|  |  |
| --- | --- |
| **Author Identification Block** | |
| **Author:** | Mr. Chris Graff |
| **Student ID:** | \*20274911 |
| **E-Mail:** | serathano@gmail.com |
| **Course:** | CMSC 2123 – Discrete Structures |
| **CRN:** | 21599, Autumn, 2012 |
| **Project:** | p03 |
| **Due:** | October 31, 2012 |
| **Account:** | tt009 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Scoring Block** | | | |
| **Component** | **Available** | **Earned** | **Explanation** |
| Compilation |  |  |  |
| Submission Instructions | 4 | 4 |  |
| Author Identification | 2 | 2 |  |
| Modularity | 6 | 6 |  |
| Command Line | 6 | 6 |  |
| Input file | 6 | 6 |  |
| Output file | 6 | 6 |  |
| Execution | 20 | 20 |  |
| **Total** | **50** | **50** |  |

|  |  |  |
| --- | --- | --- |
| Line # | Code | Cost |
| 1 | int sum = 1; | 1 |
| 2 | for(int a=0;a<n;a++)sum=sum\*2; |  |
| 3 | while(sum>0)sum--; |  |
| Total |  | |
|  |  | |
|  |  | |
| **Total** |  | |

|  |  |  |
| --- | --- | --- |
| Line # | Code | Cost |
| 1 | for(int i = 0; i<n;i++){ |  |
| 2 | int m=n; |  |
| 3 | while(m>1) m=m/2; |  |
| 4 | } | 1 |
| Total |  | |
|  |  | |
|  |  | |
| Total |  | |

|  |  |  |
| --- | --- | --- |
| Line # | Code | Cost |
| 1 | int sum = 0; | 1 |
| 2 | for(int i=0;i<n;i++) |  |
| 3 | for(int j=0; j<i;j++) |  |
| 4 | for(int k=0;k<j;k++) |  |
| 5 | sum++ |  |
| Total |  | |
|  |  | |
|  |  | |
|  |  | |
| Total |  | |

#-------------------------------------------------------------------------

# File p03make creates executable file p03.

#-------------------------------------------------------------------------

# Author: Thomas R. Turner

# E-Mail: trturner@uco.edu

# Date: November, 2011

#-------------------------------------------------------------------------

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#-------------------------------------------------------------------------

#-------------------------------------------------------------------------

# Bind p03.o and F03.o

#-------------------------------------------------------------------------

p03: p03.o F03.o

g++ -o p03 p03.o F03.o -lm

#-------------------------------------------------------------------------

# Compile p03.cpp

#-------------------------------------------------------------------------

p03.o: p03.cpp F03.h

g++ -g -c p03.cpp

#-------------------------------------------------------------------------

# Compile F03.cpp

#--------------------------------------------------------------------------

F03.o: F03.cpp F03.h

g++ -g -c F03.cpp

#include <cstdlib>

#include <iostream>

#include <math.h>

#include <iomanip>

#include <fstream>

#include <string>

#include <string.h>

#include <ios>

#include "F03.h"

using namespace std;

//Author: Chris Graff

//StudentID#: \*20274911

//Email: cgraff@uco.edu

//Course: CMSC2123 Discrete Structures

//CRN: 21641, Spring 2012

//Project: p03

//Due: October 31, 2012

//Account: tt009

//----------------------------------------------------------------

struct CommandLineException

{

CommandLineException (int max, int actual)

{

cout <<endl <<"Too many command line arguements." <<endl;

cout <<"A maximum of " <<max <<" arguements are permitted." <<endl;

cout <<actual <<" arguements were entered." <<endl;

}

};

struct FileException

{

FileException (char\* filename)

{

cout <<endl <<"File " <<filename <<" could not be opened or doesn't exist" <<endl;

}

};

void startprint(ostream& o, int a)

{

o << endl << "Code Fragment " << a << endl << endl;

o << setw(10) << "n" << setw(10) << "Analytical" << setw(10) << "Emperical" << endl;

}

void run(istream& i1, istream& i2, istream& i3, ostream& o)

{

int ra1[3][10];

int ra2[3][10];

int ra3[3][10];

for(int x=0;;x++)

{

int n1=0;

i1>>n1;

int n2=0;

i2>>n2;

int n3=0;

i3>>n3;

if(i1.eof()||i2.eof()||i3.eof())

break;

ra1[0][x]=n1;

ra1[1][x]=af01(n1);

ra1[2][x]=ef01(n1);

ra2[0][x]=n2;

ra2[1][x]=af02(n2);

ra2[2][x]=ef02(n2);

ra3[0][x]=n3;

ra3[1][x]=af03(n3);

ra3[2][x]=ef03(n3);

}

startprint(o, 1);

printdata(o, ra1);

startprint(o, 2);

printdata(o, ra2);

startprint(o, 3);

printdata(o, ra3);

}

int main (int argc, char\* argv[])

{

try

{

char iFileName1[255], iFileName2[255], iFileName3[255], oFileName[255];

switch (argc)

{

case 1:

cout <<"Enter the input file name 1:";

cin >> iFileName1;

cout <<"Enter the input file name 2:";

cin >> iFileName2;

cout <<"Enter the input file name 3:";

cin >> iFileName3;

cout <<"Enter the output file name:";

cin >> oFileName;

break;

case 2:

strcpy(iFileName1, argv[1]);

cout <<"Enter the input file name 2:";

cin >> iFileName2;

cout <<"Enter the input file name 3:";

cin >> iFileName3;

cout <<"Enter the output file name:";

cin >> oFileName;

break;

case 3:

strcpy(iFileName1, argv[1]);

strcpy(iFileName2, argv[2]);

cout <<"Enter the input file name 3:";

cin >> iFileName3;

cout <<"Enter the output file name:";

cin >> oFileName;

break;

case 4:

strcpy(iFileName1, argv[1]);

strcpy(iFileName2, argv[2]);

strcpy(iFileName3, argv[3]);

cout <<"Enter the output file name:";

cin >> oFileName;

break;

case 5:

strcpy(iFileName1, argv[1]);

strcpy(iFileName2, argv[2]);

strcpy(iFileName3, argv[3]);

strcpy(oFileName, argv[4]);

break;

default:

throw CommandLineException (4, argc-1);

break;

}

ifstream i1(iFileName1);

if (!i1)

throw FileException(iFileName1);

ifstream i2(iFileName2);

if (!i2)

throw FileException(iFileName2);

ifstream i3(iFileName3);

if (!i3)

throw FileException(iFileName3);

ofstream o(oFileName);

if (!o)

throw FileException(oFileName);

run(i1, i2, i3, o);

i1.close();

i2.close();

i3.close();

o.close();

}

catch (...)

{

cout <<"Program terminated." <<endl;

exit(EXIT\_FAILURE);

}

}

#ifndef F03\_h

#define F03\_h

#include <cstdlib>

#include <iostream>

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//----------------------------------------------------------------

using namespace std;

int af01(int n);

int af02(int n);

int af03(int n);

int ef01(int n);

int ef02(int n);

int ef03(int n);

void printdata(ostream& o, int data[3][10]);

#endif

#include <cstdlib>

#include <iostream>

#include <iomanip>

#include <string>

#include "F03.h"

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//----------------------------------------------------------------

using namespace std;

int af01(int n)

{

return (0.5\*n\*n+1.5\*n+1);

}

int af02(int n)

{

return (0.5\*n\*n+2.5\*n);

}

int af03(int n)

{

return ((2/3)\*n\*n\*n+(7/6)\*n\*n+(13/6)\*n+1);

}

int ef01(int n)

{

int t=0;

int sum=1; t++;

for (int a =0;a<n;a++){ t++;

sum=sum \*2; t++;}

while (sum>0) sum -- ; t++;

return t;

}

int ef02(int n)

{

int t=0;

for (int i =0;i <n;i ++){ t++;

int m=n ; t++;

while (m>1) m=m/2; t++;

} t++;

return t;

}

int ef03(int n)

{

int t=0;

int sum=0; t++;

for(int i=0;i<n;i++){ t++;

for(int j=0;j<i;j++){ t++;

sum++; t++;}}

return t;

}

void printdata(ostream& o, int data[3][10])

{

for(int x=0;x<10;x++)

{

o << setw(10) << data[0][x] << setw(10) << data[1][x] << setw(10) << data[2][x] << endl;

}

}