CSCI261E/F

Lecture 12: Classes, Objects, `strings`
October 4, 2010

?

Object-Oriented Programming

(OOP)

Ivan Sutherland

"A display connected to a digital computer gives us a chance to gain familiarity with concepts not realizable in the physical world. It is a looking glass into a mathematical wonderland."

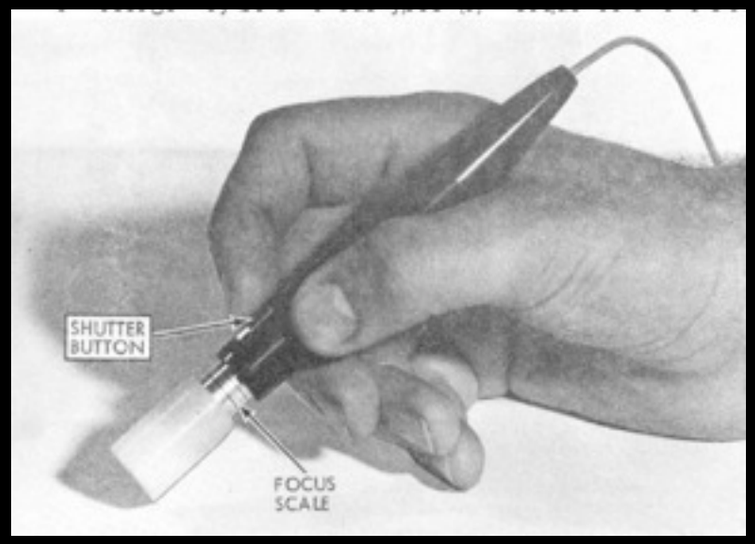
"I just need to figure out how things work."

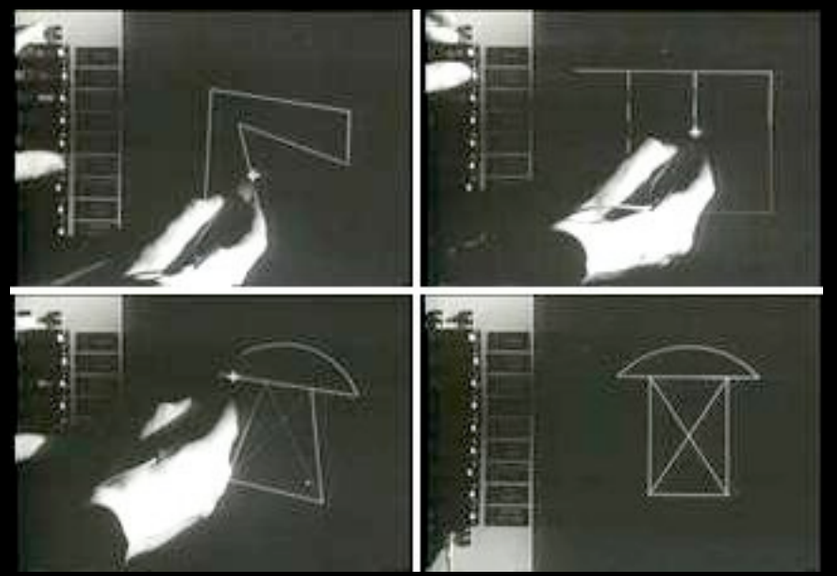
"It's very satisfying to take a problem we thought difficult and find a simple solution. The best solutions are always simple."

"The ultimate display would, of course, be a room within which the computer can control the existence of matter. A chair displayed in such a room would be good enough to sit in. Handcuffs displayed in such a room would be confining, and a bullet displayed in such a room would be fatal." (1965)

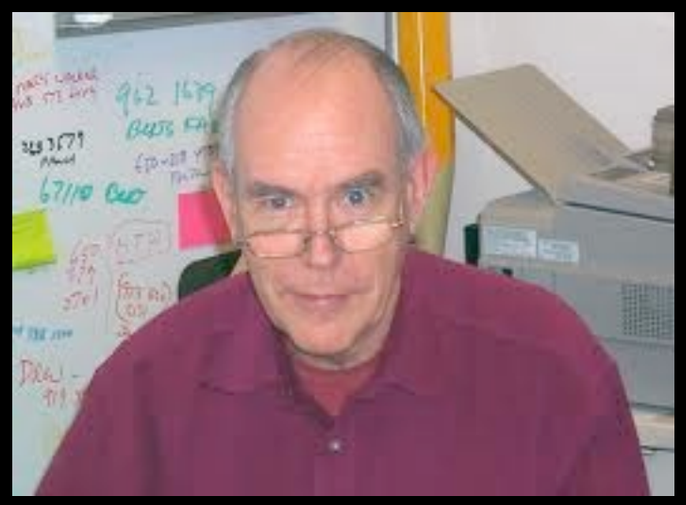
Ivan Sutherland

Sketchpad (first computer graphics)

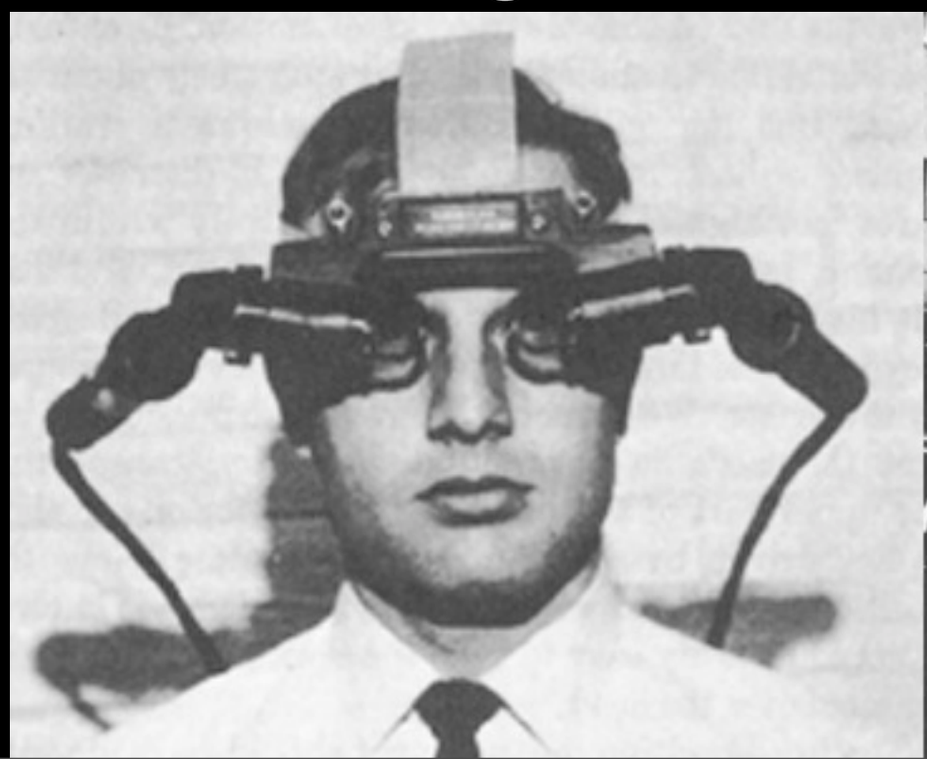


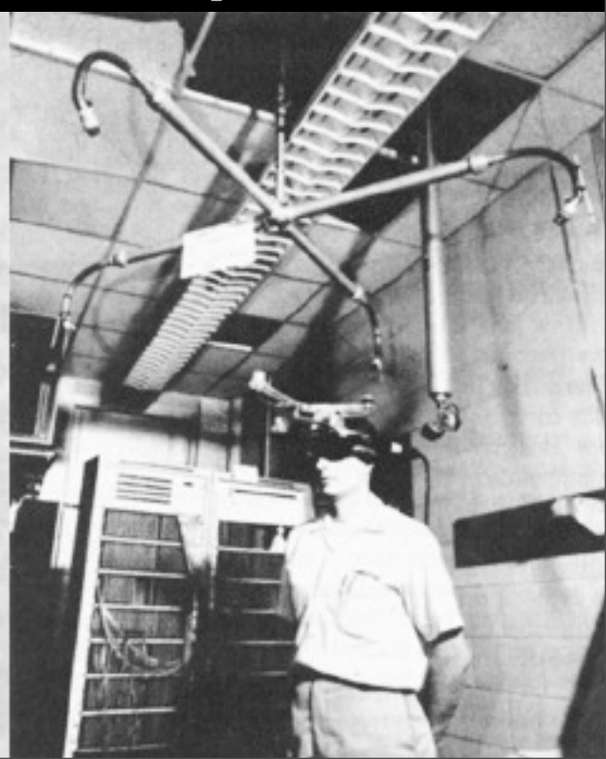


Married in 2006 at age 68!



Augmented Reality





Objects

- Behavior
- Data
- *Abstraction*

Classes

- “Define” objects
- Declare the “rules” objects must follow

OOP Review

- Remember, *objects* encapsulate attributes (values) and behavior (functions) of real world things.
- Remember, our car example
- A *class* defines the rules that *objects* must follow
- Objects are *instances* of classes
    - Each one of you is an *instance* of homo-sapien

Class v. Object

class Homo-Sapien

int age;

string name;

void walk();

void burp();

object DavidHasselhoff

age: 61

name: “David Hasselhoff”

burp()

“uuurrrrrpp!”

walk()

(he moves with confident gait)

object RachelRay

age: 42

name: “Rachel Ray”

burp()

“rrrruuuuuuuhhp!”

walk()

(she moves quickly)

You've Been Using an Object

```
string
```

String Class v. String Object

class `string`
- has a value (a bunch of characters)
- has behavior

```
size(); // tell me how long you are
empty(); // tell me if you are empty
substr();  // tell me part of you
c_str();  // describe me in c-style
```

object
"Just show me some code man"

object
"He's wearing the same jeans today"

object
"Did he really just say that?"

String Class v. String Object

The class just defines what values its objects can have, and what functions/behaviors its objects have.

In general, we work with objects only (to get stuff done)...

... but the computer uses classes (to give us our objects).

string

```
#include<string>
// ...
string mycar;
string mfg = “Lamborghini”;
string model = “Countach”;
int x;
bool y;
string z;

x = model.size(); // x = ?
y = mycar.empty(); // y = ?
mycar = mfg + model; // mycar = ?
z = mfg.substr(0, 5); // z = ?
```

NamePrinter

Homework

- Complete assignment *NamePrinter*