CSCE-312 QUIZ 6 [25 POINTS]

CSCE-312 | SAT APR 23, 2016 | DUE IN PDF FORMAT ON ECAMPUS BY FRI APR 29, 3PM

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Question 1. [5 points] List and describe in 1-2 sentences the 5 basic steps involved in compiling a program written in a high level language.

(1) Lexical Analysis – Program text is divided into a sequence of tokens. Each individual character is either interpreted as part of a meaningful symbol or discarded.
(2) Parsing – Tokens from the lexical analysis are analyzed and arranged in a hierarchical structure, such as a parse tree.
(3) Semantic Analysis – The compiler checks the semantics of the parse tree for certain errors or inconsistencies. It may check that variable types and other tokens are used appropriately.
(4) Code Optimization – The program structure is made more efficient or adapted for certain platforms. This can involve automatically removing redundant or superfluous operations.
(5) Code Generation (Translation) – The algorithm is reproduced in a lower-level language, such as assembly or virtual machine code.

Question 2. [5 points] Circle TRUE or FALSE for the following statements

(T) F **An Interpreter directly executes instructions written in a high-level programming language without previously compiling them into a machine language.**

T (F) **Lex is a standard tool used for syntax analysis in a compiler.**

T (F) **Optimizing compilers only look for optimizing lines of code in a program.**

(T) F **Early compilers had pretty sizable coding/complexity in all phases with the exception of semantic analysis.**

(T) F **Tokenizing is an important step during program syntax analysis phase of a compiler.**

Question 3a. [5 points] How many tokens are in the following high-level language construct: if (id == 5) {let student_last_name = "Smith";}.

symbol (*) used to mark tokens:
*if *(*id *== *5 *) *{ *let *student_last_name *= *"Smith" *; *}
= 13 tokens

Question 3b. [5 points] Categorize the tokens for the construct above in the following lexical elements: keyword, stringConstant, integerConstant, identifier, symbol.

If <keyword>
(<symbol>
id <identifier>
== <symbol>
5 <integerConstant>
) <symbol>
{ <symbol>
let <keyword>
student_last_name <identifier>
= <symbol>
"Smith" <stringConstant>
; <symbol>
} <symbol>

Question 4. [5 points] Draw a parse tree for the following high level language construct: ((x+25)/(y-z))*(4^3).