Expression Parser

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# Algorithm – Parser

1. **Set** **output queue** to empty.
2. **Set** **operation stack** to empty.
3. **For each token** in the **input queue**.
4. **If** the **token** is an operand **then**,
5. Append the **token** to the **output queue**.
6. **Else if** the **token** is a function **then**,
7. Push the **token** on to the **operation stack**.
8. **Else if** the **token** is an argument separator **then**,
9. **While** the top meta-operation on the **operation-stack** is not a left parenthesis **do**,
10. Pop the **operation** from the **operation-stack**.
11. Append that **operation** to the **output queue**.
12. **Else if** the **token** is an left parenthesis **then**,
13. Push the **token** on to the **operation-stack**.
14. **Else if** the **token** is a right parenthesis **then**,
15. **While** the top meta-operation on the **operation-stack** is not a left parenthesis **do**,
16. Pop the **operation** from the **operation-stack**.
17. Append that **operation** to the **output queue**.
18. **If** the operation-stack is empty **then**,
19. **Exception** “Right parenthesis, has no matching left parenthesis”
20. **Pop** the left parenthesis from the **operation-stack**.
21. **If** the top of the **operation-stack** is a function then,
22. Pop the **function** from the **operation-stack**
23. Append that **function** to the **output queue**.
24. **Else if** the **token** is an operator **then**,
25. **While** the **operation-stack** is not empty **do**
26. **If** the top of the **operation-stack** is not an operator **then**,
27. **Exit** the while loop.
28. **If** the **token** is a non-associative operator **then**,
29. **Exit** the while loop.
30. **If** the **token** is a left-associative operator ***and***   
     has greater precedence than the top of the **operation-stack** **then**,
31. **Exit** the while loop.
32. **If** the **token** is a right-associative operator ***and***   
     has greater or equal precedence than the top of the **operation-stack** **then**,
33. **Exit** the while loop.
34. Pop an **operator** from the top of the **operation-stack**.
35. Append that **operator** to the **output queue**.
36. **End while**
37. Push the **token** on to the **operation-stack**.
38. **Else**
39. **Exception** “Unknown token”.
40. **End For-each**.
41. **WHILE** the **operation stack** is not empty **DO**
42. **If** the top of the operation stack is a left-parenthesis **then**,
43. **Exception** “Missing right-parenthesis”.
44. Pop an **operator** from the top of the **operation-stack**.
45. Append that **operator** to the **output queue**.
46. **Return** **output-queue**