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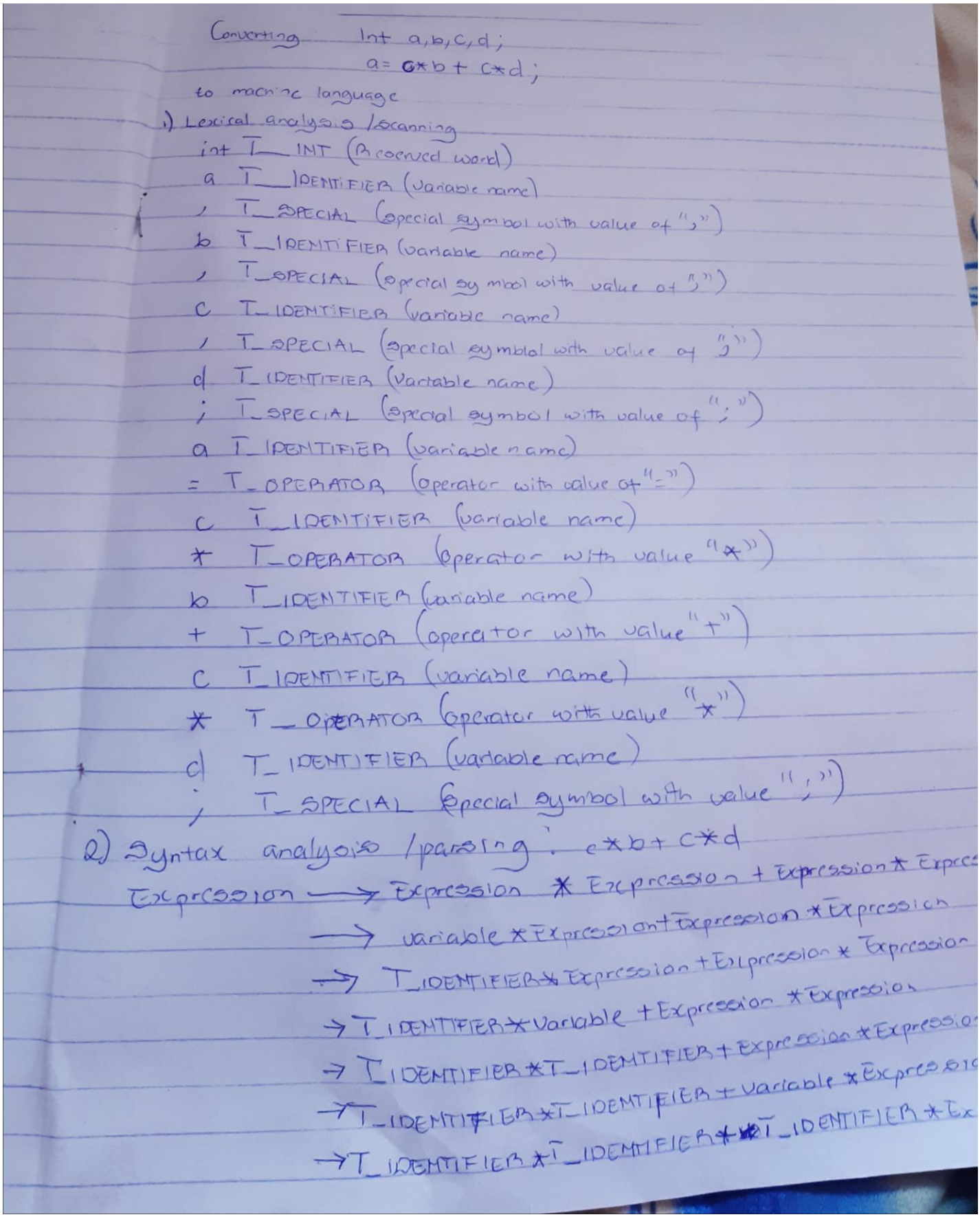
Matric numbber: 17/SCI01/043

Course: CSC 312



Converting int a,b,c,d;
a= a*b + c*d;
to machine language

1) Lexical analysis /scanning
int T_INT (Reserved word)
a T_IDENTIFIER (variable name)
, T_SPECIAL (special symbol with value of ",")
b T_IDENTIFIER (variable name)
, T_SPECIAL (special symbol with value of ",")
c T_IDENTIFIER (variable name)
, T_SPECIAL (special symbol with value of ",")
d T_IDENTIFIER (variable name)
; T_SPECIAL (special symbol with value of ";")
a T_IDENTIFIER (variable name)
= T_OPERATOR (operator with value of "=")
c T_IDENTIFIER (variable name)
* T_OPERATOR (operator with value "*")
b T_IDENTIFIER (variable name)
+ T_OPERATOR (operator with value "+")
c T_IDENTIFIER (variable name)
* T_OPERATOR (operator with value "*")
d T_IDENTIFIER (variable name)
; T_SPECIAL (special symbol with value ";")

2) Syntax analysis /parsing: e*b+c*d

Expression → Expression * Expression + Expression * Expre
→ variable * Expression + Expression * Expression
→ T_IDENTIFIER * Expression + Expression * Expression
→ T_IDENTIFIER * Variable + Expression * Expression
→ T_IDENTIFIER * T_IDENTIFIER + Expression * Expressio
→ T_IDENTIFIER * T_IDENTIFIER + Variable * Expressio
→ T_IDENTIFIER * T_IDENTIFIER * T_IDENTIFIER * Ex

→ T_IDENTIFIER * TIDENTIFIER + T_IDENTIFIER * Variable

→ T_IDENTIFIER * T_IDENTIFIER + T_IDENTIFIER * T_IDENTIFIER

3) ~~Semantic analysis~~ Intermediate code generation

TAC: a = c*b + c*d

t1 = c*b

t2 = c*d

t3 = t1+t2

a = t3

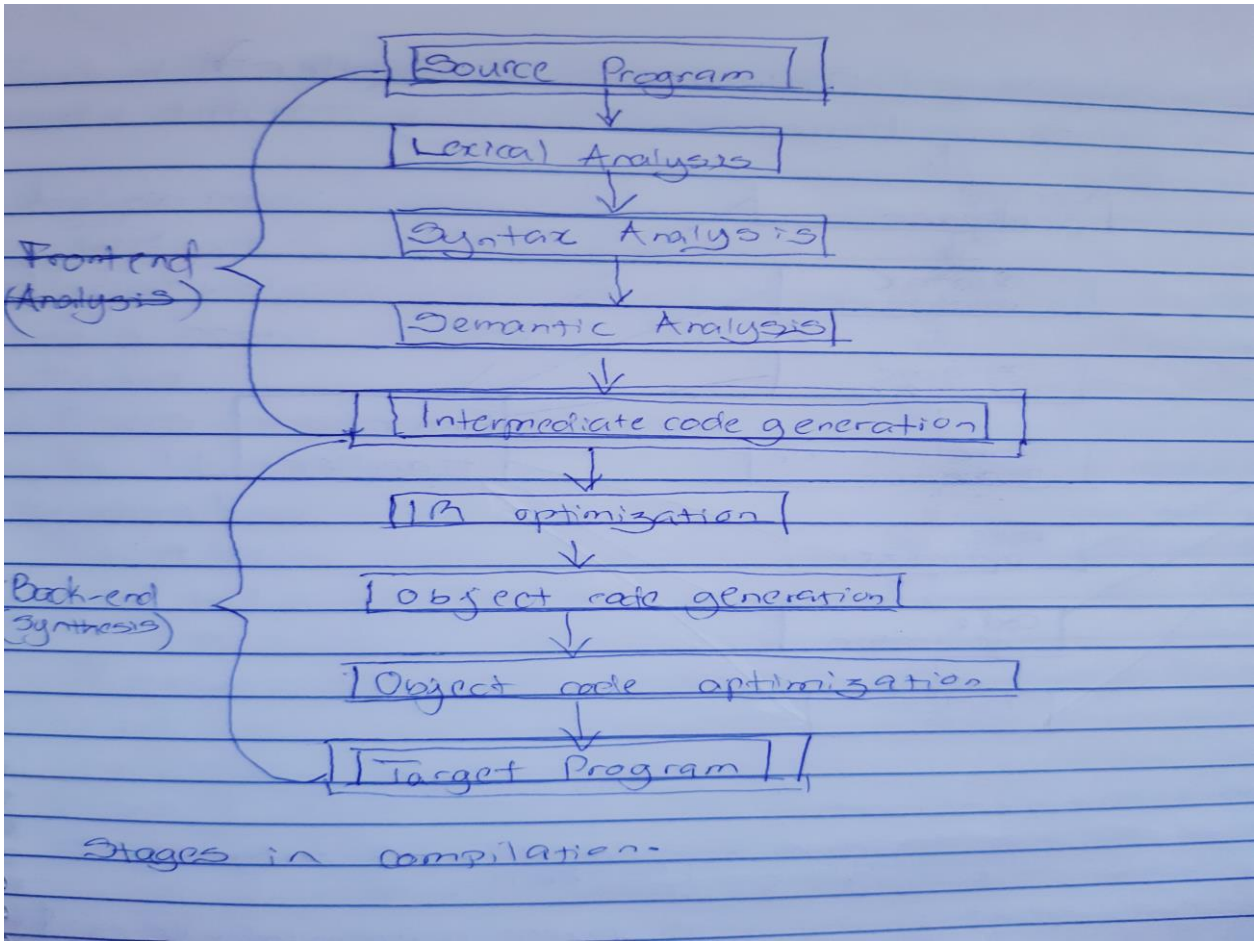
*NB. In the semantics stage, the compiler checks for statements that are gramatically incorrect. It comes before intermediate code generation

4) Intermediate code optimization: This phase really slows down the compiler so it can be skipped.

5) Object code generation: This is where the target code is generated. The TAC is translated into a sequence of machine language.

6) Object Code Optimization

It transforms the object code into tighter, more efficient object code. As with IR optimization, this phase can be skipped entirely since it is configurable.



Stages in compilation: