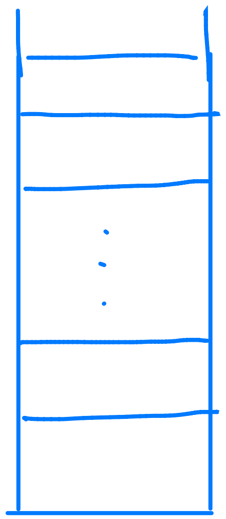
$14 - 3 * 2 + 7\$$, Where $ = end of expression

General form : $x_1 \; op_1 \; x_2 \; op_2 \; \ldots \; x_{k-1} \; op_{k-1} \; x_k \; op_k \; x_{k+1} \; \ldots\ldots \; x_n \; \underset{\$}{\underset{\|}{op_n}}$

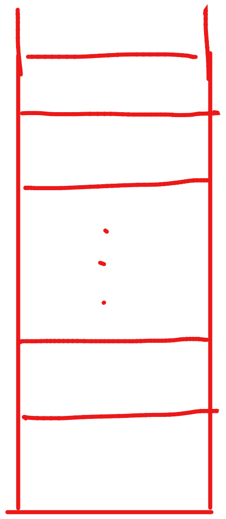
$x_1, \ldots, x_n$: Operands

$op_1, \ldots, op_n$: operators

Data structure



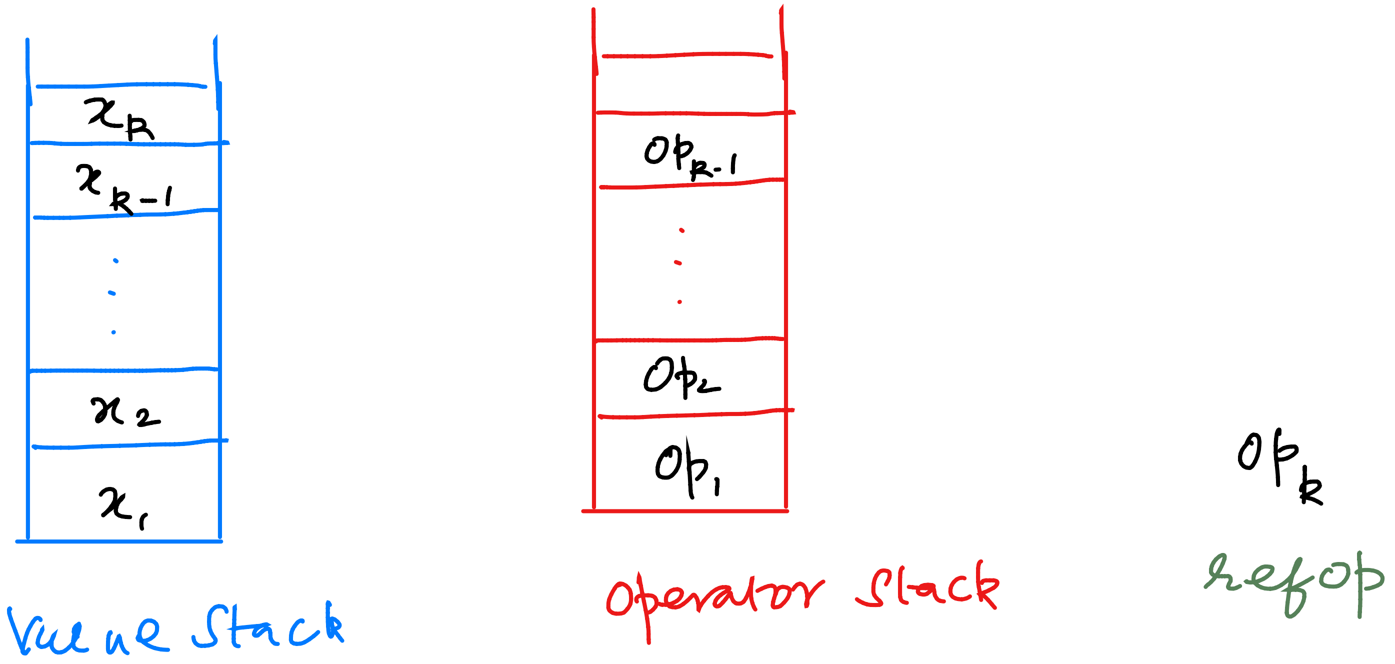
Value Stack



Operator Stack

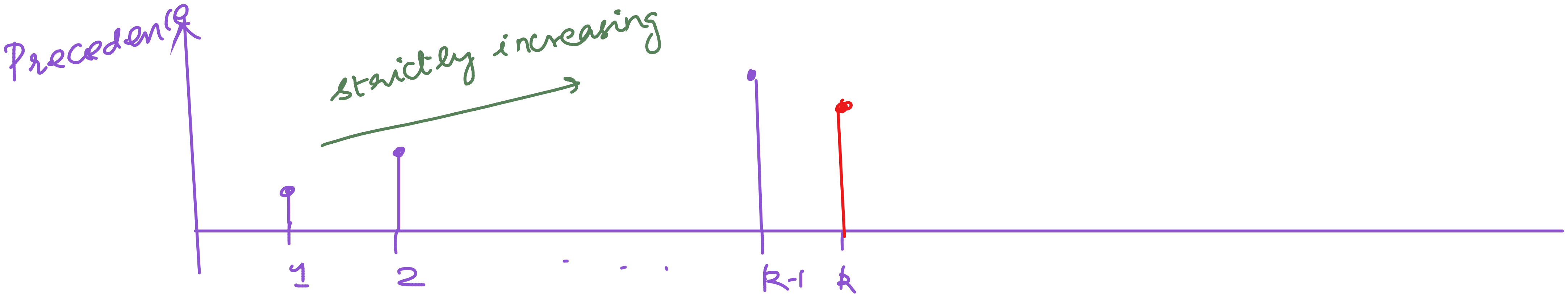
- We have to wait atleast for x_1 and x_2 to get into value stack before we do operations.

- Until the first doop() is called we are alternating between value stack and operator stack. Let us say this happens till we encounter op_k



Note: $prec(op_1) < prec(op_2) < \cdots < prec(op_{k-1})$

$prec(op_{k-1}) \geq prec(op_k)$



- why does it make sense to call do op()

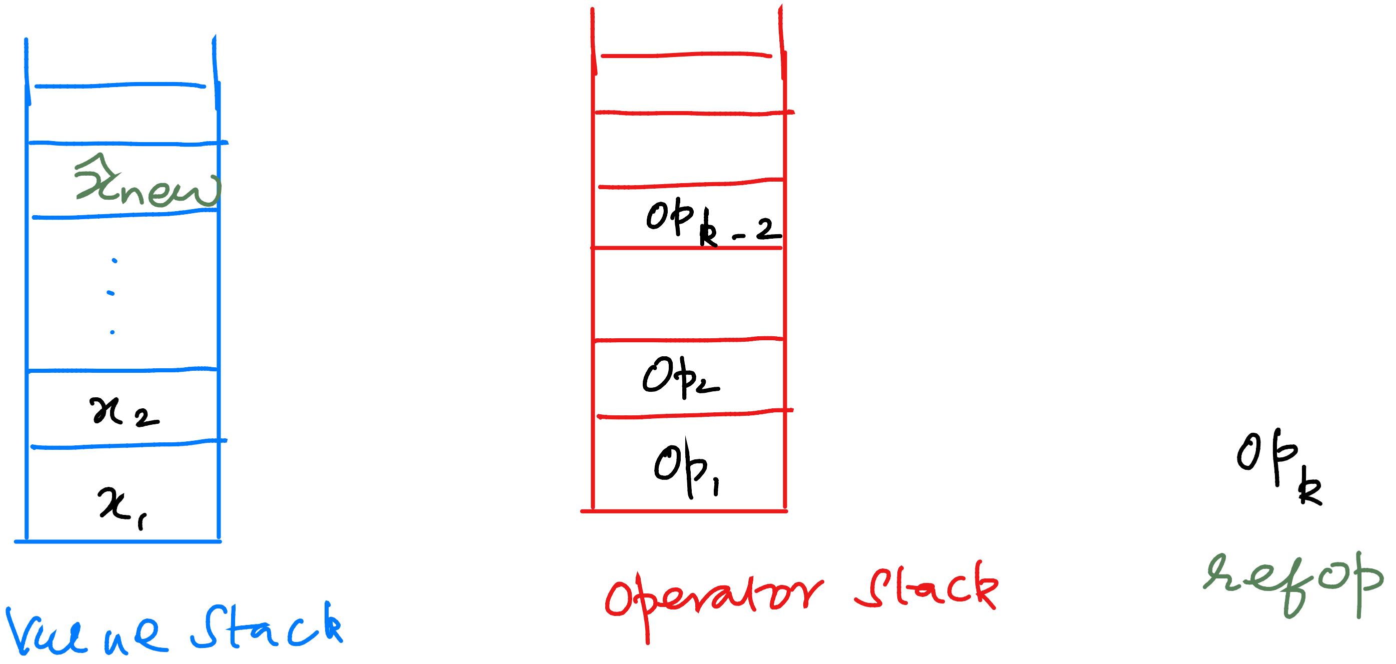
which should we compute first

$x_{k-1}\ op_{k-1}\ x_k$ vs $x_k\ op_k\ x_{k+1}$

$x_{k-1}\ op_{k-1}\ x_k\ op_k\ x_{k+1}$

- doop() itself is straight forward, pop x_k and x_{k+1} from Valstack, and op_{k-1} from op stack

then $\hat{x}_{new} = x_{k-1}\ op_{k-1}\ x_k$ and push it in the Valstack

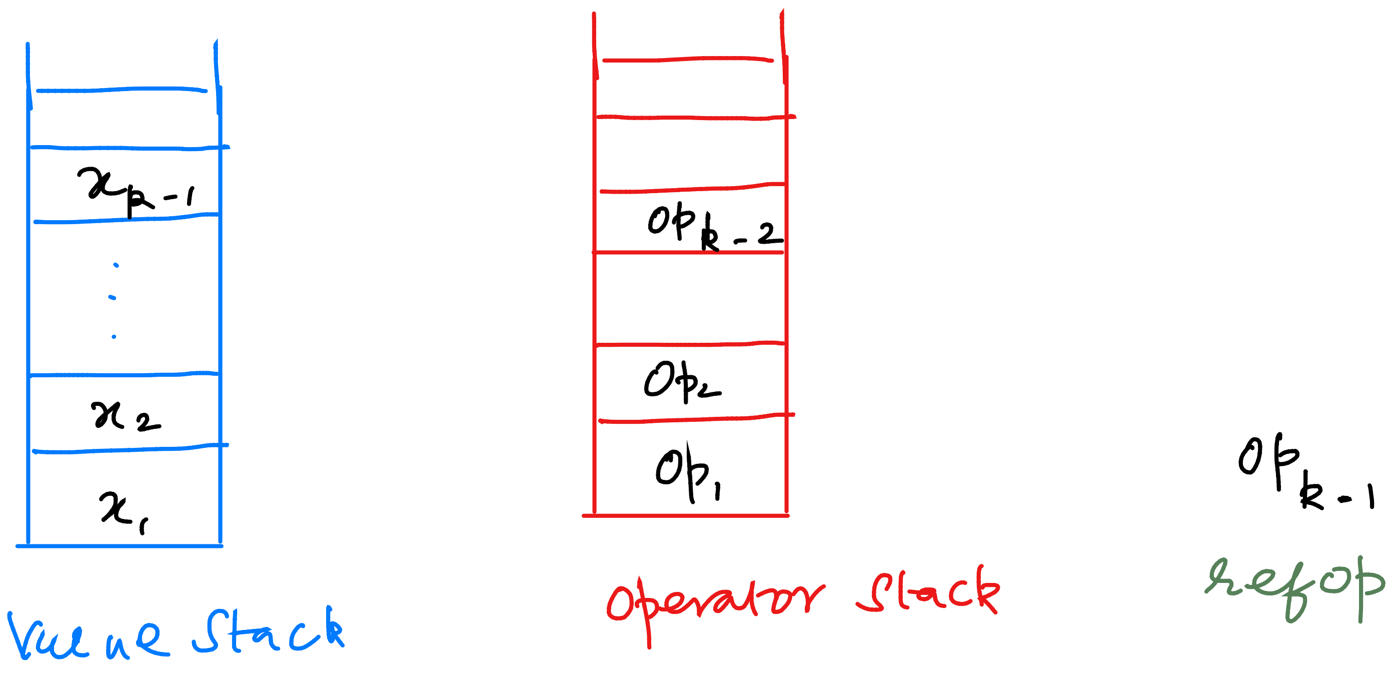


$$x_1\ op_1\ x_2\ op_2\ \cdots\ \underbrace{x_{k-1}\ op_{k-1}\ x_k}_{\hat{x}_{new}}\ op_k\ x_{k+1}\ \cdots\cdots\ x_n\ \underset{\underset{\$}{\parallel}}{op_n}$$

$$x_1\ op_1\ x_2\ op_2\ \cdots\ op_{k-2}\ \hat{x}_{new}\ op_k\ x_{k+1}\ \cdots\cdots\ x_n\ \underset{\underset{\$}{\parallel}}{op_n}$$

- Re label indices to right of k

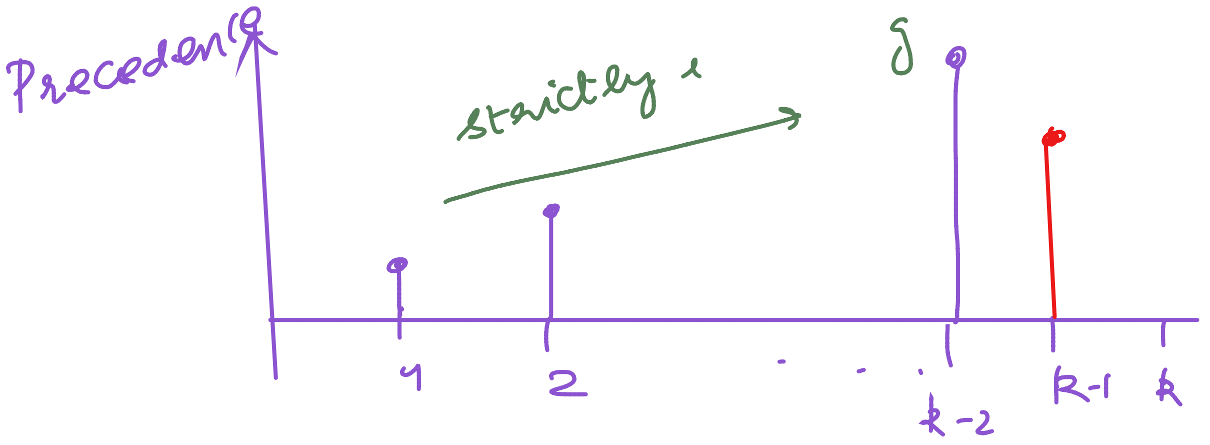
$$x_1\ op_1\ x_2\ op_2\ \cdots\ op_{k-2}\ \hat{x}_{k-1}\ op_{k-1}\ x_k\ \cdots\cdots\ x_{n-1}\ \underset{\underset{\$}{\parallel}}{op_{n-1}}$$



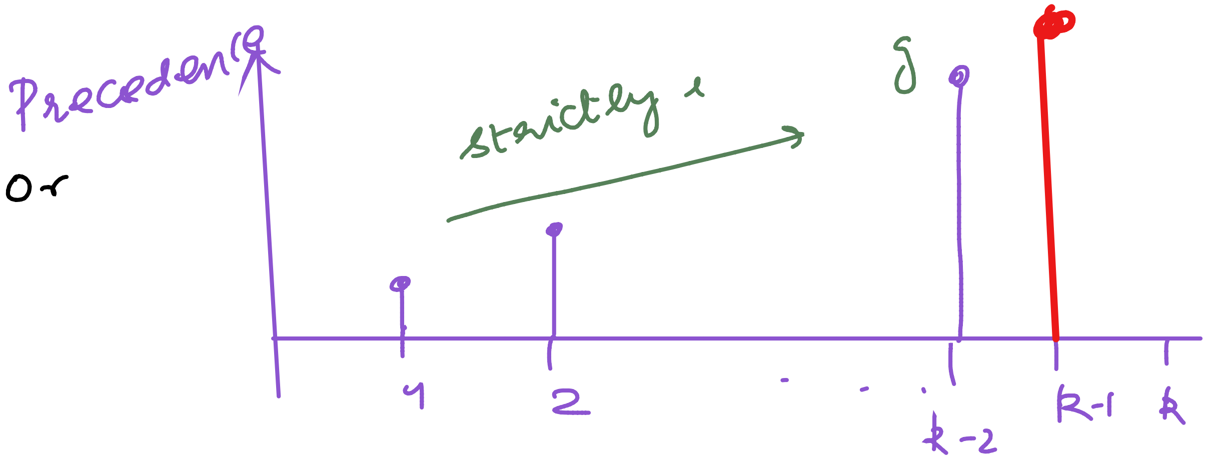
Note: $prec(op_1) < prec(op_2) < \cdots\cdots < prec(op_{k-2})$

relabelled index

Is $prec(op_{k-1}) \geq prec(op_{k-2})$



or


Precedence
strictly ↑
&
k-2
k-1
k