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Subject

CC

Assignment # 02

2: Grammer design:-

- Program Structure : program → P_TILDE stmt-list P_BACKTICK
- Variable Declaration: decl-stmt → KW_int IDENTP_TERMINATOR
- Assignment : assign-stmt → IDENT OP_ASSIGN expression P_TERMINATOR
- Conditional (if) : cond-stmt → KW_if P_TILDE expression P_BACKTICK P_CURLY_START stmt-list P_CURLY_END
- Loop (while) : loop-stmt-list → KW_while P_TILDE expression P_BACKTICK P_CURLY_START stmt-list P_CURLY_END

3: Parser Implementations:-

% %.

program : P_TILDE stmt-list P_BACKTICK

{ printf ("Syntax analysis");

stmt-list : stmt | stmt stmt-list;

stmt : decl-stmt | assign-stmt | cond-stmt |
loop-stmt | return-stmt;

decl-stmt : KW_int IDENT P_TERMINATOR;

assign-stmt : IDENT OP_ASSIGN expression

P_TERMINATOR ;

cond-stmt : KW_if P_TILDE expression

P_BACKTICK P_CURLY-START stnt-list

P_CURLY-END :

loop-stmt : KW_while P_TILDE expression

P_BACKTICK P_CURLY-START stnt-list

P_CURLY-END ;

return-stmt : KW_return expression

P_TERMINATOR

expression : INT | IDENT | expression OP_ADD

expression ;

% %.

3: Error Handling :-

```
void yyerror (const char *s){
```

```
extern int yylineno;
```

```
extern char * yytext;
```

```
fprintf (stderr, "Line %d: Syntax Error\n",
```

```
-%s (found token: '%s')\n", yylineno, s,
```

```
yytext);
```

```
}
```

45: Sample valid programs:

yagam * ;

x >= 10 ;

in = x > 5 ;

yagi * ;

56: First and follow sets:

Assumed grammar rule:

- program → stmt-list
- stmt → + decl-stmt | cond-stmt | loop-stmt
- decl-stmt → KW-int IDENT P_TERMINATOR
- cond-stmt → KW-if P_TILDE expr P_TILDE
- P_CURLY_START stmt-list P_CURLY-END

Non-Terminal

First set

Follow set

program

{ KW-int, KW-float,
KW-if, KW-while,
IDENT } { \$(EOF) }

stmt

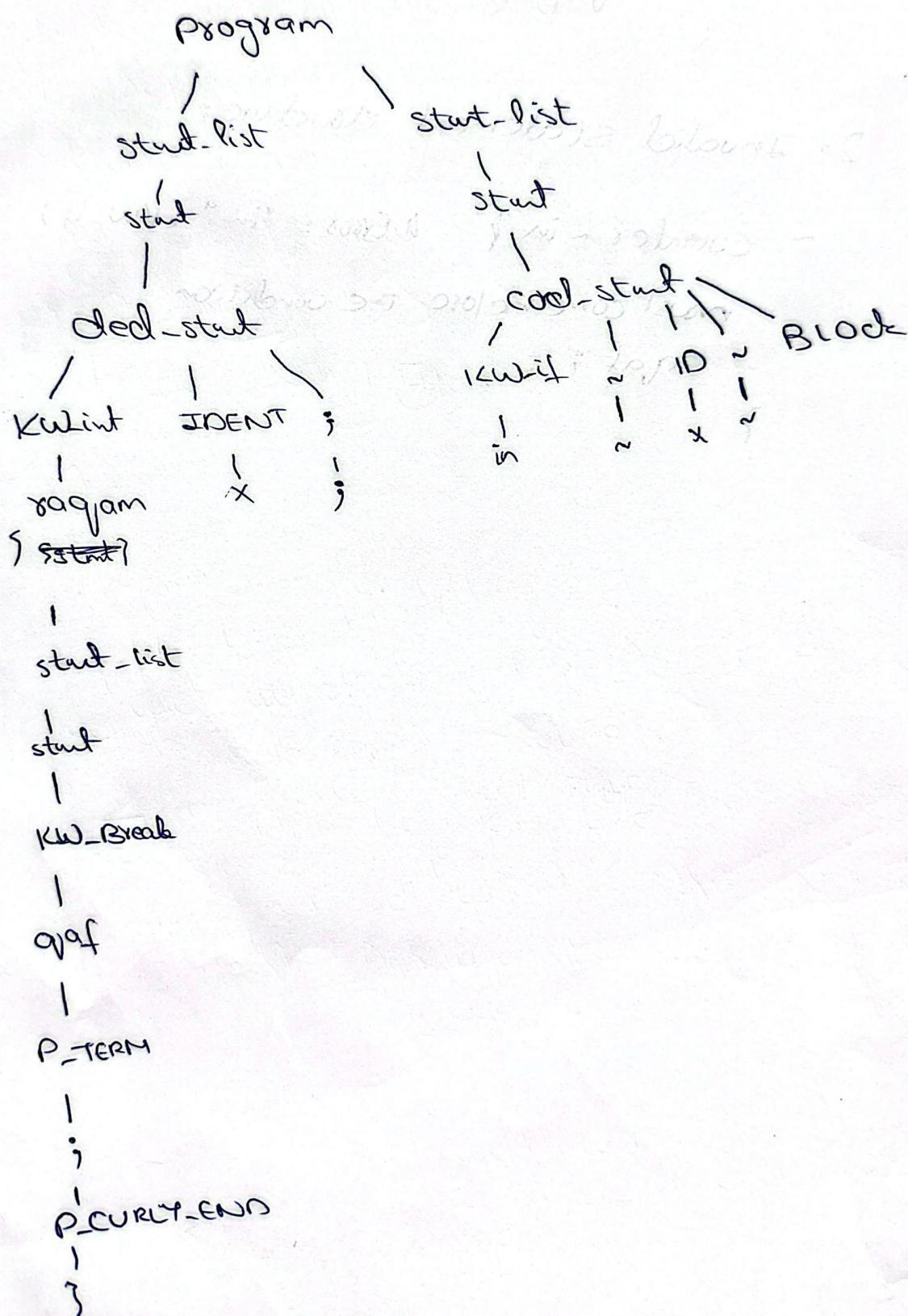
{ KW-int, KW-float,
KW-if, KW-while,
IDENT } {

{ KW-int,
KW-float,
KW-if,
KW-while,
IDENT,
P_CURLY-END, \$(EOF) }

Parse tree :-

yaqam x ;

inx x ~ qaf ; }



Error Scenarios:-

1. Missing Token error :

yaqam counter // Error: Missing
P-TERMINATOR (;)
in - counter ~ {
qaf;
}

2. Invalid statement structure:

~ counter ~ in { // Error: "in" (KW_if)

must come before the condition

yaqaf;
{ }
{ }
{ }
{ }

if

else if

else

for loop

do while

switch

break

pop

push

exit

end

end if

end for

end do

Error Scenarios:-

1. Missing Token error :

sqayam counter // Error: Missing

P-TERMINATOR (:)

in - counter ~ {

qaf;

}

2. Invalid statement structure:

- counter ~ in { // Error: "in" (KW-if)

must come before the condition

qaf ;

{ }

if

else

endif

endif