

CS 213 : Software Methodology

Spring 2016

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Lecture 1: Jan 19

Overview

Resources



<http://sakai.rutgers.edu>
(CS 213 – Spring 2016)

No Required Textbook

Lecture Notes + Pointers to Online Resources

Topics

- Object-Oriented Programming and Design
 - Classes, objects, members, encapsulation
 - Inheritance, interfaces, abstract classes, polymorphism
- Unified Modeling Language (UML) to represent OOD
- Graphical User Interfaces (GUI) with Java FX 8
- Black box unit testing
- Design patterns
- Android Programming
- Multithreading
- Lambdas and Streams (Java 8)

Grading

- OOD/OOP assignment : 10%
 - GUI assignment: 5%
 - UML assignment: 5%
 - GUI Project: 20%
 - Android Project: 20%
-
- Midterm 1 (Written): 10%
 - Midterm 2 (Written): 10%
 - Final (Written): 20%

Do stuff!
Working in pairs

Know concepts

A Brief History of Object-Oriented Programming Languages

Simula-67

<http://staff.um.edu.mt/jskl1/talk.html>

Declaration:

```
Class Rectangle (Width, Height); Real Width, Height;
                                ! Class with two parameters;
Begin
  Real Area, Perimeter;  ! Attributes;

  Procedure Update;      ! Methods (Can be Virtual);
  Begin
    Area := Width * Height;
    Perimeter := 2*(Width + Height)
  End of Update;

  Boolean Procedure IsSquare;
  IsSquare := Width=Height;

  Update;                ! Life of rectangle started at creation;
  OutText("Rectangle created: "); OutFix(Width,2,6);
  OutFix(Height,2,6); OutImage
End of Rectangle;
```

Ole Johan Dahl and
Kristen Nygaard (Norway)

Object Generation:

Ref(Rectangle) R; (Class reference variable)

...

R :- New Rectangle(50, 40); Activities involved in this object generation:

- Memory allocation, reference stored to R.
- Copying values to parameters (value passing only).
- Starting the object's body (life rules).

Smalltalk-80

Product of research led by Alan Kay at Xerox PARC in the 70s (other versions of Smalltalk preceded Smalltalk-80, but weren't publicly released).

```
Object subclass: #Server
  instanceVariableNames: 'serverSocket socketHandler'
  classVariableNames: ''
  poolDictionaries: ''
  category: ''!

!Server class methodsFor: 'instance creation'!

new: aServerSocket handler: aHandler
  | simpleServer |
  simpleServer := super new.
  simpleServer socket: aServerSocket.
  simpleServer handler: aHandler.
  simpleServer init.
  ^simpleServer
!!
```



ALAN KAY

United States – 2003

CITATION

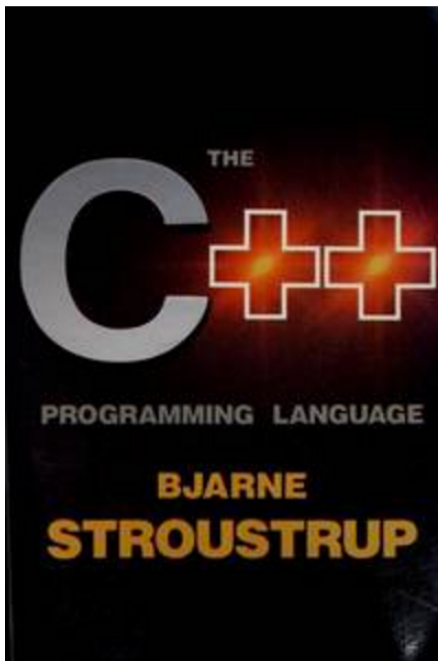
For pioneering many of the ideas at the root of contemporary object-oriented programming languages, leading the team that developed Smalltalk, and for fundamental contributions to personal computing.



C++

Bjarne Stroustrup
(AT&T)

Originally implemented in 1982 under the name “C with classes”. First commercial compilers appeared in 1988



```
class X {  
    private:                // the representation (implementation) is private  
        int m;  
    public:                 // the user interface is public  
        X(int i =0) :m{i} { } // a constructor (initialize the data member m)  
  
        int mf(int i)        // a member function  
        {  
            int old = m;  
            m = i;           // set a new value  
            return old;      // return the old value  
        }  
};  
  
X var {7}; // a variable of type X, initialized to 7  
  
int user(X var, X* ptr)  
{  
    int x = var.mf(7);      // access using . (dot)  
    int y = ptr->mf(9);     // access using -> (arrow)  
    int z = var.m;          // error: cannot access private member  
}
```

C++ was inspired by features of Simula, and built on top of C syntax. The C foundation makes C++ a hybrid language: you can use a C++ compiler to compile strictly C code without any objects

Java

James Gosling (SUN Microsystems)

Originally (early 90s) conceived as a **hardware independent** software platform to be used in consumer electronics (WORA – **W**rite **O**nce **R**un **A**newhere).

Java SE Platform at a Glance

Java 1.0 released in 1996.
JVMs available for SPARC Solaris, Windows NT, Windows 95, and Linux. Supported by Netscape Navigator 2.0 browser.

