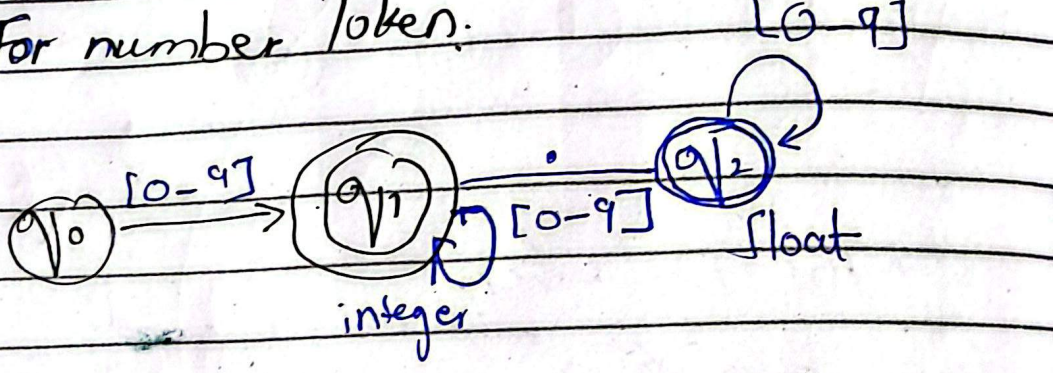
22k-4397
22k-4293

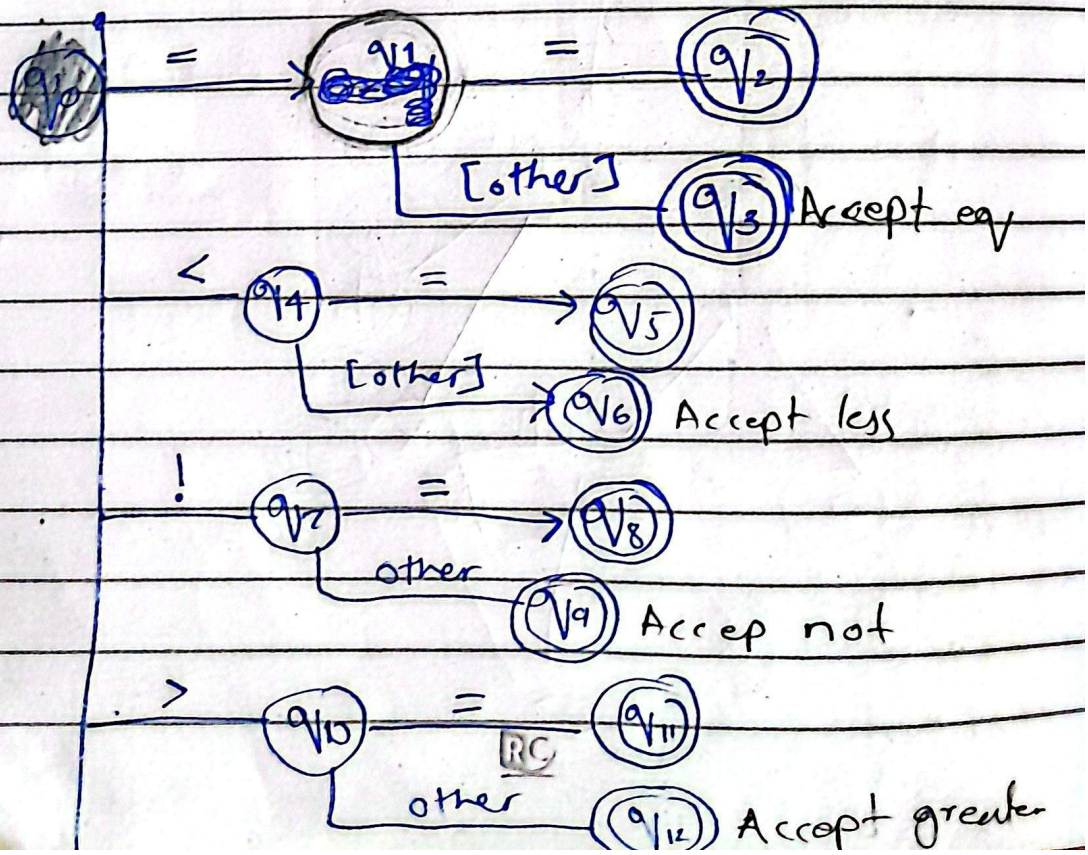
Date

1) Lexical Analysis:

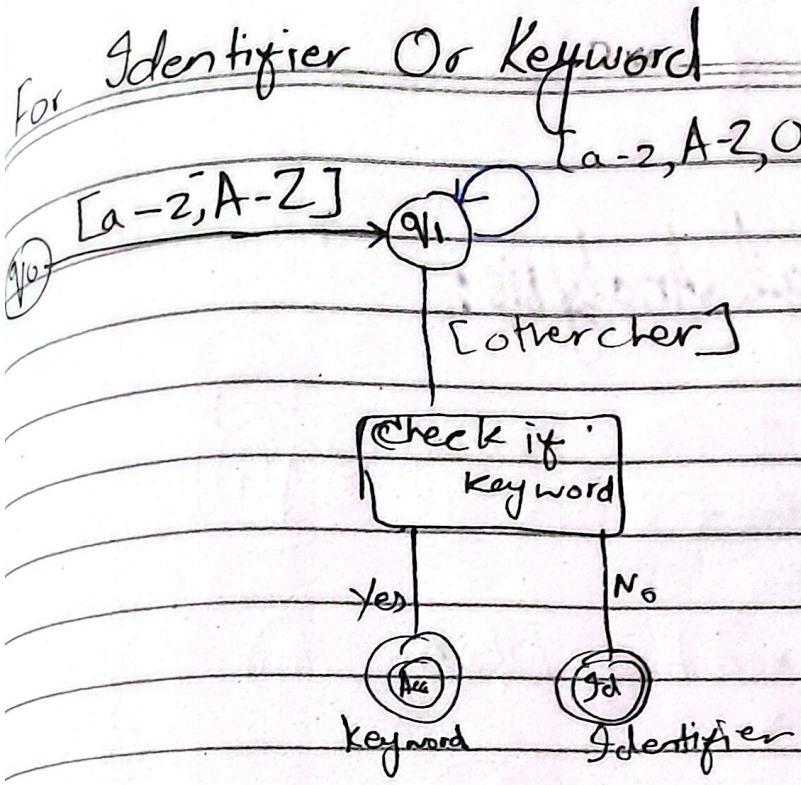
- For number Token:



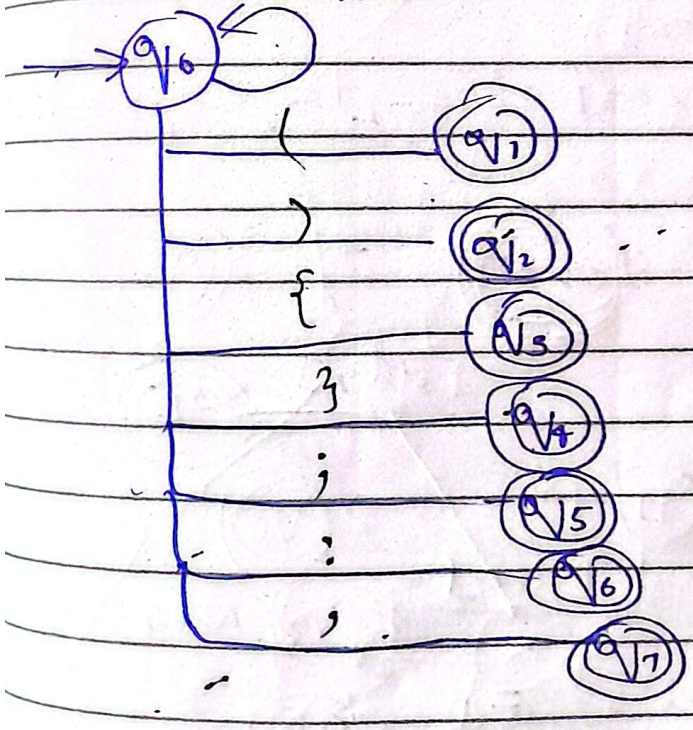
- For Operators (==, !=, <=, >=)



For Identifier Or Keyword

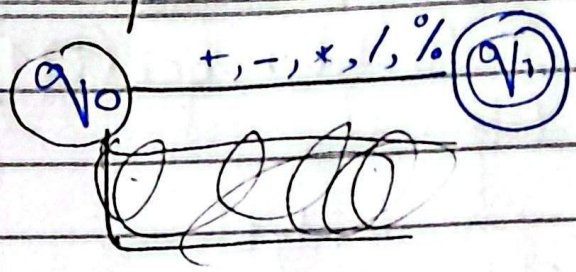


for Delimeter: whitespace or comments



For Operators:

Date

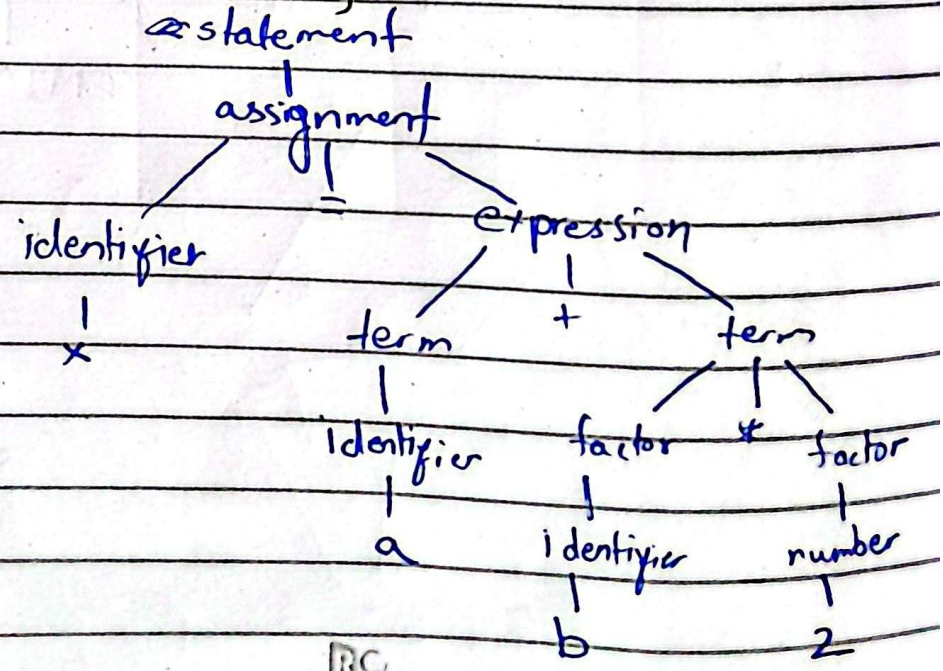
→ 

Token Categories:

- Keywords: pattern, generate, if, else, return, print
- Identifiers: [a-z A-Z] [a-z A-Z 0-9]*
- Numbers: [0-9]+
- Operators: +, -, *, /, %, ==, !=, <, >, <=, >=, =
- Delimeter: (,), {, }, ;, :, ,

2) Syntax Analysis:

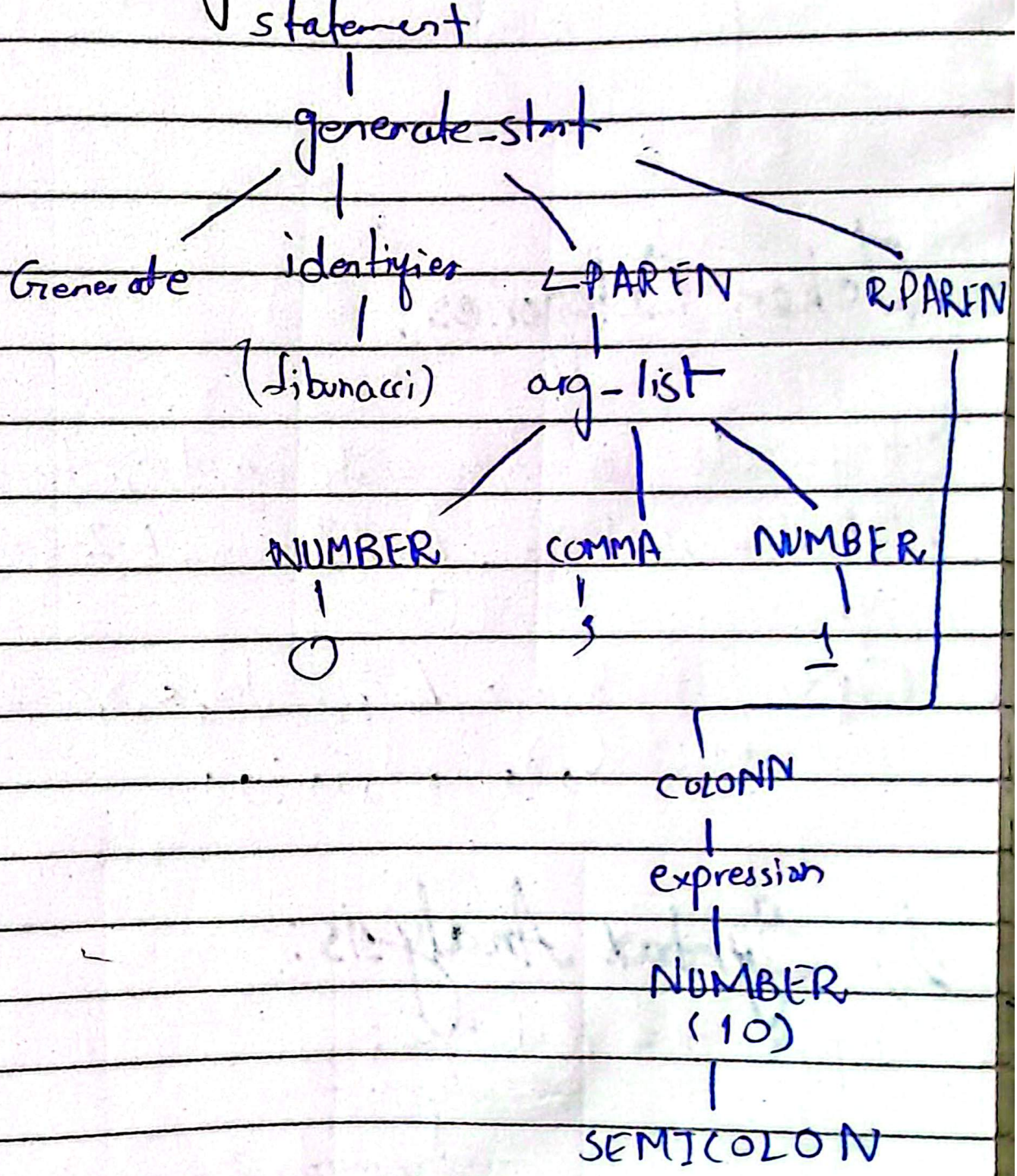
input x = a+b*2;



RC

Date

2) input: generate fibonacci (0,1): 10



Grammer Rules:

Date

- program: → pattern_def + statement *
pattern_def → "pattern"
IDENTIFIER (param_list) { stmt_list }

param_list → IDENTIFIER (, identifier)*

statement → assignment | generate_stmt |
print_stmt | if_stmt | return_stmt

assignment → IDENTIFIER = expression ;
generate_stmt → generate IDENTIFIER (arg_list)
: expression ;

expression → comparison
comparison → additive ((== | != | < | > | <= | >=)
additive)*

additive → multiplicative ((+ | -) multiplicative)*

multiplicative → unary ((* | / | %) unary)*

Unary → (+ | -) unary | primary

primary → NUMBER | IDENTIFIER |
(expression)

3) SEMANTIC Analysis

Global Symbol Table

Name	Type	Scope	Attributes
Fibonacci	pattern	global	params: [a, b]
factorial	pattern	global	params: [base]
squares	pattern	global	params: [start]

Fibonacci Pattern Scope:

Name	Type	Kind	Line Declared
a	number	parameter	1
b	"	parameter	1
n	"	builtin	—
temp	"	local	5

Scope Nesting

Date

Global Scope

PATTERN: fibonacci
Parameters: a, b
Built-in: n

IF BLOCK
Inherits: a, b, n

ELSE BLOCK
Locals: temp
Inherits a, b, n

c) Semantic Error Detection:

- ~~Undefined Variable~~

→ Lexical Error:

Input: pattern fib@nacci(a,b){...}

↑

Error: Illegal char @ at line 1, col 12

RC

→ Syntax Errors:

Input: pattern fibonacci(ab) { .... }

Error: Expected comma or RPAREN, got identifier at line 1

→ Semantic Errors:

Input: generate fibonacci(1):5;

Error: Pattern 'fibonacci' expects 2 arguments, got 1