

Objectives 1.1 Reasons for Studying Concepts of Programming Languages 1.2 Programming Domains 1.3 Language Evaluation Criteria 1.4 Influences on Language Design 1.5 Language Categories 1.6 Implementation Methods 1.8 Programming Environments Copyright (C) 2016, 2013, 2010 Pearson Education, Inc. All Rights Reserved

Evaluation Criteria:

- Writability o Simplicity and orthogonality – Few constructs, a small number of primitives, a small set of rules for combining them
- o Support for abstraction – The ability to define and use complex structures or operations in ways that allow details to be ignored
- o Expressivity – A set of relatively convenient ways of specifying operations – Strength and number of operators and predefined functions

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Evaluation Criteria:

- Readability (2 of 2) o Data types – Adequate predefined data types
- o Syntax considerations – Identifier forms: flexible composition – Special words and methods of forming compound statements – Form and meaning: self-descriptive constructs, meaningful keywords

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Programming Domains (2 of 2)

- o Artificial intelligence – Symbols rather than numbers manipulated; use of linked lists – LISP
- o Systems programming – Need efficiency because of continuous use –C
- o Web Software – Eclectic collection of languages: markup (e.g., HTML), scripting (e.g., PHP), general-purpose (e.g., Java)

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Reasons for Studying Concepts of Programming Languages

- o Increased ability to express ideas
- o Improved background for choosing appropriate languages
- o Increased ability to learn new languages
- o Better understanding of significance of implementation
- o Better use of languages that are already known
- o Overall advancement of computing

Copyright (C) 2016, 2013, 2010 Pearson Education, Inc. – A manageable set of features and constructs – Minimal feature multiplicity – Minimal operator overloading

- o Orthogonality – A relatively small set of primitive constructs can be combined in a relatively small number of ways – Every possible combination is legal

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Programming Domains (1 of 2)

- o Scientific applications – Large numbers of floating point computations; use of arrays – Fortran
- o Business applications – Produce reports, use decimal numbers and characters – COBOL

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Language Evaluation Criteria

- o Readability: the ease with which programs can be read and understood
- o Writability: the ease with which a language can be used to create programs
- o Reliability: conformance to specifications (i.e., performs to its specifications)
- o Cost: the ultimate total cost

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Evaluation Criteria:

- Readability (1 of 2) o Overall simplicity The overall simplicity of a programming language strongly affects its readability.