CS323 2025F Quiz #2

There are ten questions in this quiz.

1.Please put down your student ID. *

2.What is the primary purpose of syntax-directed translation in a compiler? *

- ◯ To optimize the generated machine code.
- ◯ To associate semantic rules with productions in a context-free grammar.
- ◯ To resolve variable names to their memory addresses.
- ◯ To convert high-level code into assembly language.

3.Which of the following statements best describes an L-attributed definition? *

- ◯ It allows both synthesized and inherited attributes, with inherited attributes being able to depend on siblings to the left.
- ◯ It allows only synthesized attributes.
- ◯ It allows both synthesized and inherited attributes, with no restrictions on dependencies.
- ◯ It is evaluated in a single pass during parsing.

4.In the context of intermediate code generation, what is a key characteristic of Three-Address Code (TAC)? *

- ◯ Each instruction can have at most one operator and three operands.
- ◯ It is a high-level representation very close to the source language.
- ◯ It is the final machine code ready for execution.
- ◯ Each instruction performs a complex operation involving multiple array indices.

5.The primary advantage of using a Directed Acyclic Graph (DAG) over an Abstract Syntax Tree (AST) for an expression is that a DAG: *

- ◯ Is easier to construct during parsing.
- ◯ Explicitly represents the flow of control in the program.
- ◯ Identifies common subexpressions, allowing for more straightforward optimization.
- ◯ Can be directly executed by an interpreter.

6.Which intermediate representation is characterized by representing each instruction as an operation, two source operands, and one destination operand? *

- ◯ Postfix Notation
- ◯ Abstract Syntax Tree (AST)
- ◯ Quadruples
- ◯ Triples

7.A key difference between triples and quadruples in three-address code is: *

- ◯ Triples use explicit temporary variable names, while quadruples do not.
- ◯ Quadruples are more compact in memory than triples.
- ◯ Quadruples are easier to rearrange during optimization because they use explicit names for temps.
- ◯ Triples are a higher-level representation than quadruples.

8.When generating three-address code for an array access like A[i] = j;, what is the essential calculation that must be performed? *

- ◯ Compute the memory address of the element A[i].
- ◯ Check that the types of i and j are compatible.
- ◯ Ensure that the array A has been declared.
- ◯ Generate a runtime check to confirm that the index i is within bounds.

9.An S-attributed definition is best described as: *

- An SDD that uses only synthesized attributes.
- An SDD that uses only inherited attributes.
- An SDD that can be evaluated in any order.
- An SDD that is suitable for top-down parsing only.

10.In the representation of three-address code using "indirect triples", the primary benefit over simple triples is: *

- They use less memory by eliminating the need for an operation field.
- They simplify the manipulation of the code by allowing instructions to be easily reordered.
- They allow for an unlimited number of operands per instruction.
- They are directly executable by a virtual machine.

11.When generating three-address code for a short-circuit logical AND operation (e.g., a && b), the control-flow translation is used primarily to: *

- Improve performance by calculating both operands in parallel.
- Ensure the correct operator precedence is maintained in the code.
- Prevent the evaluation of the second operand if the first operand is false.
- Allocate a single temporary variable for the entire expression

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