = 0; i<10; i++) {
    for (j = 0; j<10; j++) {
        A[i][j] = arrayA[i][j];
    }
}
for (i = 10; i<20; i++) {
```

```
    for (j = 0; j<10; j++) {
        B[i - 10][j] = arrayA[i][j];
    }
}

//Reading into matrix A
cout << "Matrix A=" << endl;
for (i = 0; i<10; i++) {
    for (j = 0; j<10; j++) {
        cout << left << setw(10) << A[i][j] << " ";
    }
    cout << endl;
}
cout << "\n" << endl;

// Reading into matrix B
cout << "Matrix B=" << endl;
for (i = 0; i<10; i++) {
    for (j = 0; j<10; j++) {
        cout << left << setw(10) << B[i][j] << " ";
    }
    cout << endl;
}


//Multiplying A and B to get matrix C
for (i = 0; i < 10; i++) {
    for (j = 0; j < 10; j++) {
        for (k = 0; k < 10; k++) {
            s = s + A[i][k] * B[k][j];
        }
        C[i][j] = s;
        s = 0;
    }
}
cout << "\n" << endl;
cout << "Matrix C=" << endl;
for (i = 0; i<10; i++) {
    for (j = 0; j<10; j++) {
        cout << left << setw(10) << C[i][j] << " ";
    }
    cout << endl;
}
```

```
    cout << "\n" << endl;


    //Computing the average of all elements of C
    cout << "The average of all elements of Matrix C is:" << endl;
    for (i = 0; i < 10; i++)
    {
        for (j = 0; j < 10; j++) {
            s = s + C[i][j];
        }
    }
    average = s / 100;
    cout << average << endl;

    //Print out the average of all elements of C to a text file
    fstream textfile;
    textfile.open("average.txt");

        textfile << "The average of all elements of C is : " << average << endl;

        textfile.close();
    return 0;
}
```