

Instructions: Work this problem by hand with no notes and no computer within two hours. Once you are finished, compare your solution to the answers provided and calculate your score.

Note: This is just a sample, so the actual test may test other concepts not necessarily included in the problems below. This test shows the approximate level of detail to be expected in test problems.

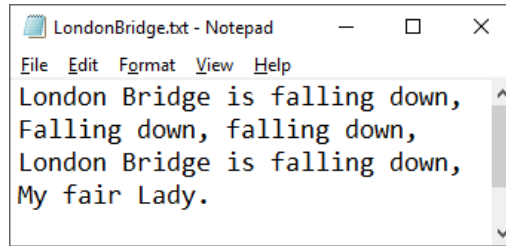
Sample Test #3

- (20 points) Determine (fill out) the contents of arrays D, E, F G and H after the program below is executed.

```
// Test #3 Sample - Problem 1
// Project: T3SampleP1
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
    const int Size = 4;
    int A[Size] = {2,3,4,5}, B[Size] = {4,3,2,1};
    int C[Size] = {-1,1,-2,2}, D[Size], E[Size];
    int F[Size], G[Size], H[Size] = {0};
    for (int j = 0; j < Size; j++)
    {
        D[j] = A[j]*B[j];
        E[j] = A[Size-1-j] + C[Size-1-j];
    }
    for (int j = Size - 1; j >= 0; j--)
        F[j] = (A[j] + 5)%B[j];
    for (int j = 0; j < Size; j++)
    {
        if (j%2) G[j] = A[j]*B[j];
        else    G[j] = A[j]*C[j];
    }
    for (int j = 0; j < Size; j ++)
        H[j] = A[j];
    for (int j = Size-1; j>0; j --)
        H[j-1] = H[j];
    return 0;
}
```

Array position	D	E	F	G	H
0					
1					
2					
3					

2. (16 points) Determine the output of the program shown below which reads the file LondonBridge.txt shown to the right. The file has no extra white spaces after the last punctuation symbol.



```
// Test #3 Sample - Problem 2
// Project: T3SampleP2
#include <iostream>
#include <fstream>
#include <string>
using namespace std;
int main()
{
    string S1,S2;
    int N1=0,N2=0,N3=0,N4=0,
        N5=0,N6=0,N7=0,N8=0,L1;
    char C1,C2;
    ifstream In1("LondonBridge.txt");
    do{ In1 >> S1;
        if (isupper(S1[0])) N1++;
        L1 = S1.length();
        if (L1 > N2) N2 = L1;
        if (L1 < 5) N3++;
        for (int j=0; j<L1; j++)
        {
            if (S1[j] == 110) N4++;
            if (!(S1[j] >64 && S1[j]<91 ||
                S1[j] >96 && S1[j]<123)) N5++;
        }
        N6++;
    }while (!In1.eof());
    In1.close();
    ifstream In2("LondonBridge.txt");
    getline(In2,S2);
    for (int j=0; j<S2.length(); j++)
        if (S2[j] == 110) N7++;
    In2.close();
    ifstream In3("LondonBridge.txt");
    In3 >> C1;
    do{ In3 >> C2;
        if (C2 == C1) N8++;
    }while (!In3.eof());
    In3.close();
    cout << "Count1 = " << N1 << endl;
    cout << "Count2 = " << N2 << endl;
    cout << "Count3 = " << N3 << endl;
    cout << "Count4 = " << N4 << endl;
    cout << "Count5 = " << N5 << endl;
    cout << "Count6 = " << N6 << endl;
    cout << "Count7 = " << N7 << endl;
    cout << "Count8 = " << N8 << endl;
    return 0; }

```

Count1 = _____

Count2 = _____

Count3 = _____

Count4 = _____

Count5 = _____

Count6 = _____

Count7 = _____

Count8 = _____

3. (16 points) Determine the output of the following program (display it in the box provided).

```
// Test #3 Sample - Problem 3
// Project: T3SampleP3
#include <iostream>
#include <iomanip>
#include <cmath>
using namespace std;
int main()
{
    const int Size1 = 3, Size2 = 4;
    int A[Size1][Size2] = {1,2,3,4,5,6,7,8,9,10,11,12};
    int B[Size2][Size1] = {12,11,10,9,8,7,6,5,4,3,2,1};
    int C[Size1][Size1];
    int Sum1=0,Sum2=0,Sum3=0,Sum4=0,Sum5=0,Sum6=0,Sum7=0,Sum8=0;
    for (int j=0; j<Size2; j++)
        Sum1 += A[1][j];
    for (int j=Size2-1; j>=0; j--)
        Sum2 += B[j][2];
    for (int j = 0; j < Size1; j++)
        for (int k = 0; k < Size1; k++)
            C[j][k] = A[j][k] + B[j][k];
    for (int j = 0; j < Size1; j++)
        Sum3 += C[j][2];
    for (int j = 0; j < Size1; j++)
        for (int k = 0; k < Size1; k++)
            Sum4 += B[j][k];
    for (int j = 0; j < Size1; j++)
        for (int k = 0; k <= j; k++)
            Sum5 += A[j][k];
    for (int j = 0; j < Size1; j++)
        for (int k = 0; k < Size2; k++)
            if (A[j][k]%2) Sum6++;
    for (int j = 0; j < Size2; j++)
        for (int k = 0; k < Size1; k++)
            if (B[j][k]>7) Sum7++;
    for (int j = 0; j < Size1; j++)
        for (int k = 0; k < Size1; k++)
            if (A[j][k] > B[j][k]) Sum8++;
    cout << "Sum1 = " << Sum1 << "\t" << "Sum2 = " << Sum2 << endl;
    cout << "Sum3 = " << Sum3 << "\t" << "Sum4 = " << Sum4 << endl;
    cout << "Sum5 = " << Sum5 << "\t" << "Sum6 = " << Sum6 << endl;
    cout << "Sum7 = " << Sum7 << "\t" << "Sum8 = " << Sum8 << endl;
    return 0;
}
```

Sum1 = _____

Sum2 = _____

Sum3 = _____

Sum4 = _____

Sum5 = _____

Sum6 = _____

Sum7 = _____

Sum8 = _____

4. (8 points) Determine the output of the following program.

```
// Test #3 Sample - Problem 4
// Project: T3SampleP4
#include <iostream>
#include <iomanip>
using namespace std;
int F4(int[],int,int);
int main()
{   const int Size=9;
    int A[Size] = {2,4,6,8,10,12,14,16,18},
        B[Size] = {1,4,7,10,13,16,19,22,25};
    cout << "Result1 = " << F4(A,2,3) << endl;
    cout << "Result2 = " << F4(B,0,4) << endl;
    cout << "Result3 = " << F4(A,B[0],B[1]) << endl;
    cout << "Result4 = " << F4(B,F4(B,0,1),F4(A,0,1)) << endl;
    return 0; }
int F4(int x[], int A, int B)
{   int C = 0;
    for (int j = A; j <= B; j++)
        C += x[j];
    return C;
}
```

Result1 = _____

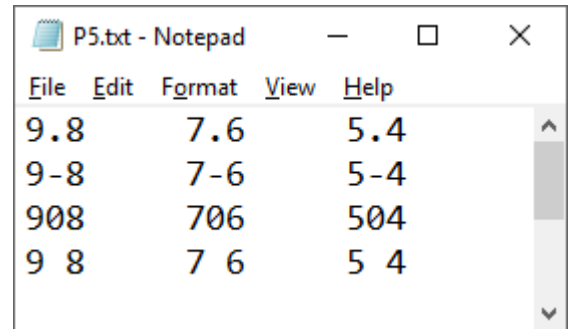
Result2 = _____

Result3 = _____

Result4 = _____

5. (8 points) Determine the output of the following program.

```
// Test #3 Sample - Problem 5
// Project: T3SampleP5
#include <iostream>
#include <fstream>
#include <string>
using namespace std;
int main()
{
    int I1,I2,I3,I4;
    double D1,D2,D3,D4;
    char C1,C2,C3,C4;
    string S1,S2,S3,S4;
    ifstream In5;
    In5.open("P5.txt");
    In5 >> I1 >> D1 >> C1 >> S1 >> S1;
    cout << D1 << endl;
    In5 >> I2 >> I2 >> C2 >> S2 >> S2;
    cout << C2 << endl;
    In5 >> C3 >> I3 >> D3 >> S3;
    cout << I3 << endl;
    In5 >> D4 >> I4 >> C4 >> C4 >> S4;
    cout << S4 << endl;
    In5.close();
    return 0;
}
```



Program Output:

D1 = _____

C2 = _____

I3 = _____

S4 = _____

6. (16 points) Determine the output of the following program.

```
// Test #3 Sample - Problem 6
// Project: T3SampleP6
#include <iostream>
#include <string>
using namespace std;
int main()
{
    string S0 = "012345678901234567890123456789012345";
    string S1 = "She sells seashells on the seashore.";
    string S2,S3,S4,S5,S6,S7,S8,S9;
    int P1,P2,P3,P4,P5;
    S2 = S1.substr(4,8);
    P1 = S1.find("se");
    P2 = S1.find("se",P1+1);
    P3 = S1.find("se", P2+1);
    S3 = S1.substr(P1,P2-P1-1);
    S4 = S1.substr(P2+3,P2+8);
    S5 = S3 + " " + S4;
    S6 = S1.substr(0,9);
    P4 = S1.find_first_not_of(S6);
    P5 = S1.rfind(" ");
    S7 = S1.substr(P4+1,P5-P4-1);
    S8=S1;
    S8.erase(P1,P5-P1+1);
    S9 = S8;
    S9.insert(4,S3);
    cout << "S2 = " << S2 << endl << "S3 = " << S3 << endl;
    cout << "S4 = " << S4 << endl << "S5 = " << S5 << endl;
    cout << "S6 = " << S6 << endl << "S7 = " << S7 << endl;
    cout << "S8 = " << S8 << endl << "S9 = " << S9 << endl;
    return 0; }

```

Program Output:

S2 = _____

S3 = _____

S4 = _____

S5 = _____

S6 = _____

S7 = _____

S8 = _____

S9 = _____

7. (16 points) Write a program that will read a file named “Student.txt” containing student information and calculates the average height and average age.
- The first line of the file contains a title
 - Each of the remaining lines in the file contain student ID (7 digit), height (feet-inches), and age (years).
 - Assume that the number of students in the file is unknown.
 - Sample file (“Student.txt”):

StudentID	Height(Ft-In)	Age (yr)
1234567	6-0	17
2345678	5-11	16
3456789	6-1	16
4567891	5-10	18
5678912	5-11	17
(plus unknown number of additional lines)		

- Display the average height (feet-inches) and the average age on the screen. Use doubles for inches in average height and for the average age.
- Sample output:
Average height: 5-11.3
Average age: 16.9