1996 Paper 12 Question 7

Compiler Construction

Outline the key features of the design of the part of a compiler that will translate the abstract syntax tree representation of a program into a stack-based intermediate code. Concentrate on those features used in the translation of the following fragment:

\[ \ldots \\
\text{LET } i = k \\
\text{LET } j = k \\
\text{WHILE } (i>0) \text{ AND } (j<100) \text{ DO } \{ i := i-1; j := j+2 \} \\
\ldots \]

In particular, concentrate on the mechanism you would choose to deal with

(a) the scopes of identifiers \[6 \text{ marks}\]
(b) the compilation of boolean expressions involving the operators \text{NOT, AND and OR} \[6 \text{ marks}\]
(c) the translation of the \text{WHILE} command \[4 \text{ marks}\]
(d) the translation of the two assignments \[4 \text{ marks}\]