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#include <iostream>

class Evaluator{
public:
    virtual double evaluate(double x)=0;
    virtual ~Evaluator()=default;
    virtual Evaluator* createCopy()=0;
};

class Sum : public Evaluator{
    Evaluator* e1;
    Evaluator* e2;

    void copy(const Sum& other) {
        e1 = other.createCopyE1();
        e2 = other.createCopyE2();
    }
public:
    Sum(Evaluator* e1, Evaluator* e2): e1{e1}, e2{e2} {}
    Sum(const Sum& other) { this->copy(other); }
    void operator=(const Sum& other) { this->copy(other); }
    virtual double evaluate(double x) { return e1->evaluate(x) + e2->evaluate(x); }
    virtual ~Sum() { delete e1; delete e2; }
    Sum* createCopy() { return new Sum(e1->createCopy(), e2->createCopy()); }
    Evaluator* createCopyE1() const { return e1->createCopy(); }
    Evaluator* createCopyE2() const { return e2->createCopy(); }
};

class Product : public Evaluator{
    Evaluator* e1;
    Evaluator* e2;

    void copy(const Product& other) {
        e1 = other.createCopyE1();
        e2 = other.createCopyE2();
    }
public:
    Product(Evaluator* e1, Evaluator* e2): e1{e1}, e2{e2} {}
    Product(const Product& other) { this->copy(other); }
    void operator=(const Product& other) { this->copy(other); }
    virtual double evaluate(double x) { return e1->evaluate(x) * e2->evaluate(x); }
    virtual ~Product() { delete e1; delete e2; }
    Product* createCopy() { return new Product(e1->createCopy(), e2->createCopy()); }
    Evaluator* createCopyE1() const { return e1->createCopy(); }
    Evaluator* createCopyE2() const { return e2->createCopy(); }
};

class Number : public Evaluator{
    double number;
public:
    Number(double number): number{number} {}
    Number(const Number& other) { number = other.number; }
    void operator=(const Number& other) { number = other.number; }
    virtual double evaluate(double x){ return number; }
    Number* createCopy() { return new Number(number); }
};

class X : public Evaluator{
public:
    virtual double evaluate(double x){ return x; }
    X* createCopy() { return new X(); }
};

int main(){
    auto E= new Sum(new Number(3), new Product(new Number(5), new Number(8)));
    for (int x=0; x<10; x++) std::cout << x << " " << E->evaluate(x) << std::endl;
    Sum f = *E;
    auto F = &f;
    delete E;
    for (int x=0; x<10; x++) std::cout << x << " " << F->evaluate(x) << std::endl;
    return 0;
}

```