KIBABII UNIVERSITY COLLEGE

UNIVERSITY EXAMINATION

CSC 320: COMPILER DESIGN

Instructions

Question ONE is compulsory

Attempt any TWO questions in SECTION B

SECTION A

QUESTION ONE (30MKS)

a. Describe different phases of a compiler with the help of a neat diagram. [9mks]
b. Explain the role of lexical Analysis in detail [5mks]
c. Write Left Most Derivation hence parse tree for a string aabbbcc given the following production rules: [5mks]

    T ->R
    T -> aTc
    R -> ?
    R -> RbR

d. Describe the various strategies that a parser can employ to recover from a syntactic error. [6mks]
e. Consider the following grammar

    E E + T | T
    T T * F | F
    F (E) | id

    Compute the FIRST and FOLLOW function for the above grammar. [5mks]

SECTION B

QUESTION TWO (20MKS)

a) What is a three address code? Mention its types. How would you implement the three address statements? Explain with examples. [10mks]
b) Define the following terms
    i. Lexemes
    ii. Patterns
    iii. Tokens [3mks]
c) Give a formal definition of Context Free Grammar (CFG) [7mks]

QUESTION THREE (20MKS)

a) Explain in detail any TWO commonly used techniques for calling procedures. [8mks]
b) Write short notes on the following [4mks]
    i. Local Optimization
    ii. Global Optimization.
c) Describe Determistic Finite Automaton (DFA). Use an illustration to show how a DFA may be used as a language recognizer [8mks]

QUESTION FOUR (20mks)

a) Consider the context-free grammar. S --> SS + | S S * | a
    i. Show how the string aa+a* can be generated by this grammar. [4mks]
    ii. Construct a parse tree for this string. [4mks]
    iii. What language does this grammar generate? Justify your answer.
b) Explain any THREE operations on strings [6mks]
c) Use a well labelled diagram to explain a typical language processing system [6mks]

QUESTION FIVE (20mks)

a) Describe a THREE PHASE compiler structure [9mks]

b) Explain common programming errors that may occur at various levels [8mks]

c) State and explain the fundamental principles of compilation [3mks]