Mid Semester Evaluation Scheme

Spring 2020

CD (CS 3002)

FM: 20

1 a) Difference atleast 2 — 1 Mark

b) Definition — 0.5 Mark

Significance — 0.5 Mark

c) Lexemes

- i) Printf
- ii) (
- iii) "arr+brr= %d \n"
- iv) ,
- v) arr
- vi) >=
- vii) 123
- viii))
- ix) ;

— 1 mark for finding all lexemes and corresponding tokens

d) @,# left associative

$ Right associative

$ Highest precedence

@,# Same precedence

— 1 mark

e) 1 mark for attempt

2) Given sting: POS= val*60 +rem;

↓

Lexical Analyzer

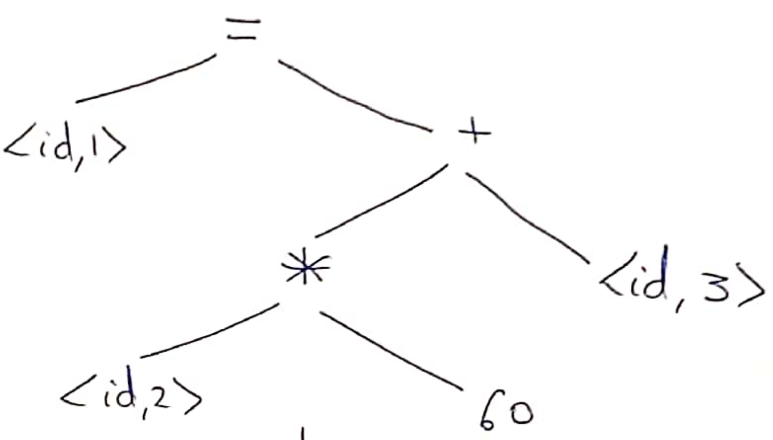
↓

<id,1><=><id,2><*><60><+><id,3>

↓

Syntax Analyzer

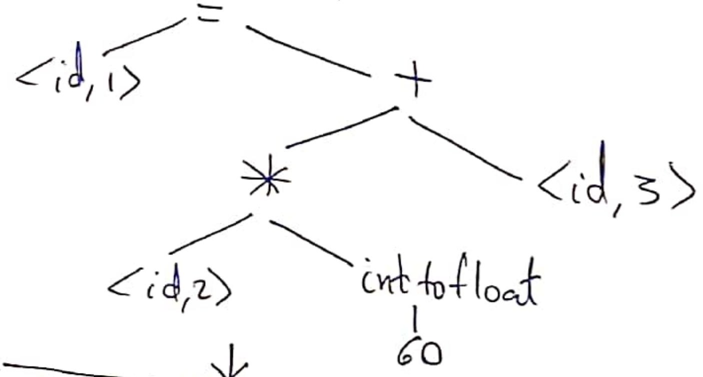
↓



↓

Semantic Analyzer

↓



↓

Intermediate Code generation

↓

t_1 = int of float (60)

t_2 = id_2 * t_1

t_3 = id_3 + t_2

id_1 = t_3

↓

Code optimizer

↓

$t_1 = id_2 * 60.0$

$id_1 = id_3 + t_1$

↓

Code generator

↓

```
LDF  R2, id2
MULF R2, R2, #60.0
LDF  R1, id3
ADDF R1, R1, R2
STF  id1, R1
```

3a) (2marks)

$$l \rightarrow A|B|\ldots|Z|a|b|\ldots|z$$

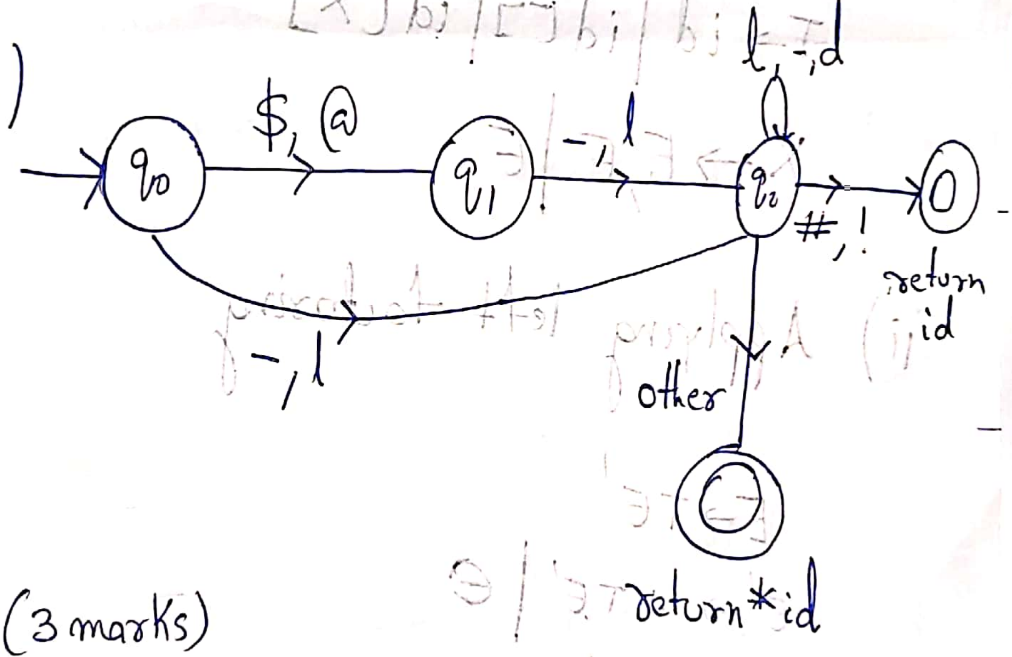
$$d \rightarrow 0|1|2|\cdots|9$$

$$id \rightarrow (\$|@|\epsilon)(l|\_)(l|\_|d)^*(\#|!|\epsilon)$$

or

$$id \rightarrow (\$|@)?(l|\_)(l|\_|d)^*(\#|!)?$$

b)



(3 marks)

4) $E \to E+T \mid T$

$T \to id \mid id[\,] \mid id[X]$

$X \to E,E \mid E$

i) Left recursion Elimination

$E \to TE'$

$E' \to +TE' \mid \epsilon$

$T \to id \mid id[\,] \mid id[X]$

$X \to E,E \mid E$

ii) Applying left factoring

$E \to TE'$

$E' \to +TE' \mid \epsilon$

$T \to idT'$

$T' \to \epsilon \mid [\,] \mid [X]$ - again apply left factoring.

$X \to EX'$

$X' \to ,E \mid \epsilon$

c,d)

	FIRST	FOLLOW
$E \to TE'$	$\{id\}$	$\{\$, ,,]\}$
$E' \to +TE' \mid \epsilon$	$\{+, \epsilon\}$	$\{\$, ,,]\}$
$T \to idT'$	$\{id\}$	$\{+, \$, ,,]\}$
$T' \to \epsilon \mid [T''$	$\{\epsilon, [\}$	$\{+, \$, ,,]\}$
$T'' \to]. \mid X]$	$\{], id\}$	$[+, \$, ,,]]$
$X \to EX'$	$\{id\}$	$\{]\}$
$X' \to ,E \mid \epsilon$	$\{,, \epsilon\}$ (Comma and epsilon)	$\{]\}$

e)

	id	+	[	]	,	\$
E	$E \to TE'$					
E'		$E' \to +TE'$		$E' \to \epsilon$	$E' \to \epsilon$	$E' \to \epsilon$
T	$T \to idT'$					
T'		$T' \to \epsilon$	$T' \to [T''$	$T' \to \epsilon$	$T' \to \epsilon$	$T' \to \epsilon$
T''	$T'' \to id$			$T'' \to]$		
X	$X \to EX'$					
X'				$X' \to \epsilon$	$X' \to ,E$	

5.) Given 5 Marks

$A \to xC \mid z$

$B \to yA$

$C \to Bx \mid AyB$

The productions can be rewritten as:

$A \to xC \mid z$

$B \to yA$

$C \to yAx \mid xCyB \mid zyB$

RDP

```
Char str[50];
int i=0, flag=0;
Void main()
{
 printf("Enter a string to be parsed");
 gets(str);
 A();
 if ((strlen(str)==i) && (flag==0))
       printf("successfully parsed");
 else
       printf("String cannot be parsed");
}

void A()
{ if (str[i++]=='x')
        C();
```

```
else if (str[i++]=='z')
            flag=0;
 else
        flag=1;
  }
  void B()
    {
      if (str[i++]=='y')
            A();
      else
            flag=1;
                  }
  void C()
    { if (str[i++]=='y')
        {
            A();
            if (str[i++]=='x')
                      flag=0;
            else
                   flag=1;
        }
  else if (str[i++]=='x')
      {
          C();
        if (str[i++]=='y')
               B();
        else
               flag=1;
                      }
```

```
else if (str[i++] == 'z')
  {
    if (str[i++]== 'y')
          B();
    else
       flag=1;
    }
  else
    flag=1;
          }
```