

Ada  
By

Jason Gorney  
Earl W. Foote

# History

- USAF Software in many languages
- Code unnecessarily difficult to maintain
- DoD held a competition
- Standards
  - Readability
  - Efficiency
  - Provability
  - Expressiveness

# History cont.

- Team lead by Jean Ichbiah
- Named after Augusta Ada Byron, Countess of Lovelace.
  - First Algorithm for Babbage's Machine
  - Recognized as first programmer.
- First internationally standardized OOP language



Augusta Ada King

# Features

- Strongly typed
- Modular
- Object Oriented
- Concurrent (threaded)
- Readable
- Expressible

# Features

- Strongly typed
- Modular
- Object Oriented
- Concurrent (threaded)
- Readable
- Expressible

# Readability

Similar to human language

Function whatever is

Type something is relation of somethingElse

```
MyVar : type [:= initial];
```

Similar to some other languages

Derived from Algol

Similar to Pascal, Modula, PL/SQL

“Even managers can read Ada”

# Writability

You can define your own types.

- The compiler checks for proper usage.

Feels very natural.

Arrays can start at any value

- Indexes tailor to your problem!

- Type Graph is array (-10.0..10.0) of Real

# Reliability

- Exception handling.
- Strongly typed
  - Limited intermixing
  - Prevents errors
    - eg. adding an int to a real without realizing it

# Cost

- Somewhat high cost for training
- Easy to maintain
  - High readability
  - Designed for maintenance
- Can have lengthy compile times

# Drawbacks

- Developers familiar to C-like languages
- Unique, unconventional operators
- Strong typing causes extra work
- Complex language
- Relative scarceness

# Example Ada Code

```
with Ada.Text_IO; use Ada.Text_IO;
with Ada.Float_Text_IO; use Ada.Float_Text_IO;
with Operator_Examples; use Operator_Examples;

procedure Operator_Excerciser is
  My_Sales : Daily_Sales;
begin
  My_Sales(Monday)    := 1200.15;
  My_Sales(Tuesday)  := 1073.88;
  My_Sales(Wednesday) := 1105.33;
  My_Sales(Thursday) := 2100.59;
  My_Sales(Friday)   := 2135.02;
  My_Sales(Saturday) := 1101.19;
  My_Sales(Sunday)   := 1285.12;

  for Day in Days loop
    Put(Days'Image(Day)(1..3) & ":" & Character'Val (09)
        & Character'Val (09));
    Print_Message(Day);
  end loop;
  Put("Total Sales: " & Character'Val(09));
  Put(Item => Total(My_Sales), Aft => 2, Exp =>0);
  New_Line;
  Put("Mean Sales : " & Character'Val(09));
  Put(Item => Geometric_Mean(My_Sales), Aft => 3, Exp => 0);
  New_Line;
end Operator_Excerciser;
```

# Example Ada Code (Cont.)

```
package Operator_Examples is
  type Days is (Monday,
                Tuesday,
                Wednesday,
                Thursday,
                Friday,
                Saturday,
                Sunday);

  procedure Print_Message(For_Day : in Days);

  type Daily_Sales is array(Days) of Float;
  function Total(Sales : in Daily_Sales) return Float;
  function Geometric_Mean(Sales : in Daily_Sales)
    return Float;
end Operator_Examples;
```

# Example Ada Code (Cont.)

```
with Ada.Text_IO; use Ada.Text_IO;
with Ada.Numerics.Elementary_Functions;
use Ada.Numerics.Elementary_Functions;

package body Operator_Examples is
  procedure Print_Message(For_Day : in Days) is
  begin
    if For_Day in Saturday..Sunday then
      Put_Line("Go Fishing!!");
    else
      Put_Line("Go to School!!");
    end if;
  end Print_Message;

  function Total(Sales : in Daily_Sales) return Float is
    Sum : Float := 0.0;
  begin
    for I in Sales'range loop
      Sum := Sum + Sales(I);
    end loop;
    return Sum;
  end Total;

  function Geometric_Mean(Sales : in Daily_Sales)
    return Float is
    Product : Float := 1.0;
  begin
    for I in Sales'range loop
      Product := Product * Sales(I);
    end loop;
    return Product**(1.0 / Float(Sales'Length));
  end Geometric_Mean;
end Operator_Examples;
```

# Who?

Lockheed Martin

Boeing

Hertz

Honeywell

Raytheon

Rail systems

➤ Hong Kong, France, London

Lawrence Livermore National Laboratories

# Sources

- <http://www.adaic.org/advantages/ada-overview/>
- <http://www.seas.gwu.edu/~mfeldman/ada-project-summary.html>
- <http://www.adahome.com/FAQ/programming.html>