Cmp 338

9.3.09

Stack ADT

What is a ADT?

ADT = Abstract Data Type

Description of a set and the operations that can be performed on elements of that set without any information pertaining to the underlying construction that allows for its existance.

Stack ADT

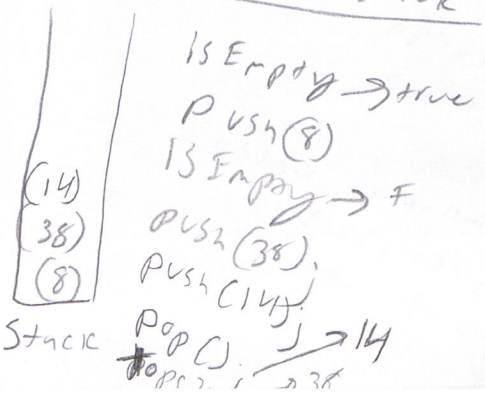
Push – puts an item onto the top of the stack

Pop – takes the top item off of the stack

top – tell you what item is on the top of the stack

IsEmpty – tells you whether or not the stack is empty

Abstract Drawing of a Stack

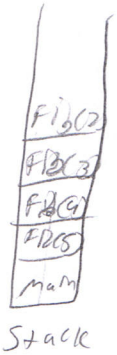


LIFO → Last In, First Out

FILO → First In, Last Out

Back tracking

Link of process



Stack

return fib(n-1) + fib(n-2);

Infix notation is a notation for representing mathematical expressions where the operators are placed in between the operands in which they function

ex

operator

5 + 2

operand

Operator - is a symbol used to represent a mathematical function

Operands - are values upon which operators apply their functions

Postfix notation - is a notation for representing mathematical expressions where the

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Operators are placed immediately after the operands on which they function.

ex

operand

8 3 7 * + ← operator

ex

8+3*7

Evaluating a Postfix Expression

ex

2 2 4 * +

2 12 +

14

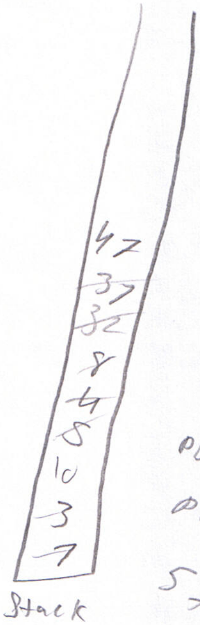
ex

7 3 + 5 4 8 * + +

10 5 32 +

10 37 +

47



→ push on stack

7 3 + 5 4 8 * + +

pop twice

7+3=10

push the 10 on stack

pop twice

4*8=32

push the 32 on stack

pop twice

5+32=37

push the 37 on stack

pop twice

10+37=47

Evaluating a postfix Expression

1) Create a stack to hold the operands
2) Read through the expression from left to right each time you encounter an operand; push it onto the stack

Operator: 1) pop the stack twice
2) apply the operator to these two operands

↓

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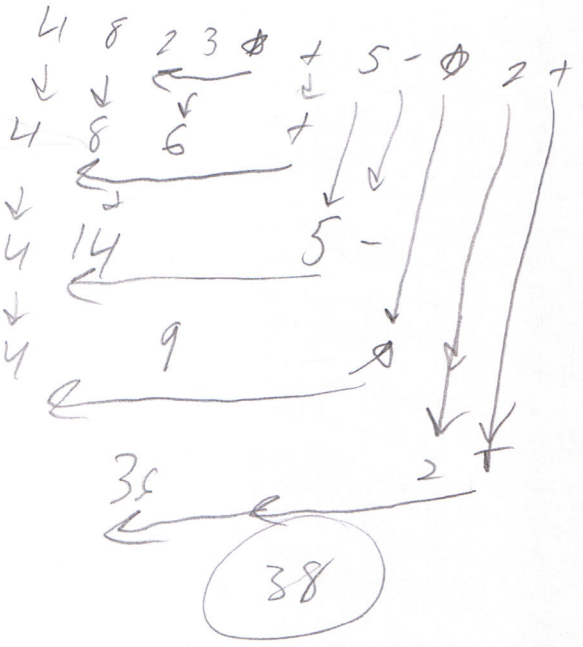
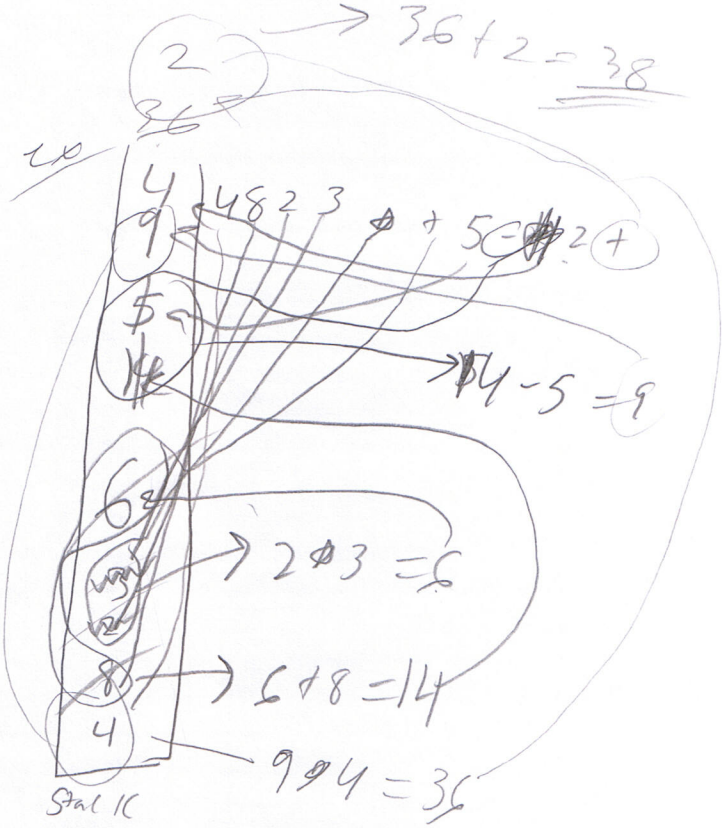
c) push the result onto the stack

3) The result is the only value on the stack.

ex



ex



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2 + 3 ∅ 4

5 ∅ 4

~~20~~

2 + 3 ∅ 4

2 + 12

14

2 + (3 + 5 + 3)

2 + (4 + 4 + 4)