

C1) This is a recursive descent parser. Write the grammar from this parser.

```
block()
    match('{')
    stmt()
    match('}')

```

$block \rightarrow \{ stmt \}$

```
stmt()
    if( currenttoken == 'id') ignore this, add
        stmt1()
        stmt()
    else
        ε

```

$stmt \rightarrow stmt_1 stmt \mid \epsilon$

if clause,  
not true

```
stmt1()
    match('id')
    match('=')
    expr()
    match(';')

```

$stmt_1 \rightarrow id = expr ;$

```
expr()
    match('id')
    exprs()

```

$expr \rightarrow id exprs$

```
exprs()
    if( currenttoken == '+')
        match('+')
        exprs()

```

$exprs \rightarrow + exprs \mid \epsilon$

C2) Given this grammar, compute First and Follow set, draw the parsing table

```
dcl = ID dcl2
dcl2 = ( formal ) stmt | [ NUM ]
formal = ID formals | empty
formals = , formal | empty

```

	First		First	Follow
dcl	{ID, ε}	dcl	{ID}	{\$}
dcl2	{ID, ε}	dcl2	{(, [ }	{\$}
dcl2	{(, [ }	formal	{ID, ε}	{), }
dcl	{ID}	formals	{, , ε}	{, }

Should include  
all Non-Term  
+ Term

- ①  $dcl \rightarrow ID dcl_2$
- ②  $dcl_2 \rightarrow (formal) stmt$
- ③  $dcl_2 \rightarrow [NUM]$
- ④  $formal \rightarrow ID formals$
- ⑤  $formal \rightarrow \epsilon$
- ⑥  $formals \rightarrow , formal$
- ⑦  $formals \rightarrow \epsilon$

$dcl \xrightarrow{ID} dcl \rightarrow ID dcl_2$   
 $dcl_2 \xrightarrow{(} dcl_2 \rightarrow (formal) stmt$   
 $dcl_2 \xrightarrow{[} dcl_2 \rightarrow [NUM]$   
 $formal \xrightarrow{ID} formal \rightarrow ID formals$   
 $formal \xrightarrow{\epsilon} formal \rightarrow \epsilon$   
 $formals \xrightarrow{,} formals \rightarrow , formal$   
 $formals \xrightarrow{\epsilon} formals \rightarrow \epsilon$