

Data Structures and Algorithms

V22.0102

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Infix to Postfix Conversion

- We use a stack
- When an operand is read, output it
- When an operator is read
 - Pop until the top of the stack has an element of lower precedence
 - Then push it
- When) is found, pop until we find the matching (
- (has the lowest precedence when in the stack
- but has the highest precedence when in the input
- When we reach the end of input, pop until the stack is empty

Infix to Postfix Conversion

Example 1

- $3+4*5/6$

Infix to Postfix Conversion

Example 1

- 3+4*5/6
- Stack:
- Output:

Infix to Postfix Conversion

Example 1

- $3 + 4 * 5 / 6$
- Stack:
- Output: 3

Infix to Postfix Conversion

Example 1

- $3 + \underline{4} * 5 / 6$
- Stack: +
- Output: 3

Infix to Postfix Conversion

Example 1

- $3+4_5/6$
- Stack: +
- Output: 3 4

Infix to Postfix Conversion

Example 1

- $3+4*\underline{5}/6$
- Stack: + *
- Output: 3 4

Infix to Postfix Conversion

Example 1

- $3+4*5/6$
- Stack: + *
- Output: 3 4 5

Infix to Postfix Conversion

Example 1

- $3+4*5/6$
- Stack: +
- Output: 3 4 5 *

Infix to Postfix Conversion

Example 1

- $3+4*5/\underline{6}$
- Stack: + /
- Output: 3 4 5 *

Infix to Postfix Conversion

Example 1

- $3+4*5/6$
- Stack: + /
- Output: 3 4 5 * 6

Infix to Postfix Conversion

Example 1

- $3+4*5/6$
- Stack: +
- Output: 3 4 5 * 6 /

Infix to Postfix Conversion

Example 1

- $3+4*5/6$
- Stack:
- Output: 3 4 5 * 6 / +
- Done!

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack:
- Output:

Infix to Postfix Conversion

Example 2

- $(\underline{300}+23)*(43-21)/(84+7)$
- Stack: (
- Output:

Infix to Postfix Conversion

Example 2

- $(300_{\underline{+}}23)*(43-21)/(84+7)$
- Stack: (
- Output: 300

Infix to Postfix Conversion

Example 2

- $(300+\underline{23})*(43-21)/(84+7)$
- Stack: (+
- Output: 300

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: (+
- Output: 300 23

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: (
- Output: 300 23 +

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack:
- Output: 300 23 +

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: *
- Output: 300 23 +

Infix to Postfix Conversion

Example 2

- $(300+23)*(\underline{43}-21)/(84+7)$
- Stack: * (
- Output: 300 23 +

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: * (
- Output: 300 23 + 43

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-\underline{\underline{21}})/(84+7)$
- Stack: * (-
- Output: 300 23 + 43

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: * (-
- Output: 300 23 + 43 21

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: * (
- Output: 300 23 + 43 21 -

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: *
- Output: 300 23 + 43 21 -

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack:
- Output: 300 23 + 43 21 - *

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: /
- Output: 300 23 + 43 21 - *

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(\underline{84}+7)$
- Stack: / (
- Output: 300 23 + 43 21 - *

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84\pm 7)$
- Stack: / (
- Output: 300 23 + 43 21 - * 84

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+\underline{7})$
- Stack: / (+
- Output: 300 23 + 43 21 - * 84

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: / (+
- Output: 300 23 + 43 21 - * 84 7

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: / (
- Output: 300 23 + 43 21 - * 84 7 +

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack: /
- Output: 300 23 + 43 21 - * 84 7 +

Infix to Postfix Conversion

Example 2

- $(300+23)*(43-21)/(84+7)$
- Stack:
- Output: 300 23 + 43 21 - * 84 7 + /
- Done!

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack:
- Output:

Infix to Postfix Conversion

Example 3

- $(\underline{4}+8)*(6-5)/((3-2)*(2+2))$
- Stack: (
- Output:

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: (
- Output: 4

Infix to Postfix Conversion

Example 3

- $(4+\underline{8})*(6-5)/((3-2)*(2+2))$
- Stack: (+
- Output: 4

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: (+
- Output: 4 8

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: (
- Output: 4 8 +

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack:
- Output: 4 8 +

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: *
- Output: 4 8 +

Infix to Postfix Conversion

Example 3

- $(4+8)*(\underline{6}-5)/((3-2)*(2+2))$
- Stack: * (
- Output: 4 8 +

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: * (
- Output: 4 8 + 6

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-\underline{5})/((3-2)*(2+2))$
- Stack: * (-
- Output: 4 8 + 6

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: * (-
- Output: 4 8 + 6 5

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: * (
- Output: 4 8 + 6 5 -

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: *
- Output: 4 8 + 6 5 -

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack:
- Output: 4 8 + 6 5 - *

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: /
- Output: 4 8 + 6 5 - *

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (
- Output: 4 8 + 6 5 - *

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((\underline{3}-2)*(2+2))$
- Stack: / ((
- Output: 4 8 + 6 5 - *

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / ((
- Output: 4 8 + 6 5 - * 3

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-\underline{2})*(2+2))$
- Stack: / ((-
- Output: 4 8 + 6 5 - * 3

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / ((-
- Output: 4 8 + 6 5 - * 3 2

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / ((
- Output: 4 8 + 6 5 - * 3 2 -

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (
- Output: 4 8 + 6 5 - * 3 2 -

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (*
- Output: 4 8 + 6 5 - * 3 2 -

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (* (
- Output: 4 8 + 6 5 - * 3 2 -

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (* (
- Output: 4 8 + 6 5 - * 3 2 - 2

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+\underline{2}))$
- Stack: / (* (+
- Output: 4 8 + 6 5 - * 3 2 - 2

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (* (+
- Output: 4 8 + 6 5 - * 3 2 - 2 2

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (* (
- Output: 4 8 + 6 5 - * 3 2 - 2 2 +

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (*
- Output: 4 8 + 6 5 - * 3 2 - 2 2 +

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: / (
- Output: 4 8 + 6 5 - * 3 2 - 2 2 + *

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack: /
- Output: 4 8 + 6 5 - * 3 2 - 2 2 + *

Infix to Postfix Conversion

Example 3

- $(4+8)*(6-5)/((3-2)*(2+2))$
- Stack:
- Output: 4 8 + 6 5 - * 3 2 - 2 2 + * /
- Done!