

Evaluation is needed to accept, revise or reject a class design.

Five aspects to be evaluated:

- **Abstraction:** does it provide a useful one?
- **Responsibilities:** are they reasonable for the type?
- **Interface:** is it clean, simple?
- **Usage:** do we provide the “right” set of methods?
- **Implementation:** reasonable?

Identity:

Are class purpose and method purposes well-defined and connected?

Clarity:

Can purpose of class be given in brief, dictionary-style definition?

Uniformity:

Do operations have uniform level of abstraction?

class Date:

Date represents a specific instant in time, with millisecond precision.

class TimeZone:

TimeZone represents a time zone offset, and also figures out daylight savings.

Clear:

Does class have specific responsibilities?

Limited:

Do responsibilities fit the abstraction (no more/less)?

Coherent:

Do responsibilities make sense as a whole?

Complete:

Does class completely capture the abstraction?

```
class Complex {  
private:  
    double Real, Imag;  
public:  
    Complex(double R = 0.0, double I = 0.0);  
    double getReal() const;  
    double getImag() const;  
    void    setReal();  
    void    setImag();  
    double Magnitude() const;  
};
```

Naming:

Do names clearly express the intended effect?

Symmetry:

Are names and effects of pairs of inverse operations clear?

Flexibility:

Are methods adequately overloaded?

Convenience:

Are default values used when possible?

```
class ItemList {
private:
// . . .
public:
    void Delete(Item item);
        // Take Item's node out of list and delete Item

    void Remove(Item item);
        // Take Item's node out of the list but do not
        // delete Item

    void Erase(Item item);
        // Keep Item's node in List, but with no information
};
```

Hard to remember difference!

Examine how objects of the class are used in different contexts (see below...)

Incorporate all operations that may be useful in these contexts... up to a point...

```
class Location {
  private:
    int xCoord, yCoord; //coordinates
public:
  Location(int x = 0, int y = 0);
  int xCoord();          //return xCoord value
  int yCoord();          //return yCoord value
};

// usage:
Location point(100,100);
// shift point:
point = Location( point.xCoord()+5, point.yCoord()+10 );
```

It's so complex!

```
class Location {
  private:
    int xCoord, yCoord; //coordinates
public:
  Location(int x = 0, int y = 0);
  int XCoord();        //return xCoord value
  int YCoord();        //return yCoord value
  void ShiftBy(int dx, int dy); // shift by relative coordinates
};

// Revised usage:
Location point(100,100);

point.ShiftBy(5, 10); // shift point
```

Least important, mostly easily changed aspect to be evaluated.

- poorly engineered designs lead to problematic implementations
- massaging a problematic implementation (without redesign) rarely produces any effective improvement
- it's only code... the issues here are primarily language syntax and semantics

Overly complex implementation may mean:

- class is not well conceived
- class has been given too much responsibility