23/08/2023

220 / 145

8 Tuesday

* Compiler Design *

2017 AUGUST

Week-32

SCHEDULES

8.00

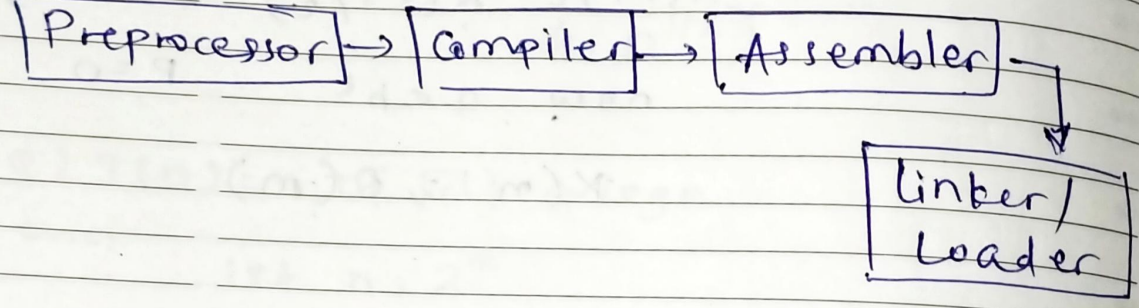
Translator - It is a software that converts high level language to low level of language

9.00

10.00

Internal Architecture of Translator

11.00



12.00

1.00

2.00

3.00

Interpretor	compiler
4.00 i) Compile one line at a time	i) compile whole program at a time
5.00	
6.00 ii) Takes more time.	ii) faster than interpretor.
7.00	
iii) eg python, javascript	iii) eg. C, C++

8.00

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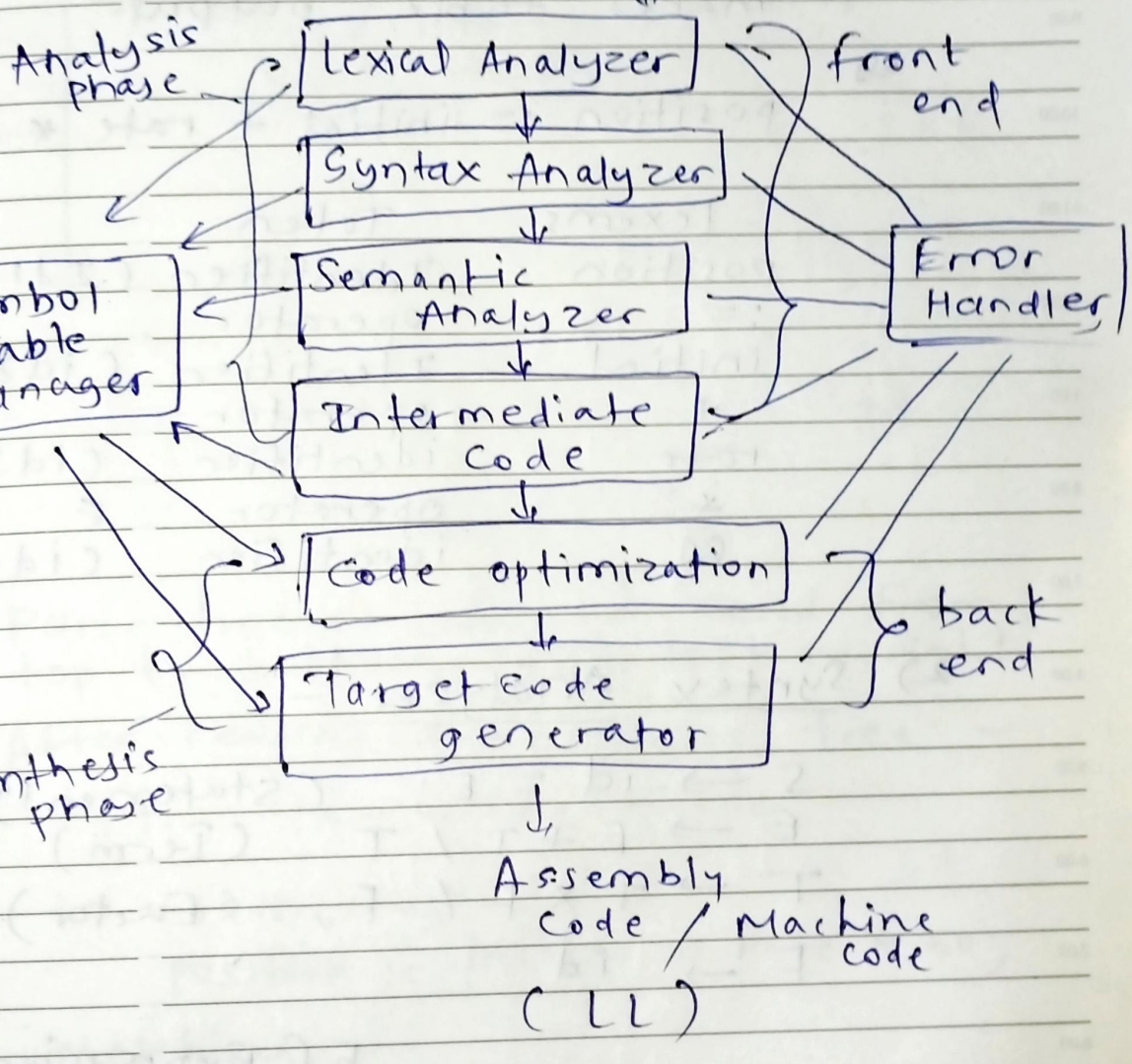
SCHEDULES

Phase of Compiler :- HLL



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12.00
1.00
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8.00

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SCHEDULES

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8.00

1) Lexical Analyser -

it finds out lexems (variables, keywords), tokens

it makes table output.

eg.

position := initial + rate * 60;

Lexems	Token
position	Identifier (Id1)
:=	operator
initial	Identifier (id2)
+	operator
rate	identifier (id3)
*	operator
60	identifier (id4)

2) Syntax Analyzer -

S → id = E; (Statement)

E → E + T / T (Term)

T → T * F / F (Factor)

F → id

E (Expression)

SCHEDULES

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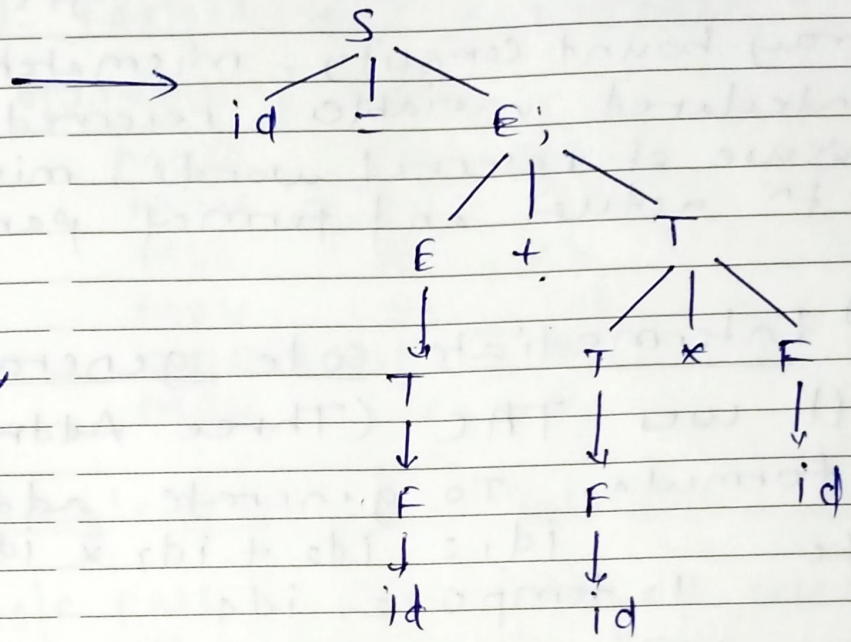
Parse tree



Parse tree is always read from top to bottom and left to right.

After reading above parse tree -

$id_1 = id_2 + id_3 * id_4$

ie same as

position := initial + rate * 60;

Matching

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SCHEDULES

3) Semantic Analyzer -

It is responsible for type checking, array bound capacity, mismatch error, undeclared variable, reserved ~~or~~words, misuse of reserved words, mismatch bet^n actual and formal parameters.

4) Intermediate code generator -

It use TAC (Three Address Code) formula. To generate addresses. like

$id_1 = id_2 + id_3 * id_4$

1. temp0 = id4
2. temp1 = id3 * temp0
3) temp2 = id2 + temp1
4. temp3 = temp2

5) Code optimization -

temp1 = id2 * 60

temp2 = id1 + temp1

(id3)

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6) Target code generator -

Assembly code

```
MOV   R1 , 60
MOV   R2 , id2
MUL   R1 , R2
MOV   R3 , id1
ADD   R3 , R1
MOV   id3 , R3
```

* Single pass & Multi pass compiler -

- Single pass - compiler will pass through all phases only once
- Multipass - compiler will pass through all phases multiple time and producing intermediate code every time.

Multipass compiler generates machine dependent as well as machine independent code.

NOTES

SCHEDULES

8.00 ★ Cross compiler - when the compilation of source code is done on one system and then it is run on other system then it is called cross compiler.

9.00

10.00

11.00

* for the lexical analyser use the 'lex' tool.
* for semantic analysis use directed translat^ enginec
* for intemediate code generat^ use automatic code generator
* for code optimizer use data flow analysis engine
* for target code generat^ use compiler construct^ tool kit.
* for syntax analyzer use yet another compiler

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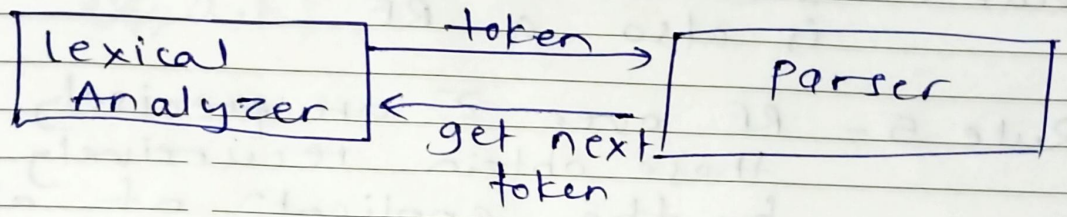
2nd chapter - Role of lexical Analyzer -



Also it generates error message.

* Regular Expression - are used for representing certain sets of strings in an algebric form. ~~So wh~~

Rule 1 - Any terminal symbol i.e ϵ, Σ including empty (Λ) and null (ϕ) are regular expressions.
eg. a, b, c, a1, ϵ, Σ, dz

Rule 2 - union of two R.E is also a regular expression

Rule 3 - concatenat^ of two RE is also a RE.

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Rule 4 - the iterat^n or closure of a RE is also a RE

Rule 5 - RE over Σ are precisely those obtain recursively by the applicat^n of above rules once or several times.

1) $\{0, 1, 2\}$ - $0+1+2$

2) $\{\wedge, ab\}$ - $\wedge ab$

3) $\{\wedge, 0, 00, \ldots\}$ - 0^*

4) $\{0, 00, 000, \ldots\}$ - 0^+

Q) $S \rightarrow AaAb \mid BbBa$

$A \rightarrow \varepsilon$

$B \rightarrow \varepsilon$

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