

# Lecture 15

## Ada Fundamentals

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# Summary of Previous Lecture

- 1. Snobol Pattern Matching with Replacement**
- 2. Sample Programs**
- 3. Anchored and Unanchored Matching**
- 4. Snobol Arrays**

# Outline

- 1. Ada Design Goals**
- 2. Ada History**
- 3. Ada Features**
- 4. Data Types**
- 5. Operators**

# Design Goals

- Programs reliability and maintenance is important
    - **Military software systems are expected to have a minimum lifetime of 30 years**
  - Programming is a human activity
  - Efficiency
- "Hence emphasis was placed on program readability over ease of writing"

# History

- The need for a single standard language – 1975
- Requirements document developed; strawman
- Refined to Woodman and then Tinman – 1976
- Further refined to ironman
- Proposals were invited for the design of a new language
- Four selected (green, red, blue, and yellow)
- Initial designs were submitted in 1978
  - red and green proposals were short listed
- Standard refined to steelman
- The designs were refined further and finally ‘green’ was selected in 1979

# History

- DoD announced that the language will be called Ada.
- The 1995 revision of Ada (Ada 95) was developed by a small team led by Tucker Taft. In both cases, the design underwent a public comment period where the designers responded to public comments and finally the language was finalized

# Features

- Packages (modules) of related types, objects, and operations can be defined
- Packages and types can be made generic (parameterized templates) to help create reusable components
- It is strongly typed
- Errors can be signaled as exceptions and handled explicitly. Many serious errors (such as computational overflow and invalid array indexes) are automatically caught and handled through this exception handling mechanism, thus improving program reliability

# Features

- Tasks
  - Multiple parallel threads of control that can be used to create and communicate different threads of control. This is a major capability not supported in a standard way by many other languages



# Features

- A predefined library is included; it provides input/output (I/O), string manipulation, numeric functions, a command line interface, and a random number generator (the last two were available in Ada 83, but are standardized in Ada 95)
- Object-oriented programming is supported (this is a new feature of Ada 95). In fact, Ada 95 is the first internationally standardized object-oriented programming language
- Interfaces to other languages (such as C, Fortran, and COBOL) are included in the language

# Data Types & Operators

<http://www.adaic.org/learn/materials/intro/>

# Exercise

Write “Hello World” Program in Ada.

*Write an Ada program that performs all arithmetic operations on two variables.*

# Summary

- ✓ **Ada Design Goals**
- ✓ **Ada History**
- ✓ **Ada Features**
- ✓ **Data Types**
- ✓ **Operators**