Massey University, Albany
Semester 2 2012

Student ID _____

Student Family Name_____

Student Given Names_____

159.234 Object Oriented Programming
Term test

This test has 3 questions.
Answer all of them. Assume all necessary header files were included and `using namespace std;` was used.
Maximum possible marks: 20
Time: 45 minutes

Mark /20

Success!

Question 1. [6 Marks] Consider the following class.

```
class Rational {
public:
  //does not matter...
private:
  int d, n  //denominator is 3; numerator is 4, so the rational number is 4/3
};
```

Choose the best answer.

A. The correct prototype for the default constructor of the `Rational` class is

i) `Rational(int denum=0.0,int num=0.0);`
ii) `Rational& Rational();`
iii) `Rational(int denum=0,int num=1);`
iv) `Rational(0,1);`

B. The correct prototype for the destructor the `Rational` class is

i) `~Rational();`
ii) `~Rational(0,0);`
iii) `~Rational(int, int);`
iv) `~Rational(Rational&);`

C. The correct prototype for the assignment operator for the `Rational` class is

i) `Rational operator=(Rational);`
ii) `Rational operator=(const Rational&);`
iii) `Rational& operator=(const Rational&);`
iv) `Rational operator=(const Rational);`

D. The correct prototype for overloading `operator-` as a member function of the `Rational` class is

i) `Rational operator-(Rational&, Rational&)const;`
ii) *`Rational& operator-(const Rational&)const;`*
iii) `const Rational& operator-(Rational&);`
iv) `const Rational& operator-(Rational&)const;`

E. The correct prototype for overloading `operator+` as a global function is

i) `Rational operator+(Rational, Rational);`
ii) `Rational operator+(Rational&, Rational&) const;`
iii) `Rational& operator+(const Rational&, const Rational&);`
iv) None of the above

F. The function:

```
Rational foo(){int a=9,int b=-7; return Rational(a,b);}
```

i) Returns the Rational object if the class has a public member with the prototype `Rational(int,int);`
ii) Returns the Rational object if the class has a private member with the prototype `Rational(int,int);`
iii) Returns the Rational object if function foo is a friend of the Rational class.
iv) None of the above.

Question 2. [6 Marks] What is the output of the following program?

```
void fun(int& x, int y=3);

int main(){
   int s = 2;
   int a = 1;
   fun(s);
   fun(s,a);
   cout <<"\ns is: "<< s << " a is: " << a << endl;
}

void fun(int& x, int y){
   int static a = 5;
   x +=a++;
   cout  << "\nx is: " << x << " a is: " << a;
}
```

Your answer:

Question 3. [8 marks] Assume that you are part of a team that have to write a program that computes the final marks for 159.234 students.
The final mark is computed using the following:

- five assignment marks; each assignment contributes 4% to the final mark and each assignment is out of 10;
- a term test mark that contributes 20% to the final mark; the term test is out of 20;
- a final exam mark that contributes 60% to the final mark; the exam is out of 100.
- all missing assessment components (assignment, test, exam) will get 0 marks.

The program should use the type `Student` defined by the following class:

```
class Student{
public:
   Student();   //everything set to default values (0.0 or empty string)
   void setName(const string &fName)    //set the fullName
   //set all 5 assignment marks
   void setAssgMarks(double aMarks[], int size=5);
   void setTestMark(double mt);  //set term test mark
   void setExamMark(double ex);  //set exam mark
   string getName()const ;  //returns fullName value
   double getFinalMark()const; //computes and returns final mark
private:
    string fullName;    // one word like Calude-Elena
    double assg[5];     // all 5 assignment marks
```

```
    double test;        // term test mark
    double exam;        // exam mark
};
```

Your task is to write the following two functions. **Write comments to explain your code**.
A) Write the definition of a **global** non-friend function, input(..), to read data for a student from the keyboard. You may assume that all input will be valid input. The function prototype should be:

```
void input(Student& oneStudent);
```

B) Write the definition of the not-inline member function, `getFinalMark`, which computes and returns the final mark for each student.

Your answer:

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