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:

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

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

(a) the scopes of identifiers [6 marks]

(b) the compilation of boolean expressions involving the operators NOT, AND and OR [6 marks]

(c) the translation of the WHILE command [4 marks]

(d) the translation of the two assignments [4 marks]