Homework #8 – Object construction & const-correctness

1. **(2 points)** Why won't the following program compile? How can the code in `main()` be changed to properly construct `t`?

```
struct Foo { int i; };

int main()
{
   Foo t();
   t.i = 7;
}
```

2. **(2 points)** What will the following program output? How can the code in `main()` be changed to follow the recommended guidelines for object construction?

```
#include <iostream>

struct Foo
{
   Foo(const Foo &)
   {
      std::cout << "bar";
   }

   Foo(int i)
   {
      std::cout << i;
   }
};

int main()
{
   Foo t = 7;
}
```

3. **(6 points)** Make the following program const-correct. Once you've made corrections the program should compile and run without error. *You must not change anything in `main()`.*

```
#include <cfloat>
#include <iostream>
using namespace std;

class Object
{
   friend ostream &operator<<(ostream &, Object &);

public:
   Object(double mass, double acceleration)
      : mass_(mass),
        acceleration_(acceleration)
```

```
    {
        clearForce();
    }

    double getMass()
    {
        return mass_;
    }

    void setMass(double mass)
    {
        mass_ = mass;
        clearForce();
    }

    double getAcceleration()
    {
        return acceleration_;
    }

    void setAcceleration(double acceleration)
    {
        acceleration_ = acceleration;
        clearForce();
    }

    double getForce()
    {
        if (!isForceComputed())
            computeForce();
        return force_;
    }

private:
    void computeForce()
    {
        force_ = mass_ * acceleration_;
    }

    void clearForce()
    {
        force_ = DBL_MIN;
    }

    bool isForceComputed()
    {
        return force_ != DBL_MIN;
    }

    double mass_;            // Grams
    double acceleration_;    // Meters per second squared
    double force_;           // Newtons
};
```

```
ostream &operator<<(ostream &out, Object &obj)
{
   return out << obj.getMass() << "g, "
              << obj.getAcceleration() << "m / s^2, "
              << obj.getForce() << "N";
}

int main()
{
   Object obj(12, 150);
   cout << obj << "\n";

   const Object cobj(7, 275);
   cout << cobj << "\n";
}
```

Place all answers in a single PDF document. Submit this document.