

Examination 1

CSC315 Programming Language Concepts

09 October 2015

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Chapter 1

Eric Andow

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- (a) Ada uses parentheses to enclose the index.
 - (b) The programmers used parentheses instead of brackets to provide uniformity between arrays and functions, since they both use mapping.

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A token is a category of one or more lexemes within a language.

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- (a) Non-terminal symbols.

(b) Terminal symbols.

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Backus-Naur Form syntax description

5. What problem were the creators of Common LISP trying to solve?

The problem was a lack of portability between programs written in different dialects of LISP.

6. What is an ambiguous context free grammar?

An ambiguous context free grammar can generate sentences with more than one leftmost and rightmost derivation.

7. Contrast the complexity of algorithms that can parse strings that conform to the most general kinds of context free grammars and the complexity of the algorithms that can parse strings that conform to the grammars of programming languages?

Algorithms for parsing any unambiguous grammars are highly inefficient, with a complexity of $O(n^3)$, whereas algorithms for programming languages are complexity $O(n)$.

8. Java represents characters with Unicode. It is the first widely used programming language with this feature. What is the significance of this feature?

Unicode allows programs to be written which can communicate with other

countries whose languages cannot be represented by the basic english alphabet.

9. How does the binary coded decimal type differ from the floating point type?
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Floating point numbers are an approximation of the number using fractions and exponents, stored in binary which can make them even less accurate. Binary coded decimals precisely store decimal values at the cost of taking up more storage than floating point numbers.

10. Identify a user-defined ordinal type in the Java programming language.
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Enumeration

11. Mathematicians and programmers might have different ideas about the precedence of Boolean operators. Explain.
-

When Boolean operators evaluate to 0 and 1, they can be used in equations with multiple relational operators to produce unexpected results. $(1 \neq 2 \neq 1) \neq ((\text{true}/1) \neq 1) \neq \text{true}$

12. Programmers should use `===` rather than `==` to test the equality of the values of two expressions in JavaScript. Why?
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With `+=`, strings can be coerced into numbers to check for equality. With `===`, no coercion will take place, so strings and numbers will not resolve as equal.

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If there is a side effect in the right hand side of the expression and it

short-circuits on the left, then the side effect will not occur.

14. Briefly describe the three steps in the mark-sweep algorithm for garbage collection.

1- all cells in heap set indicators to 'garbage' 2- all pointers in the program are traced, and anything which is pointed to is changed to 'not garbage' 3- all cells still marked 'garbage' are reverted to available space

15. What led Yukihiro Matsumoto to create the Ruby programming language?

Matsumoto was dissatisfied with Perl and Python; specifically, that they were not pure object-oriented languages because they had primitive types and functions.

16. What did Microsoft aim to achieve with its development of the C# language?

Microsoft aimed to provide a language for development of component-based software in the .NET framework.

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11. Mathematicians and programmers might have different ideas about the precedence of Boolean operators. Explain.

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12. Programmers should use `===` rather than `==` to test the equality of the values of two expressions in JavaScript. Why?

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13. Describe a hazard of allowing short-circuited evaluation of expressions and side effects in expressions at the same time.

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14. Briefly describe the three steps in the mark-sweep algorithm for garbage collection.

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15. What led Yukihiro Matsumoto to create the Ruby programming language?

Write your answer here.

16. What did Microsoft aim to achieve with its development of the C# language?

Write your answer here.

Chapter 14

Cameron Seebach

1. Most programming languages require the use of brackets to enclose the index in a reference to an element of an array.
 - (a) Identify a language that requires the use of parentheses to enclose the index in a reference to an element of an array.
 - (b) Why did the designers of the language choose parentheses rather than brackets?

-
- (a) Write your answer here.
 - (b) Write your answer here.

2. What is the relationship between a lexeme and a token?

Write your answer here.

3.
 - (a) What kind of symbols are found at the internal nodes of a parse tree?
 - (b) What kind of symbols are found at the leaves of a parse tree?

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- (a) Write your answer here.
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4. One of the most significant contributions from the developers of ALGOL 60 also limited the success of that language. What was that contribution?

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Joe Sterchele

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Htut Khine Win

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