Classes (Finally!)

Classes in C++

Object-oriented programming (OOP) is a **programming paradigm** based on the concept of "objects", which can contain data and code: data in the form of fields (often known as attributes or properties), and code, in the form of procedures (often known as methods).

Classes in C++

Dictionary

Search for a word

interface

/ˈɪntəfeɪs/

See definitions in:

All | Physics | Computing

noun

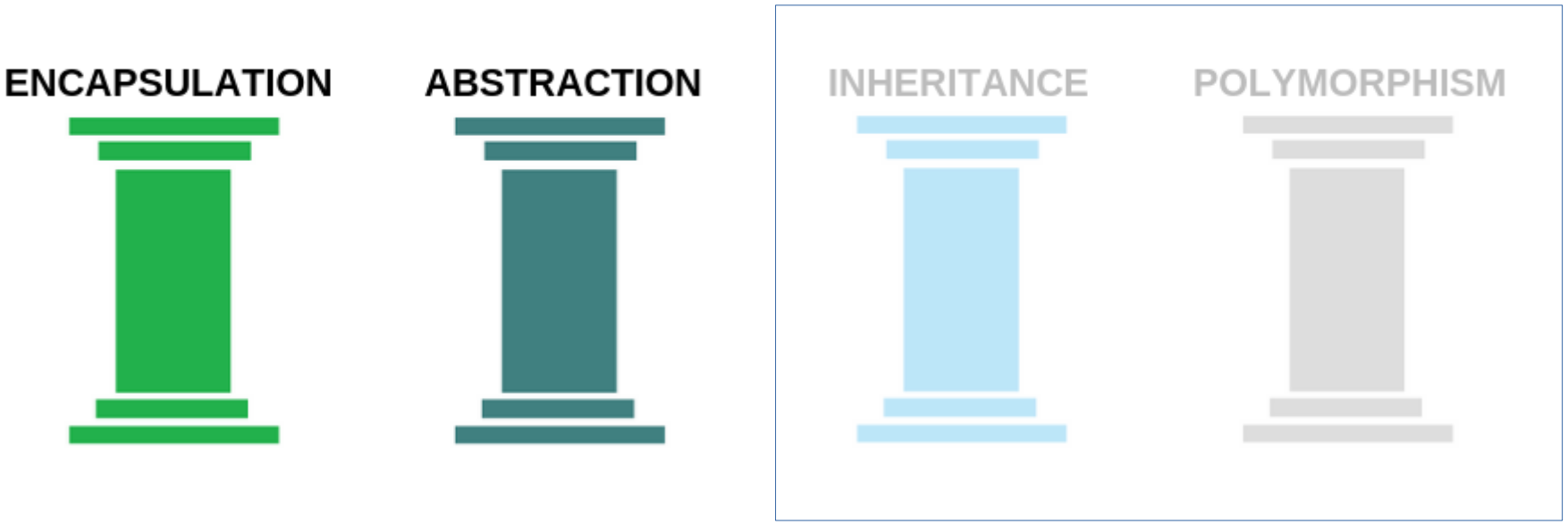
2. COMPUTING
   a device or program enabling a user to communicate with a computer.
   "a graphical user interface"
   - a device or program for connecting two items of hardware or software so that they can be operated jointly or communicate with each other.
     "an application program interface"

In computing, an **interface** is a shared boundary across which two or more separate components of a **computer** system exchange information. The exchange can be between software, **computer** hardware, peripheral devices, humans, and combinations of these.

en.wikipedia.org › wiki › Interface_(computing)

Interface (computing) - Wikipedia

The four pillars



Abstraction in the real world

I'm a coffee addict. So, when I wake up in the morning, I go into my kitchen, switch on the coffee machine and make coffee. Sounds familiar?

Making coffee with a coffee machine is a good example of abstraction.

You need to know how to use your coffee machine to make coffee. You need to provide water and coffee beans, switch it on and select the kind of coffee you want to get.

Classes in C++

```
40  class Scopes {
41      // this here is private
42      int a;
43  private:
44      int b;
45  public:
46      int c;
47  protected:
48      int d;
49  }
```

Classes in C++

```
16  int main() {
17
18      Scopes showcase;
19
20      // error: ‘int Scopes::a’ is private within this context
21      showcase.a = 1;
22      // error: ‘int Scopes::b’ is private within this context
23      showcase.b = 2;
24      // all cool!
25      showcase.c = 3;
26      // error: ‘int Scopes::d’ is private within this context
27      showcase.d = 4;
28
29      return 0;
30  }
```

Classes in C++

Terms:

- **Class** – a custom type, think of it as a template for creating objects

- **Object** = Instance of type Class = variable of type Class
- **Property** = class property = class attribute = class variable
- **Method** = class function

Classes in C++

```
5   class Point {
6       // not OK!
7       // int a = 1;
8       float x;
9       float y;
10  public:
11      void setX(float x);
12      float getX() {
13          return this->x;
14      }
15  };
16
17  void Point::setX(float x) { this->x = x; };
18
19  int main() {
20      Point p;
21
22      p.setX(2);
23      cout << p.getX() << endl;
24  }
```

Classes in C++

```
20  int main() {
21
22      {
23          Point p1;                p1.print(); // 0x0
24          Point p2 = Point();      p2.print(); // 0x0
25          Point p3{};              p3.print(); // 0x0
26          Point p4 = {};           p4.print(); // 0x0
27      }
28
29      {
30          Point p1(1, 2);          p1.print(); // 1x2
31          Point p2 = Point(1, 2); p2.print(); // 1x2
32          Point p3{2, 1};          p3.print(); // 2x1
33          Point p4 = Point{2, 1}; p4.print(); // 2x1
34      }
35
36      return 0;
37  }
```