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Reverse Polish Notation

Written by Dr. J.J. Shepherd

Reverse Polish Notation

- Most math expressions you have seen were written in “in-fix” notation
- Example:

3 + 5

- However, there is another notation called “post-fix” or “Revere Polish Notation” where the operator is at the end
- Example

3 5 +

Big Idea

- Use a stack to solve reverse polish notation
- You push onto the stack when there's a number
- When there's an operator (+, -, *, /) then
  - Pop off two items from the stack
  - Evaluate the two numbers with that operation
  - Push the result back to the stack
- Once it has completed the expression there should only be one item left on the stack

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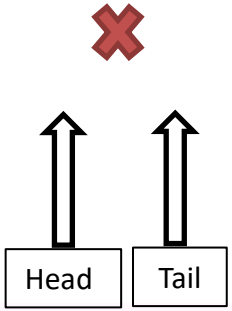
Example

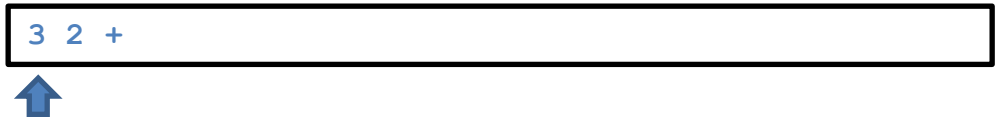
Reverse Polish Example

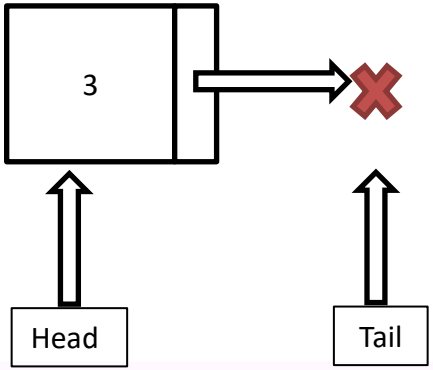
- Here the user has inputted the string 3 2 +



Reverse Polish Example

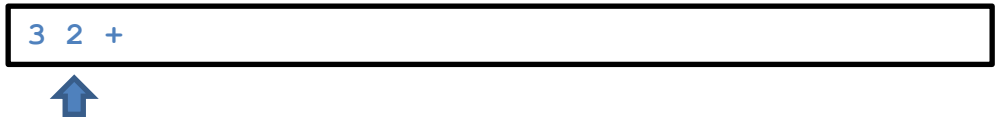
- 3 is a number so push it on the stack

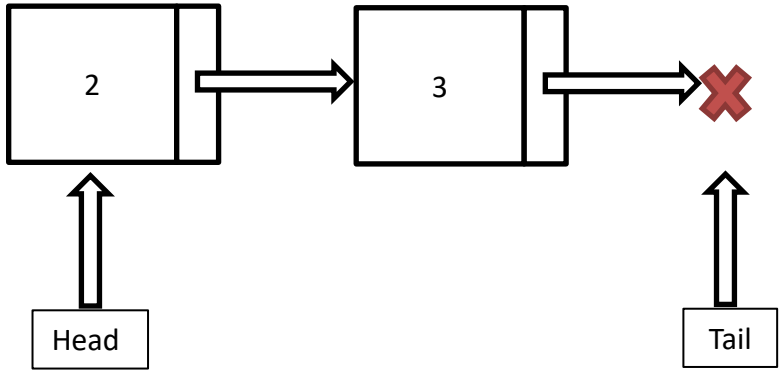




Reverse Polish Example

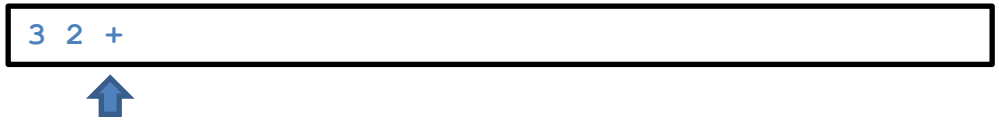
- 2 is a number so push it on the stack

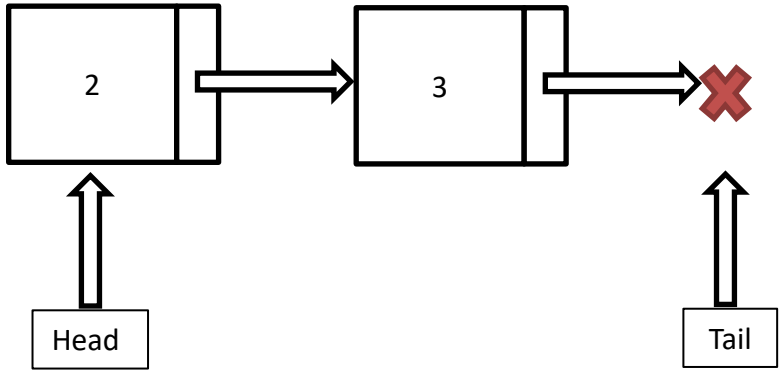




Reverse Polish Example

- + is an operator so pop of two





Reverse Polish Example

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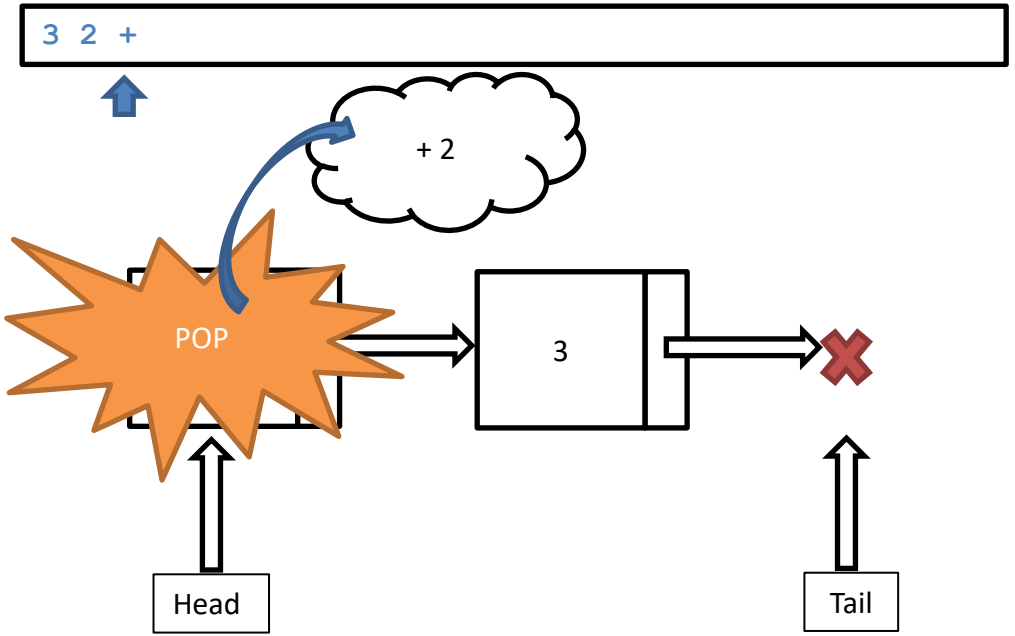
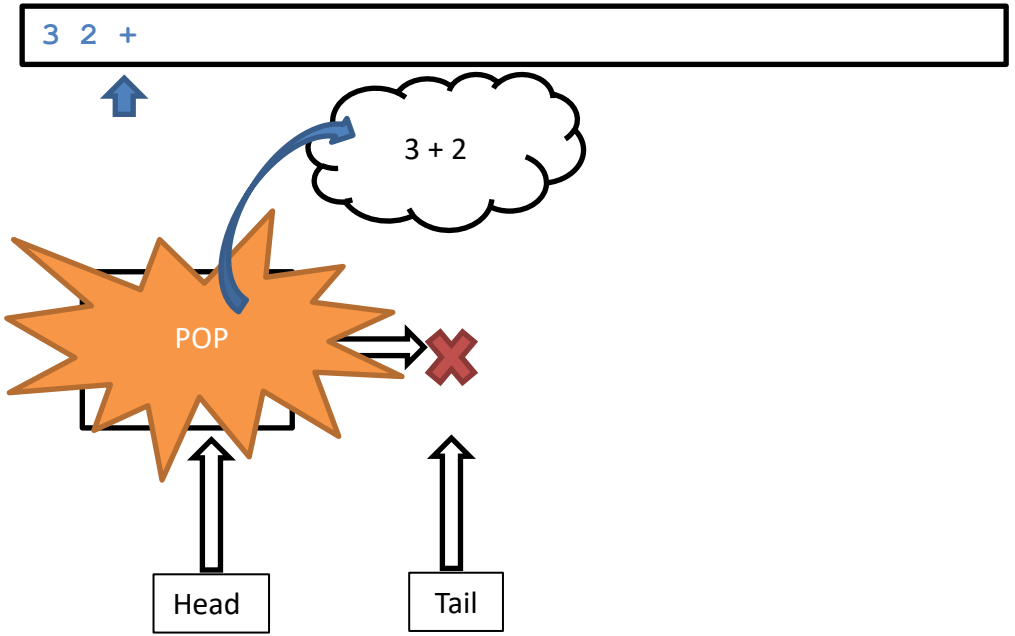


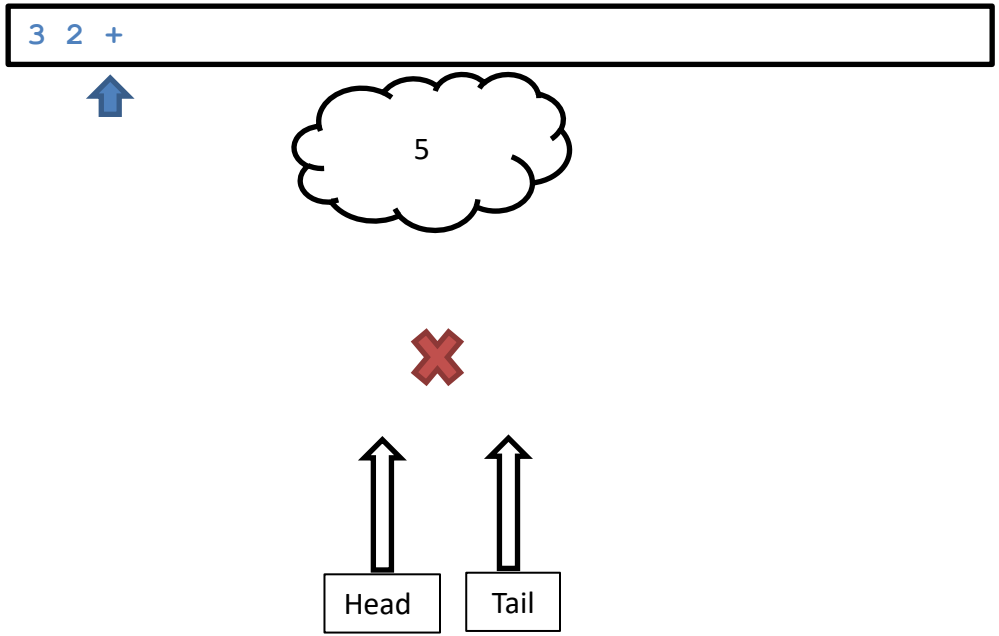
Reverse Polish Example

- + is an operator so pop of two



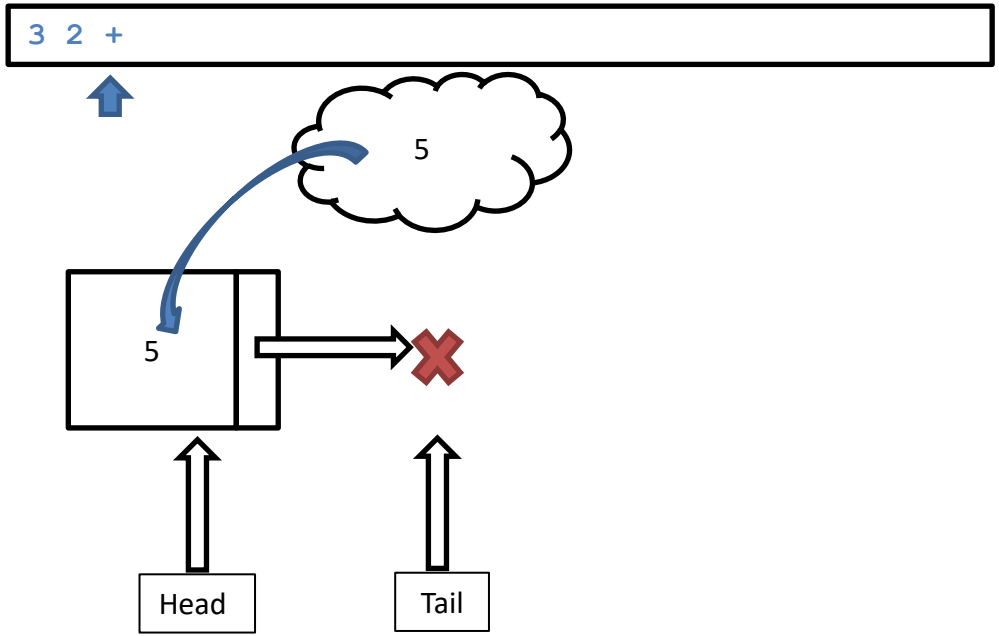
Reverse Polish Example

- Evaluate



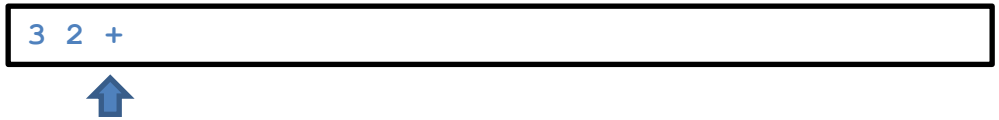
Reverse Polish Example

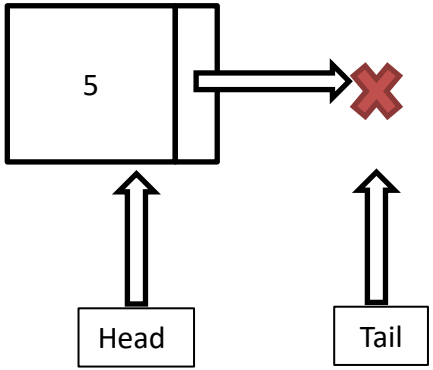
- Push the value back



Reverse Polish Example

- DONE!





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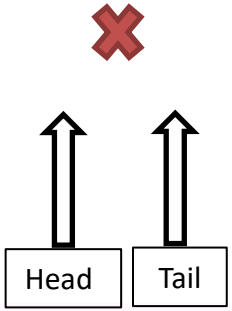
Example

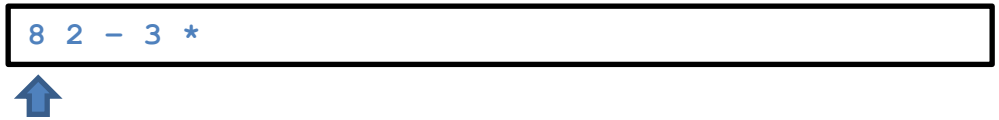
Reverse Polish Example

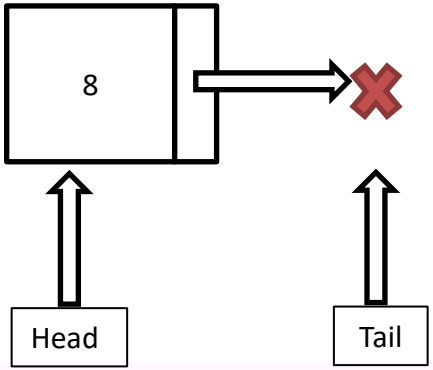
- Here the user has inputted the string 8 2 – 3 *



Reverse Polish Example

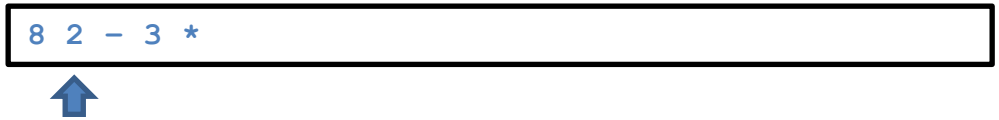
- 8 is a number so push it on the stack

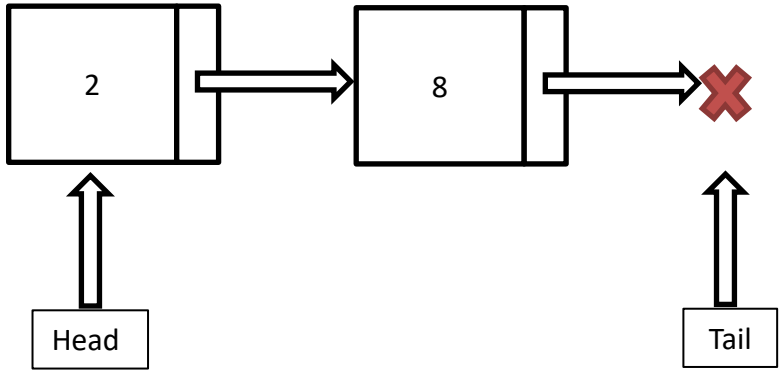




Reverse Polish Example

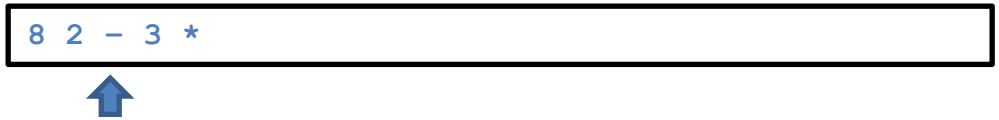
- 2 is a number so push it on the stack

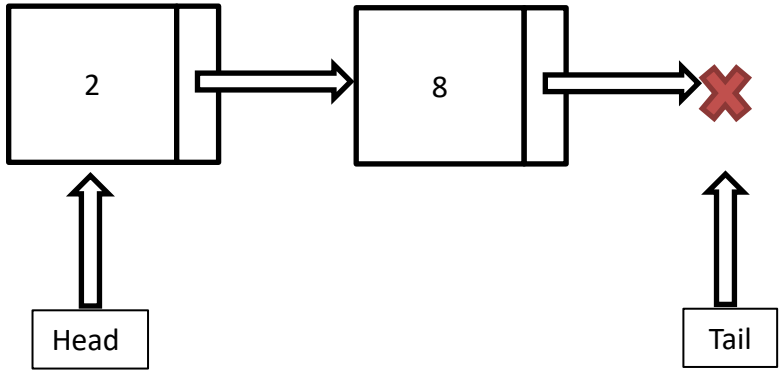




Reverse Polish Example

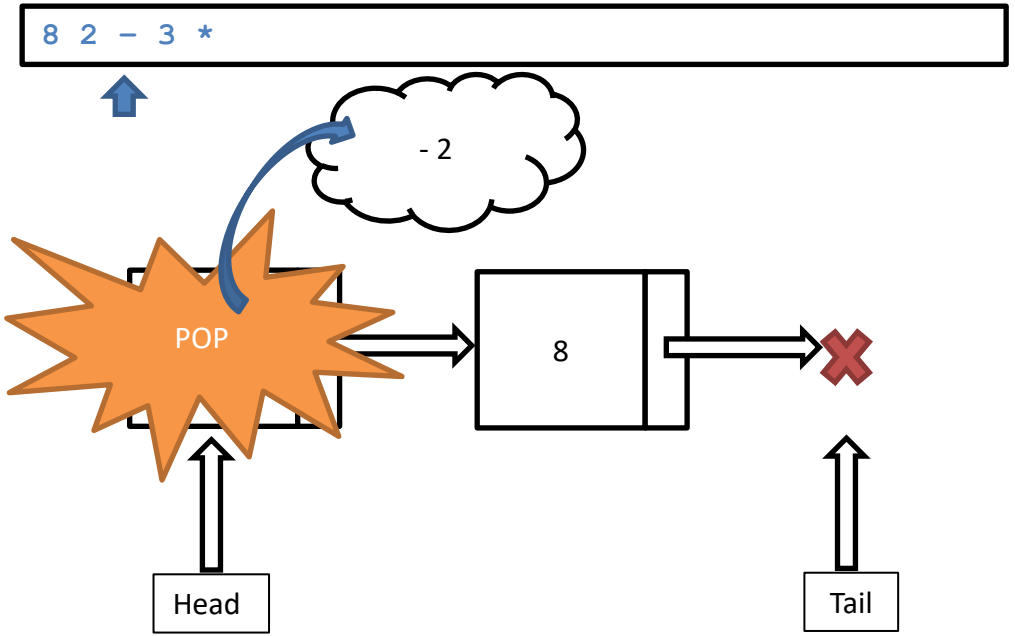
- - is an operator so pop of two





Reverse Polish Example

- + is an operator so pop of two



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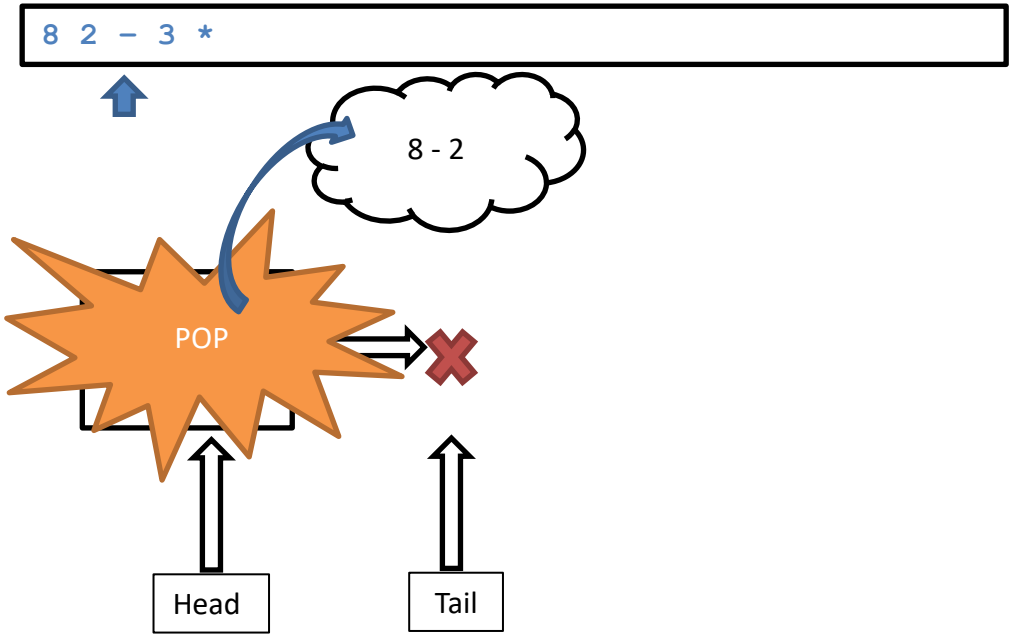
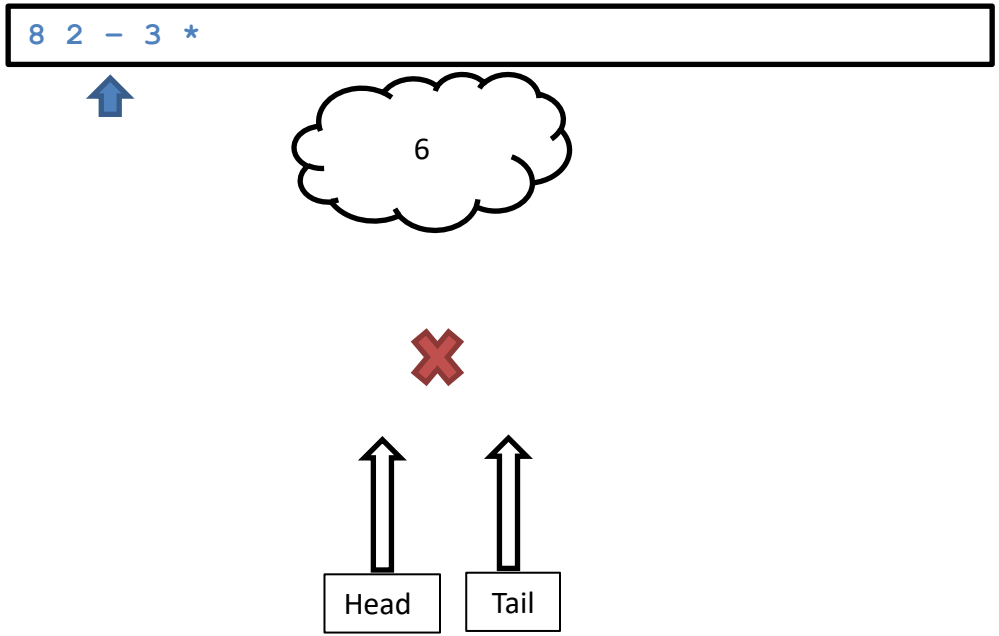


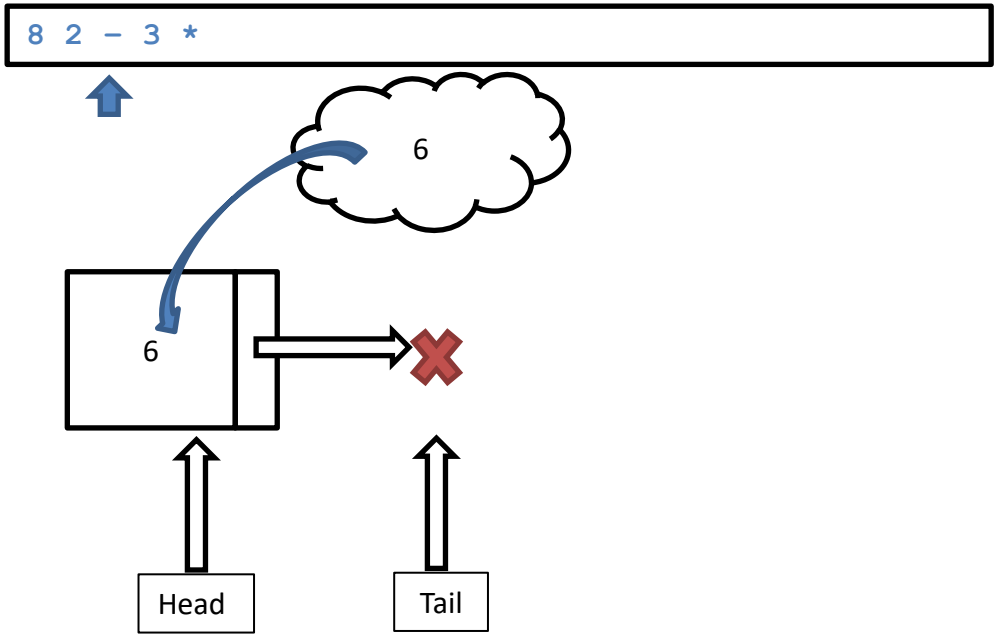
Reverse Polish Example

- Evaluate



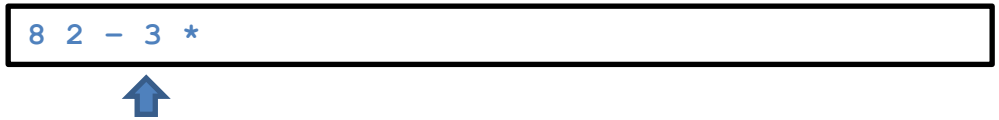
Reverse Polish Example

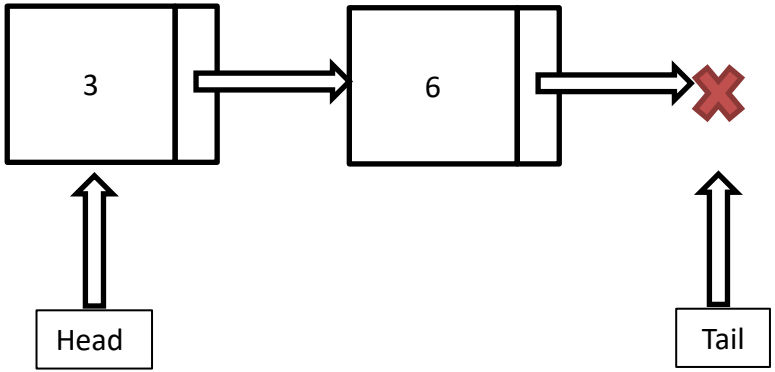
- Push the value back



Reverse Polish Example

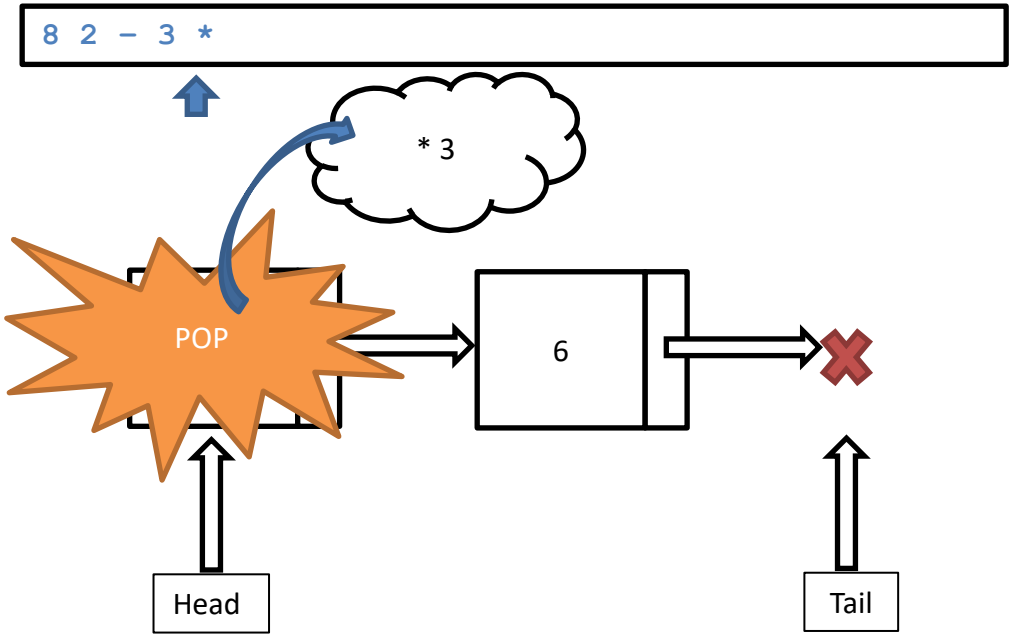
- 3 is a number so push it onto the stack





Reverse Polish Example

- * is an operator so pop of two



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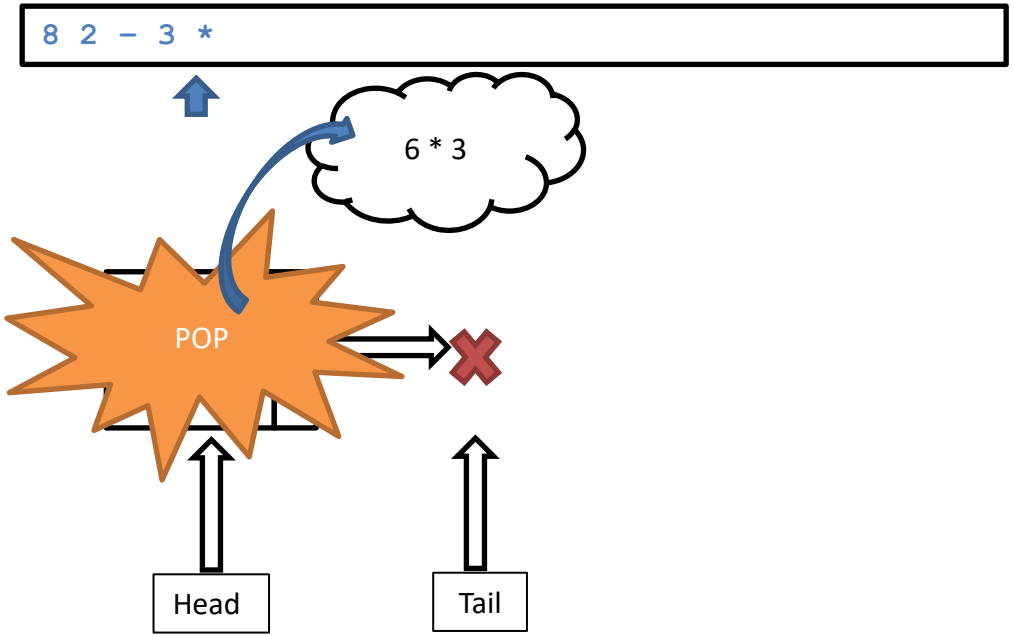

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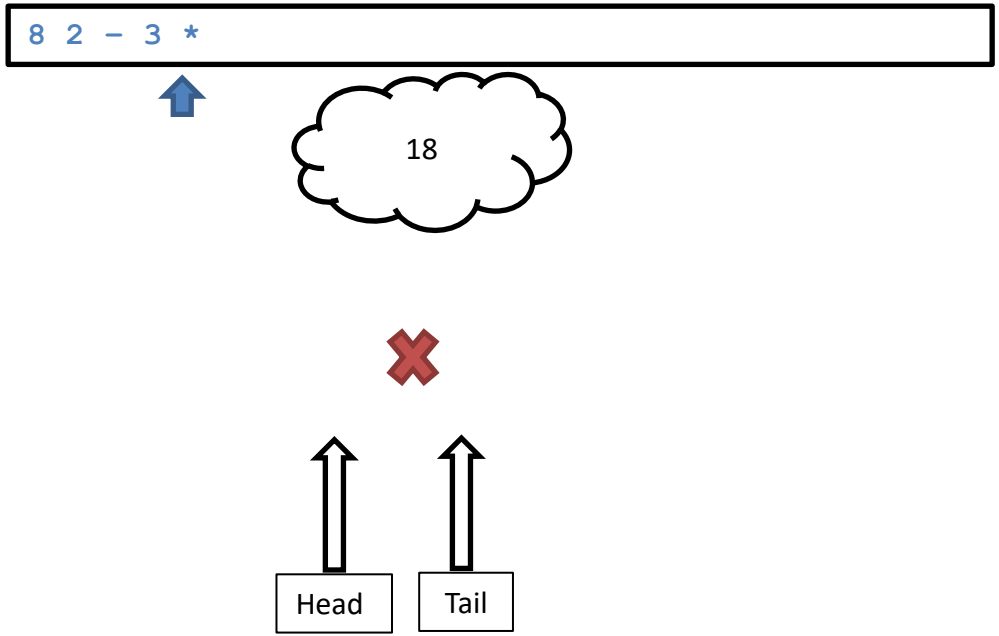

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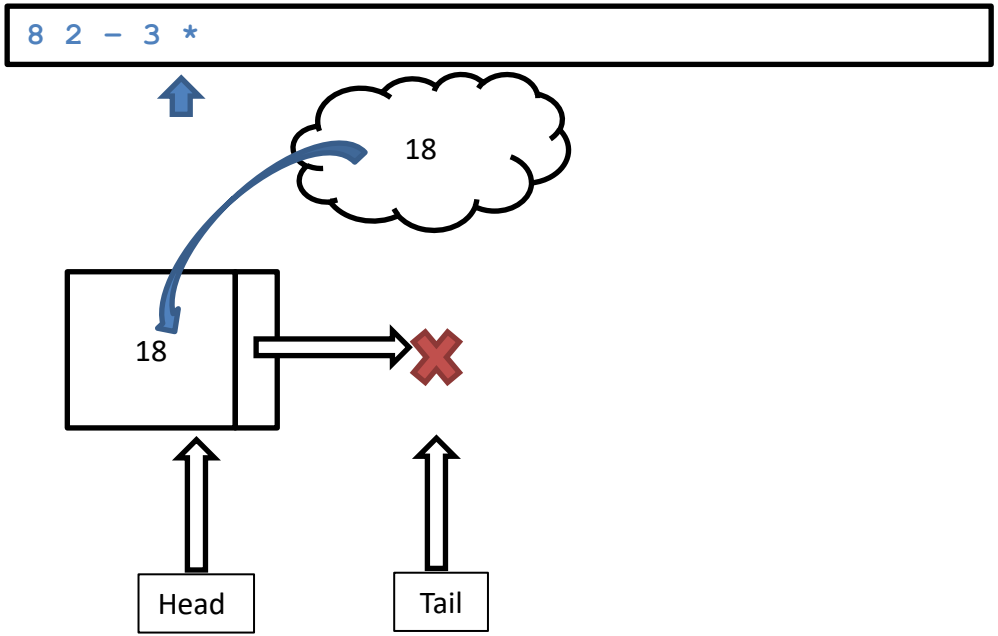

Reverse Polish Example

- DONE!