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Embedded Design

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Homework 4

Code:

BarGraph.h:

```
class BarGraph
{
    int size;
    char symbol;

public:
    BarGraph() {}
    ~BarGraph() {}
    void setSize(int sz);
    void setSymbol(char sym);
    static void displayAxis(char sym);
    void getBar();
};
```

BarGraph.cpp:

```
#include "BarGraph.h"
#include <iostream>

using std::cout;
using std::endl;

void BarGraph::setSize(int sz)
{
    size = sz;
}

void BarGraph::setSymbol(char sym)
{
    symbol = sym;
}

void BarGraph::displayAxis(char sym)
{
    cout << "2  10   20   30   40   50   60   70   80   90   100%" << endl;
```

```
    cout << "|  |    |    |    |    |    |    |    |    |    |   " << endl;
    for (int i = 0; i < 49; i++)
    {
        cout << sym;
    }
    cout << endl;
}

void BarGraph::getBar()
{
    for (int i = 0; i < size; i++)
    {
        cout << symbol;
    }
    cout << endl;
}
```

GradeGraph.h:

```
class GradeGraph
{
    int nAs;
    int nBs;
    int nCs;
    int nDs;
    int nFs;

public:
    GradeGraph() {}
    ~GradeGraph() {}
    void set(int numAs, int numBs, int numCs, int numDs, int numFs);
    void draw();
};
```

GradeGraph.cpp:

```
#include "GradeGraph.h"
#include "BarGraph.h"
#include <math.h>

void GradeGraph::set(int numAs, int numBs, int numCs, int numDs, int numFs)
{
    nAs = numAs;
    nBs = numBs;
    nCs = numCs;
```

```
    nDs = numDs;
    nFs = numFs;
}

void GradeGraph::draw()
{
    BarGraph::displayAxis('+');
    BarGraph *BarA = new BarGraph;
    BarGraph *BarB = new BarGraph;
    BarGraph *BarC = new BarGraph;
    BarGraph *BarD = new BarGraph;
    BarGraph *BarF = new BarGraph;

    int sum = nAs + nBs + nCs + nDs + nFs;
    BarA->setSize(ceil(nAs / (sum / 50.0)));
    BarA->setSymbol('A');
    BarA->getBar();
    BarB->setSize(ceil(nBs / (sum / 50.0)));
    BarB->setSymbol('B');
    BarB->getBar();
    BarC->setSize(ceil(nCs / (sum / 50.0)));
    BarC->setSymbol('C');
    BarC->getBar();
    BarD->setSize(ceil(nDs / (sum / 50.0)));
    BarD->setSymbol('D');
    BarD->getBar();
    BarF->setSize(ceil(nFs / (sum / 50.0)));
    BarF->setSymbol('F');
    BarF->getBar();
}
```

PassFailGraph.h:

```
class PassFailGraph
{
    int nPass;
    int nFail;

public:
    PassFailGraph() {}
    ~PassFailGraph() {}
    void setNPass(int n);
    void setNFail(int n);
    int getNPass();
    int getNFail();
```

```
    void draw();
};
```

PassFailGraph.cpp:

```
#include "PassFailGraph.h"
#include "BarGraph.h"
#include <math.h>

void PassFailGraph::setNPass(int n)
{
    nPass = n;
}
void PassFailGraph::setNFail(int n)
{
    nFail = n;
}
int PassFailGraph::getNPass()
{
    return nPass;
}
int PassFailGraph::getNFail()
{
    return nFail;
}
void PassFailGraph::draw()
{
    BarGraph::displayAxis('=');
    BarGraph *BarPass = new BarGraph;
    BarGraph *BarFail = new BarGraph;

    int sum = nPass + nFail;
    BarPass->setSize(ceil(getNPass() / (sum / 50.0)));
    BarPass->setSymbol('P');
    BarPass->getBar();
    BarFail->setSize(ceil(getNFail() / (sum / 50.0)));
    BarFail->setSymbol('F');
    BarFail->getBar();
}
```

main.cpp:

```
#include <iostream>
#include "GradeGraph.h"
#include "PassFailGraph.h"
```

```
using std::cin;
using std::cout;
using std::endl;

// Include all the necessary libraries/files
int main()
{
    int nAs, nBs, nCs, nDs, nFs; // Variables representing input grades.
    cout << "Welcome to the grade grapher." << endl;
    cout << "Enter the number of As, Bs, Cs, Ds and Fs." << endl;
    cout << "As: ";
    cin >> nAs;
    cout << "Bs: ";
    cin >> nBs;
    cout << "Cs: ";
    cin >> nCs;
    cout << "Ds: ";
    cin >> nDs;
    cout << "Fs: ";
    cin >> nFs;

    // A object is created which sets and calls the PassFailGraph.
    PassFailGraph *passFailGraph = new PassFailGraph;
    passFailGraph->setNPass(nAs + nBs + nCs);
    passFailGraph->setNFail(nDs + nFs);
    passFailGraph->draw();

    // A object is created which sets and calls the GradeGraph.
    GradeGraph *gradegraph = new GradeGraph;
    gradegraph->set(nAs, nBs, nCs, nDs, nFs);
    gradegraph->draw();

    // delete objects
    delete passFailGraph;
    delete gradegraph;
}
```

Makefile:

```
OBJS = BarGraph.o GradeGraph.o PassFailGraph.o main.o

main: $(OBJS)
    g++ -o main $(OBJS)
```

```
%o: %.cpp %.h
    g++ -c $<

.PHONY: clean

clean:
    rm -f $(OBJS).o
```

Sample Outputs:

Case 1:

```
PS C:\Users\Mark\OneDrive - Northeastern University\Embeded Design\Homework\Homework 4> .\main
Welcome to the grade grapher.
Enter the number of As, Bs, Cs, Ds and Fs.
As: 38
Bs: 20
Cs: 5
Ds: 3
Fs: 1
2  10   20   30   40   50   60   70   80   90   100%
|  |    |    |    |    |    |    |    |    |    |
==================================================
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
FFF
2  10   20   30   40   50   60   70   80   90   100%
|  |    |    |    |    |    |    |    |    |    |
++++++++++++++++++++++++++++++++++++++++++++++++++
AAAAAAAAAAAAAAAAAAAAAAAAAA
BBBBBBBBBBBBBB
CCCC
DDD
F
```

Case 2:

```
PS C:\Users\Mark\OneDrive - Northeastern University\Embeded Design\Homework\Homework 4> .\main
Welcome to the grade grapher.
Enter the number of As, Bs, Cs, Ds and Fs.
As: 0
Bs: 10
Cs: 20
Ds: 5
Fs: 0
2  10   20   30   40   50   60   70   80   90   100%
|  |    |    |    |    |    |    |    |    |    |
==================================================
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
FFFFFFFF
2  10   20   30   40   50   60   70   80   90   100%
|  |    |    |    |    |    |    |    |    |    |
++++++++++++++++++++++++++++++++++++++++++++++++++

BBBBBBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCCCCCCCCC
DDDDDDDD
```