Converting infix expressions to postfix expressions

Infix to Postfix Conversion using a stack

- Read the input
- If the input is an operand, write to output
- If the input is an operator
    - Pop until the top of the stack has an element of lower precedence, and write them to output
    - Push the new operand into stack
- If the input is ')', pop until we find the matching '(' and write them to output. Do not write the ')' to the output. Remove the '(' from stack.
- When we reach the end of input, pop all the remaining operands

Infix to Postfix Conversion Example

(14+8)*(8-4)/((6-2*2)*(1+2))

- Stack:

- Output:

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '('   -- Push into stack

- Stack: (
- Output:

Infix to Postfix Conversion
Example-Continued

(<u>14</u>+8)*(8-4)/((6-2*2)*(1+2))

Processing 14   -- Write to output

- Stack: (
- Output: 14

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '+'   -- Push into stack

- Stack: (+
- Output: 14

Infix to Postfix Conversion
Example-Continued

(14+<u>8</u>)*(8-4)/((6-2*2)*(1+2))

Processing '8'   -- Write to output

- Stack: (+
- Output: 14 8

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing ')'   -- Pop until you find '('

- Stack:
- Output: 14 8 +

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing *   -- Push into stack

- Stack: *
- Output: 14 8 +

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '('   -- Push into stack

- Stack: * (
- Output: 14 8 +

Infix to Postfix Conversion
Example-Continued

(14+8)*(<u>8</u>-4)/((6-2*2)*(1+2))

Processing '8'   -- Write to output

- Stack: * (
- Output: 14 8 + 8

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '-'   -- Push into stack

- Stack: * (-
- Output: 14 8 + 8

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-<u>4</u>)/((6-2*2)*(1+2))

Processing '4'   -- Write to output

- Stack: * (-
- Output: 14 8 + 8 4

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing ')'   -- Pop until you find '('

- Stack: *

- Output: 14 8 + 8 4 -

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)<u>/</u>((6-2*2)*(1+2))

Processing '/'   -- Pop '*' and push '/' into stack

- Stack: /

- Output: 14 8 + 8 4 - *

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '('   -- push into stack

- Stack: / (

- Output: 14 8 + 8 4 - *

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '('   -- Push into stack

- Stack: / ((
- Output: 14 8 + 8 4 - *

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '6'   -- Write to output

- Stack: / ((
- Output: 14 8 + 8 4 - * 6

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '-'   -- Push into stack

- Stack: / ((-
- Output: 14 8 + 8 4 - * 6

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-<u>2</u>*2)*(1+2))

Processing '2'   -- Write to output

- Stack: / ((-
- Output: 14 8 + 8 4 - * 6 2

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2_*2)*(1+2))

Processing '*'   -- Push into stack

- Stack: / ((- *
- Output: 14 8 + 8 4 - * 6 2

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '2'   -- Write to output

- Stack: / ((- *
- Output: 14 8 + 8 4 - * 6 2 2

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing ')'   -- Pop until you find ')'

- Stack: / (

- Output: 14 8 + 8 4 - * 6 2 2 * -

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)_*(1+2))

Processing '*'   -- Push into stack

- Stack: / (*
- Output: 14 8 + 8 4 - * 6 2 2 * -

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '('   -- Push into stack

- Stack: / (* (
- Output: 14 8 + 8 4 - * 6 2 2 * -

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(<u>1</u>+2))

Processing '1'   -- Write to output

- Stack: / (* (
- Output: 14 8 + 8 4 - * 6 2 2 * - 1

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing '+'   -- Push into stack

- Stack: / (* (+
- Output: 14 8 + 8 4 - * 6 2 2 * - 1

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+<u>2</u>))

Processing '2'   -- Write to output

- Stack: / (* (+
- Output: 14 8 + 8 4 - * 6 2 2 * – 1 2

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing ')'   -- Pop until you find ')'

- Stack: / (*

- Output: 14 8 + 8 4 - * 6 2 2 * – 1 2 +

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

Processing ')'   -- Pop until you find '('

- Stack: /

- Output: 14 8 + 8 4 - * 6 2 2 * – 1 2 + *

Infix to Postfix Conversion
Example-Continued

(14+8)*(8-4)/((6-2*2)*(1+2))

No more input   -- Empty stack

- Stack:

- Output: 14 8 + 8 4 - * 6 2 2 * − 1 2 + * /