

Exercise - 5

1. Evaluate the given expression with operator precedence and associativity

Sol: Given: $a = 1, b = 2, c = 3, d = 4, e = 5$

$$(A) a^* b - 1 + c.$$

$$\rightarrow a^* b = 1^* 2 = 2.$$

$$\rightarrow (a^* b - 1) = 2 - 1 = 1.$$

$$\rightarrow (a^* b - 1) + c = 1 + 3 = 4.$$

$$\therefore \underline{a^* b - 1 + c = 4}.$$

$$B. (a - b)/c * (d^* e/a - 3).$$

$$\rightarrow (a - b) = 1 - 2 = -1$$

~~$$\rightarrow d^* e = 4^* 5 = 20$$~~

~~$$\rightarrow d^* e/a = 20/1 = 20.$$~~

~~$$\rightarrow d^* e/a - 3 = 20 - 3$$~~

$$(B) (a - b)/c * (d^* e/a - 3)$$

$$\rightarrow (a - b) = 1 - 2 = -1$$

$$\rightarrow e/a = 5/1 = 5.$$

$$\rightarrow d^* e/a = 4 \times 5 = 20.$$

$$\rightarrow d^* e/a - 3 = 20 - 3 = 17.$$

$$\rightarrow (a - b)/c = -1/3$$

$$\rightarrow (a - b)/c * (d^* e/a - 3) = 17 \times -1/3 = -17/3$$

$$(c) -a+b$$

$$\rightarrow -a = -1$$

$$\rightarrow -a+b = -1+2 = \underline{\underline{-1}}$$

2. Evaluate expression with operator precedence (right to left)

$$(A) a+b-1+c$$

$$\rightarrow -1+c = -1+3 = 2$$

$$\rightarrow a+b = 1+2 = 2$$

$$\rightarrow a+b-1+c = 2+2 = \underline{\underline{4}}$$

$$(B) (a-b)/c + (d^e/a)^{-3}$$

$$\rightarrow d^e/a = 4 \times 5/1 = 20$$

$$\rightarrow d^e/a^{-3} = 20^{-3} = 1/20$$

$$\rightarrow (a-b)/c = (1-2)/3 = -1/3$$

$$\rightarrow (a-b)/c + (d^e/a)^{-3} = -1/3 + \underline{\underline{1/20}}$$

$$(C) -a+b$$

$$\rightarrow -a+b = -1+2 = \underline{\underline{1}}$$

3. `int fun(int * k) {`

$*k += 4;$

`return 3 * (*k) - 1;`

`}`

`void main() {`

`int i = 10, j = 10, sum1, sum2;`

`sum1 = (i/2) + fun(4*i)`

`sum2 = fun(4*j) + (j/2);`

`}`

A. If operands are evaluated left to right.

• Sum 1:

$$\rightarrow \overline{i/2} = 10/5 = 2$$

$$\rightarrow i = i + 4 = 10 + 4 = 14$$

$$\rightarrow \text{return } 3 * 14 - 1 = 42 - 1 = 41$$

$$\rightarrow \text{sum1} = 5 + 41 = 46$$

Inside fun(4*i)

• Sum 2:

$$(1) \rightarrow \overline{j/2} = j + 4 = 10 + 4 = 14$$

$$\rightarrow \text{return value: } 3 * 14 - 1 = 41$$

Inside fun(4*j)

$$\rightarrow j/2 = 14/2 = 7$$

$$\rightarrow \text{sum2} = 41 + 7 = 48$$

• Result

$$\cancel{\text{sum1}} \rightarrow \text{sum1} = 46$$

$$\text{sum2} = 48$$

B. If operands are evaluated right to left:

• Sum 1:

$$\rightarrow i = i + 4 = 10 + 4 = 14$$

$$\rightarrow \text{Return value: } 3 * 14 - 1 = 41 \quad \left. \begin{array}{l} \\ \end{array} \right\} \text{Inside fun(f,i)}$$

$$\rightarrow i/2 = 14/2 = 7.$$

$$\rightarrow \text{Sum 1} = 7 * 14 = 48.$$

• Sum 2:

$$\rightarrow j/2 = 10/2 = 5.$$

$$\rightarrow j = j + 4 = 14.$$

$$\rightarrow \text{Return value: } 41 \quad \left. \begin{array}{l} \\ \end{array} \right\} \text{Inside fun(f,j)}$$

$$\rightarrow \text{Sum 2} = 41 + 5 = 46.$$

• Result:

$$\text{Sum 1} = 48$$

$$\text{Sum 2} = 46.$$

4. Evaluate final value of x after function call.

: int fun(int + i)

{

*i += 5;

return y;

3.

(A) If operands are evaluated left to right

$$\rightarrow x = 3$$

$$\rightarrow x = x + 5 = 3 + 5 = 8 \quad \text{Inside fun(} f(x) \text{)}$$

\rightarrow Return value: 8.

$$\rightarrow x = 8 + 4 = 12$$

(B) If operands are evaluated right to left

$$\rightarrow x = x + 5 = 3 + 5 = 8 \quad \text{Inside fun(} f(x) \text{)}$$

\rightarrow Return value: 8.

$$\rightarrow x = 3 + 4 = 7$$

Result

(1) $x = 7$.