HIGH-LEVEL PROGRAMMING I

Comma operator   by Prasanna Ghali

Comma Operator: Syntax (1/2)

- Allows "gluing" of multiple expressions into single expression

- Syntax: *expression$_1$, expression$_2$*

Comma Operator: Syntax (2/2)

- Syntax: ***expression$_1$, expression$_2$***
  - "*Fully* evaluate ***expression$_1$***, then evaluate ***expression$_2$***"
  - Type and value of entire expression is type and value of *rightmost* expression ***expression$_2$***
  - This means that both ***expression$_1$*** and ***expression$_2$*** must have *same* type
  - Bottom of precedence table, L-R associative

Comma Operator: Exercise (1/2)

- What are the values of **int** variables **i**, **j** and **k** after execution of each of following expressions?
- For each expression, assume **i** is **0** and **j** is **5**

Expression	i	j	k
`i++, j = j + i`			-
`++i, i = j + i`			-
`i = 1, j = 2, k = ++i+j`			

Comma Operator: Exercise (2/2)

□ What are the values of **int** variables **i**, **j** and **k** after execution of each of following expressions?

□ For each expression, assume **i** is **0** and **j** is **5**

Expression	i	j	k
`i++, j = j + i`	1	6	-
`++i, i = j + i`	6	5	-
`i = 1, j = 2, k = ++i+j`	2	2	4

Comma Operator in **for** Statements

□ *Most often* used in **for** statements

  ▪ Allows multiple assignment expressions to be combined into single expression for purpose of initializing multiple variables when entering **for** loop

```
for (x = 0, y = N; x<N && y>0; ++x,--y) {
  /* statements */
}
```

Comma Operator: Example 1

```
for (int i=0, j=0; i<16 || j<8; i+=2, j++) {
  printf("%2d * %d = %2d\n", i, j, i*j);
}
```

```
 0 * 0 =  0
 2 * 1 =  2
 4 * 2 =  8
 6 * 3 = 18
 8 * 4 = 32
10 * 5 = 50
12 * 6 = 72
14 * 7 = 98
```

Comma Operator: Exercises (1/2)

- What are the values of **int** variables **i**, **j** and **k** after execution of each of following expressions?
  - For each expression, assume **i** is **5** and **j** is **3**

Expression	c	i	j
`c = i++, ++j, j + i`			
`c = (i++, ++j), j + i`			
`c = (++i, ++j, j + i)`			

Comma Operator: Exercises (2/2)

□ What are the values of **int** variables **i**, **j** and **k** after execution of each of following expressions?

□ For each expression, assume **i** is **5** and **j** is **3**

Expression	c	i	j
`c = i++, ++j, j + i;`	5	6	4
`c = (i++, ++j), j + i;`	4	6	4
`c = (++i, ++j, j + i);`	10	6	4