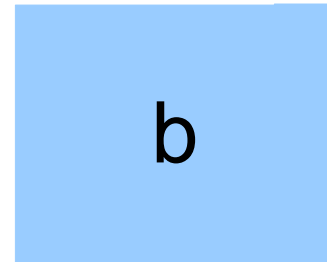


Recursive Arithmetic

Recursive Arithmetic

plus



Recursive Arithmetic

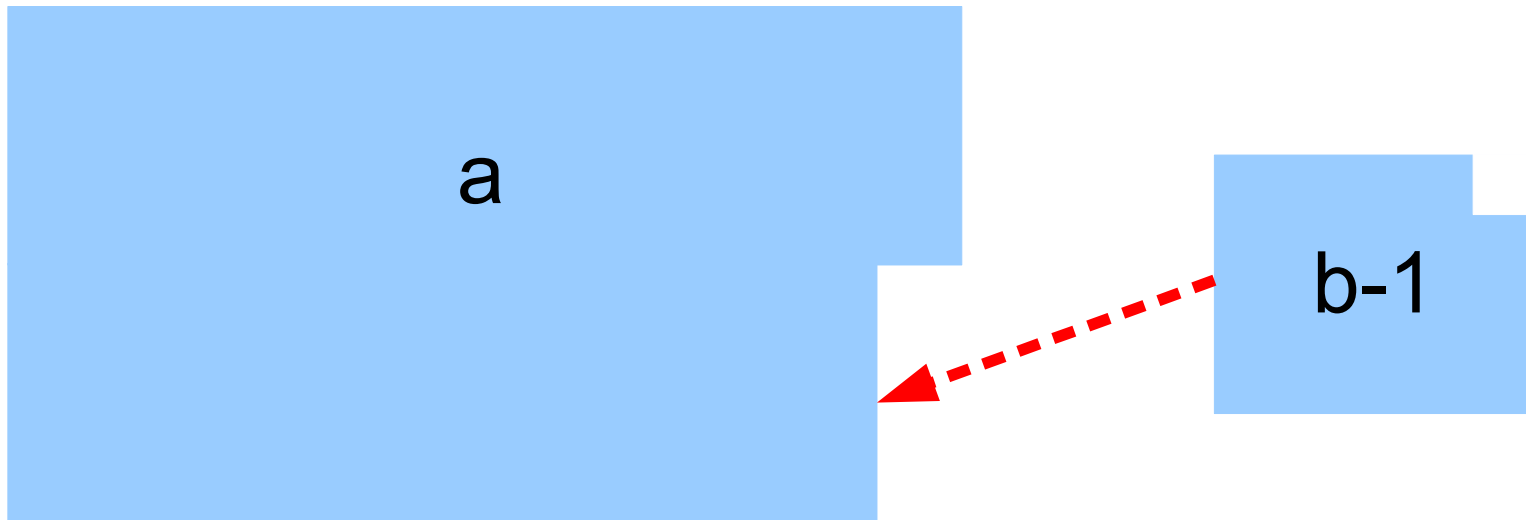
plus



(sub1 b)

Recursive Arithmetic

plus



`(plus a (sub1 b))`

`(sub1 b)`

Recursive Arithmetic

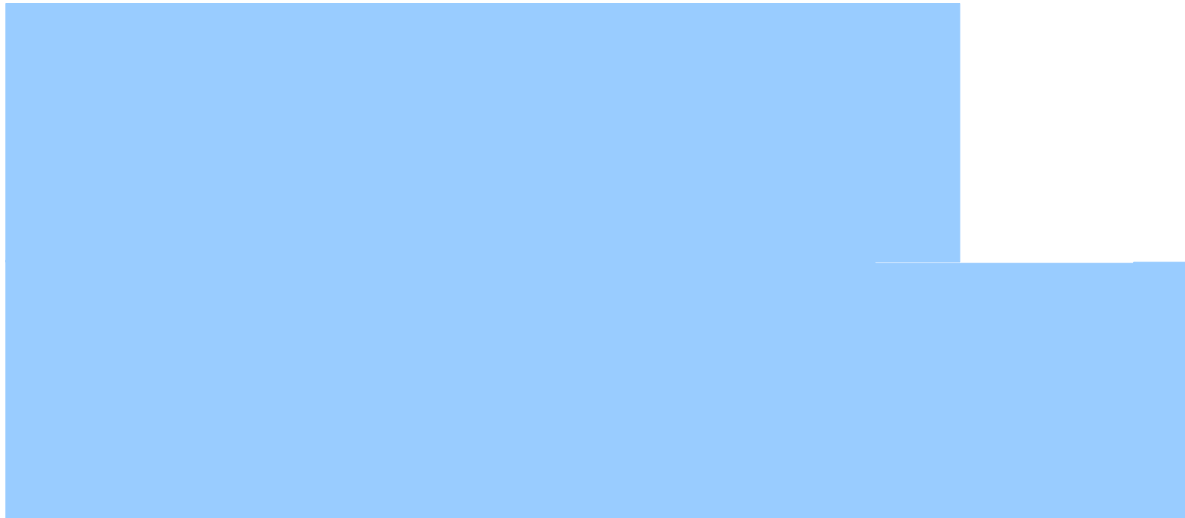
plus



```
(plus a (sub1 b))
```

Recursive Arithmetic

plus



```
(add1 (plus a (sub1 b)))
```

Recursive Arithmetic

times



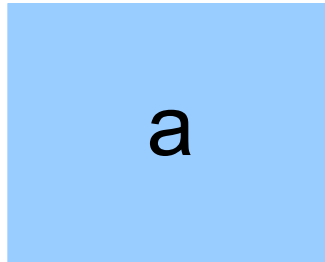
a



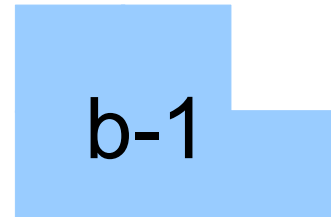
b

Recursive Arithmetic

times



a

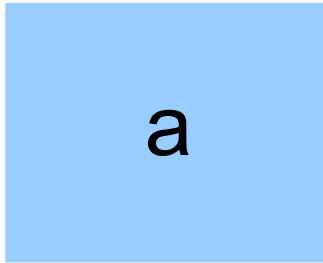


b-1

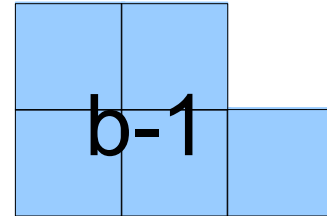
(sub1 b)

Recursive Arithmetic

times



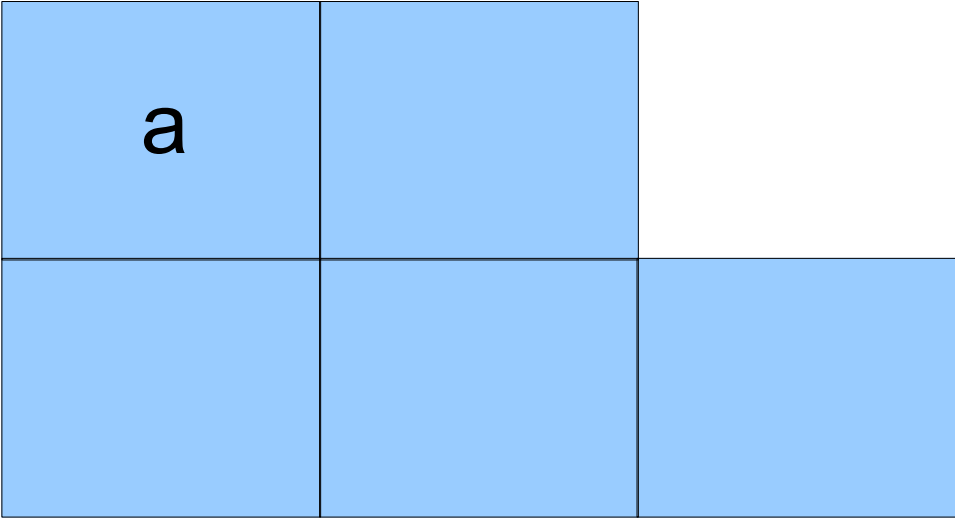
`(times a (sub1 b))`



`(sub1 b)`

Recursive Arithmetic

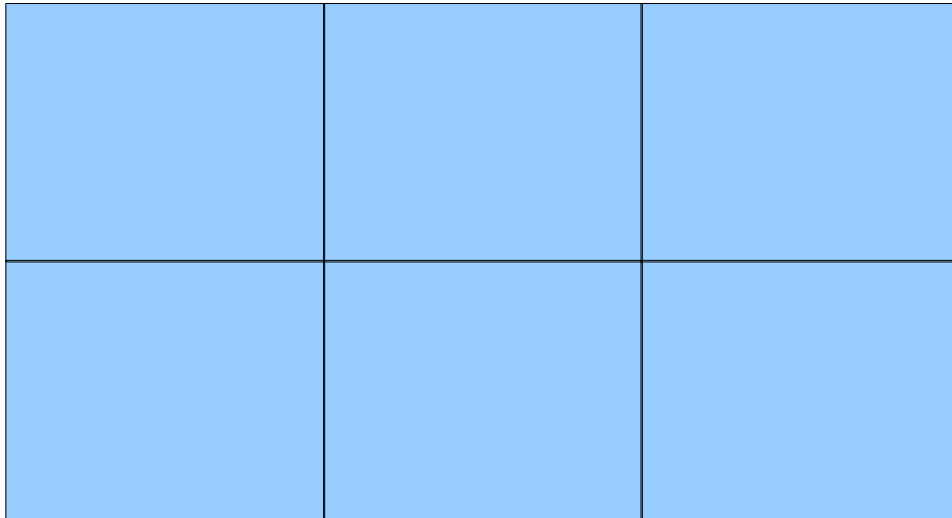
times



```
(times a (sub1 b))
```

Recursive Arithmetic

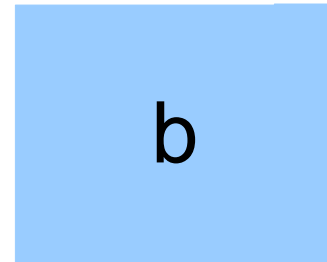
times



```
(plus a (times a (sub1 b)))
```

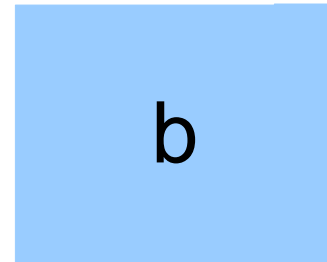
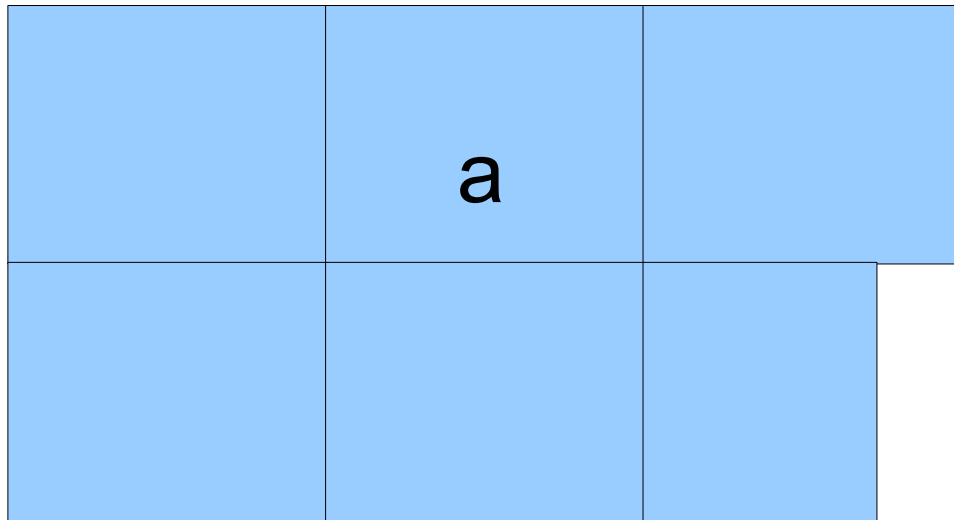
Recursive Arithmetic

minus



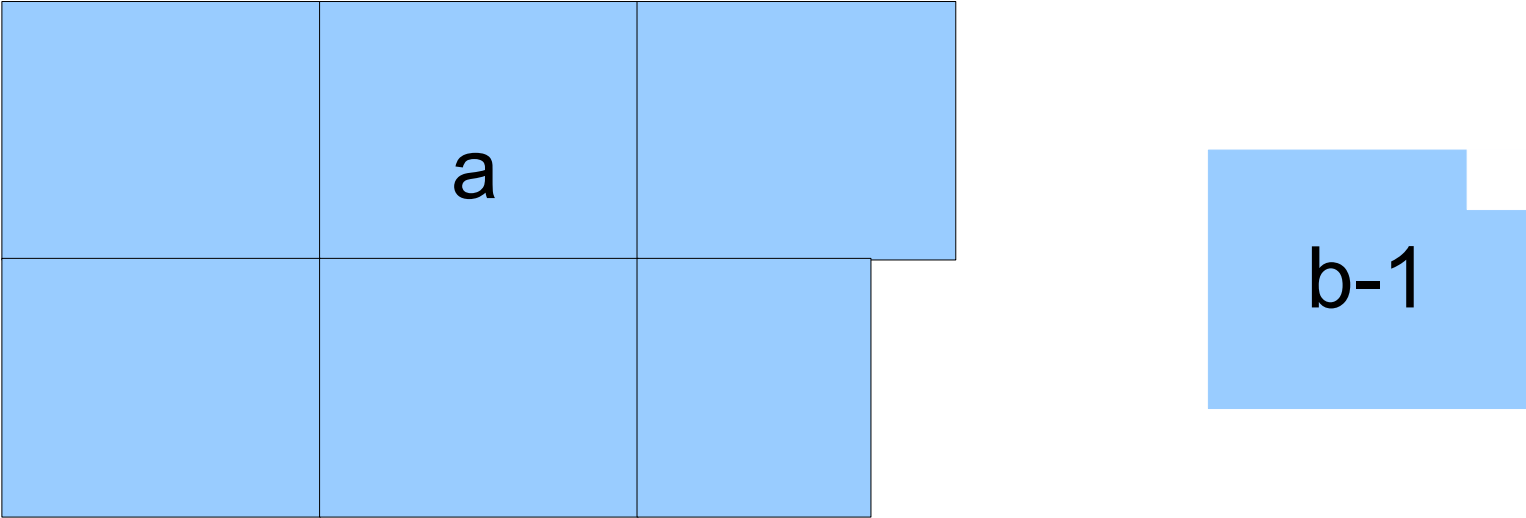
Recursive Arithmetic

minus



Recursive Arithmetic

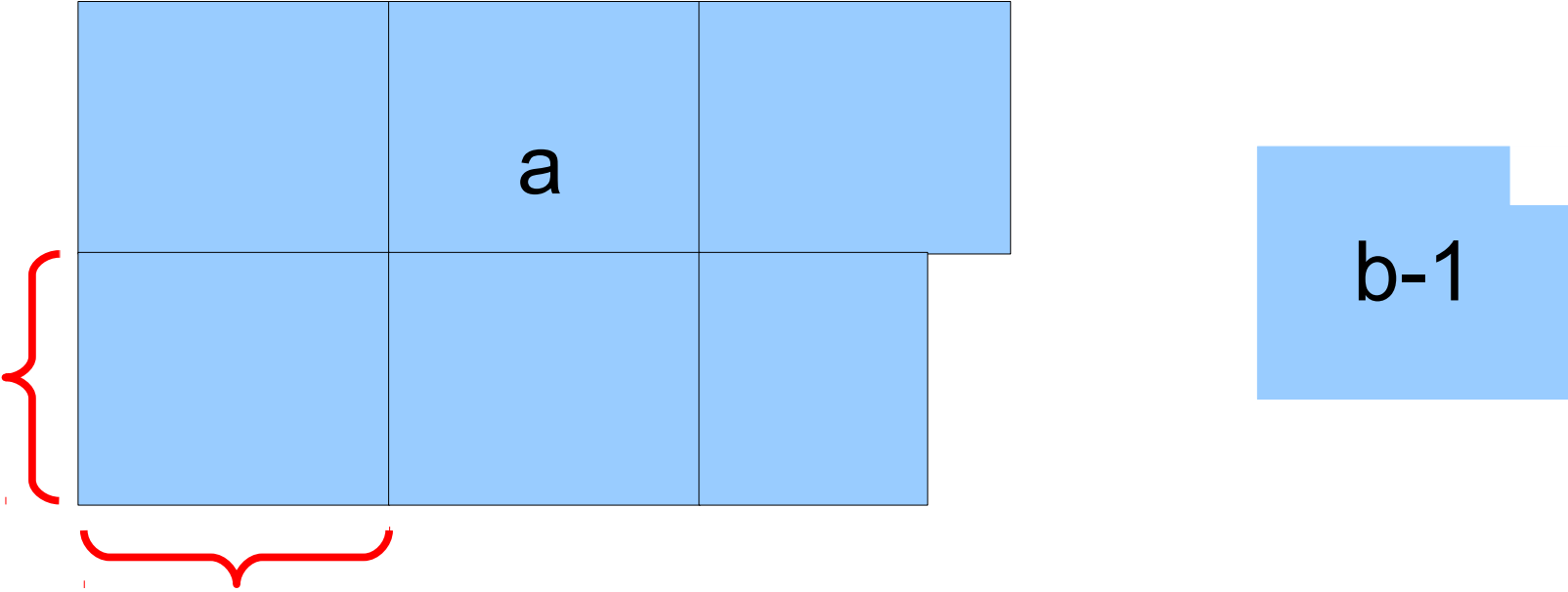
minus



(sub1 b)

Recursive Arithmetic

minus

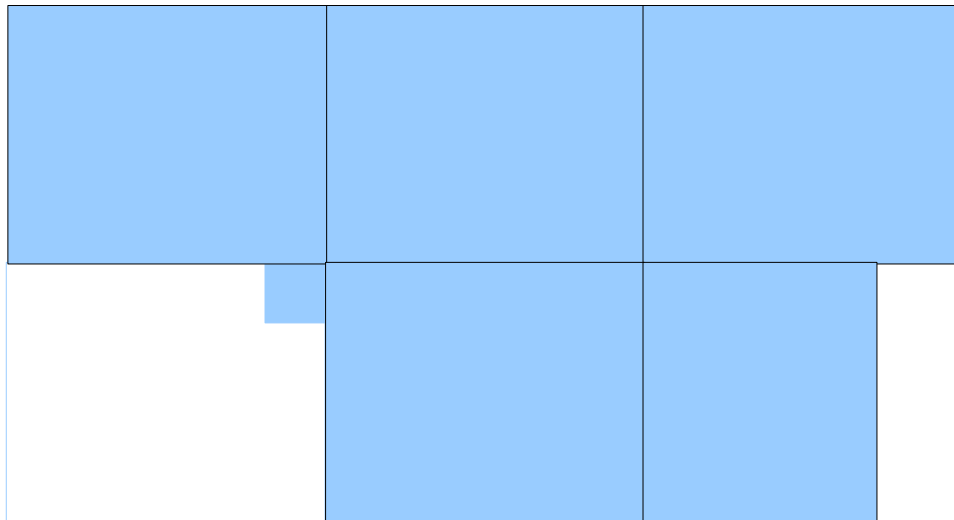


`(minus a (sub1 b))`

`(sub1 b)`

Recursive Arithmetic

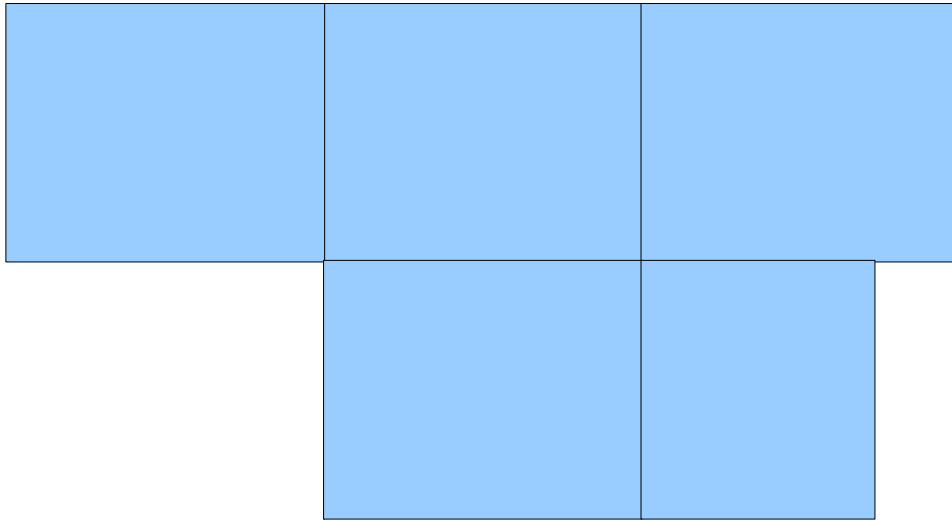
minus



`(minus a (sub1 b))`

Recursive Arithmetic

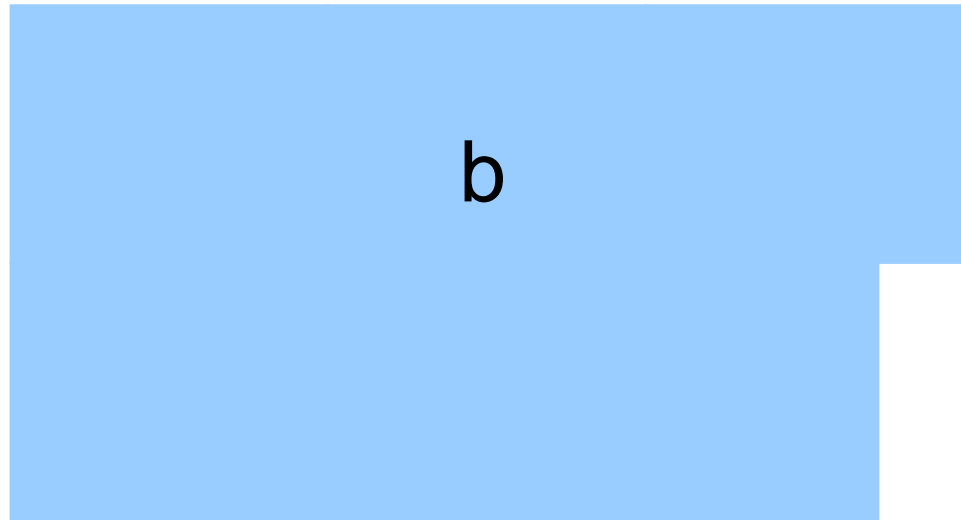
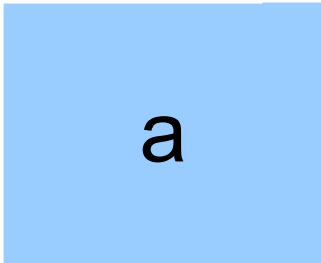
minus



```
(sub1 (minus a (sub1 b)))
```

Recursive Arithmetic

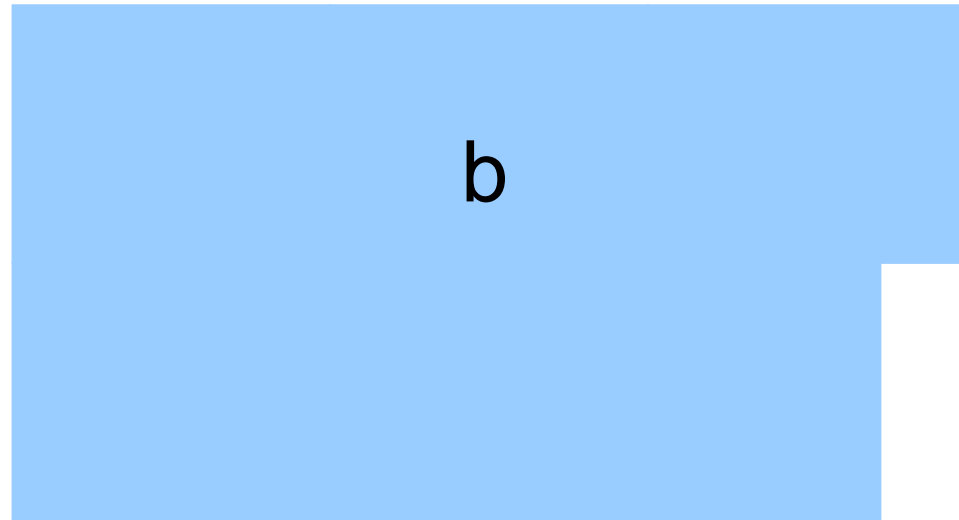
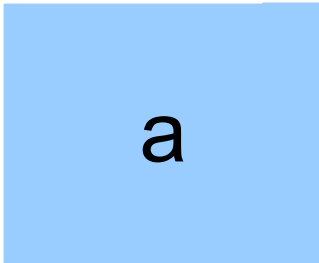
divide



Recursive Arithmetic

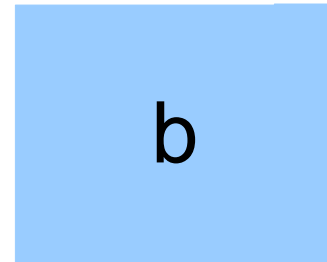
divide

$a / b = 0$ remainder a



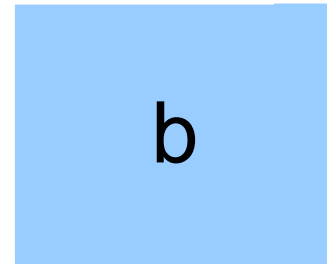
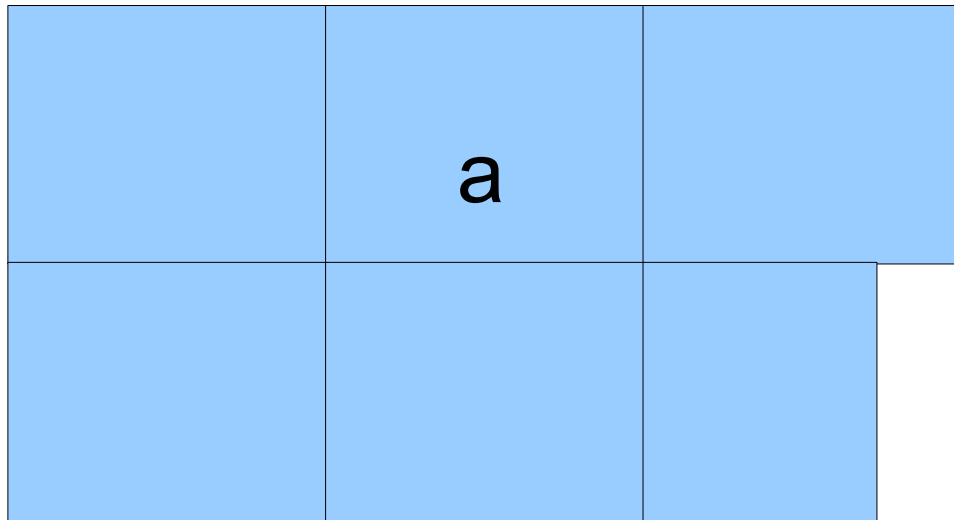
Recursive Arithmetic

divide



Recursive Arithmetic

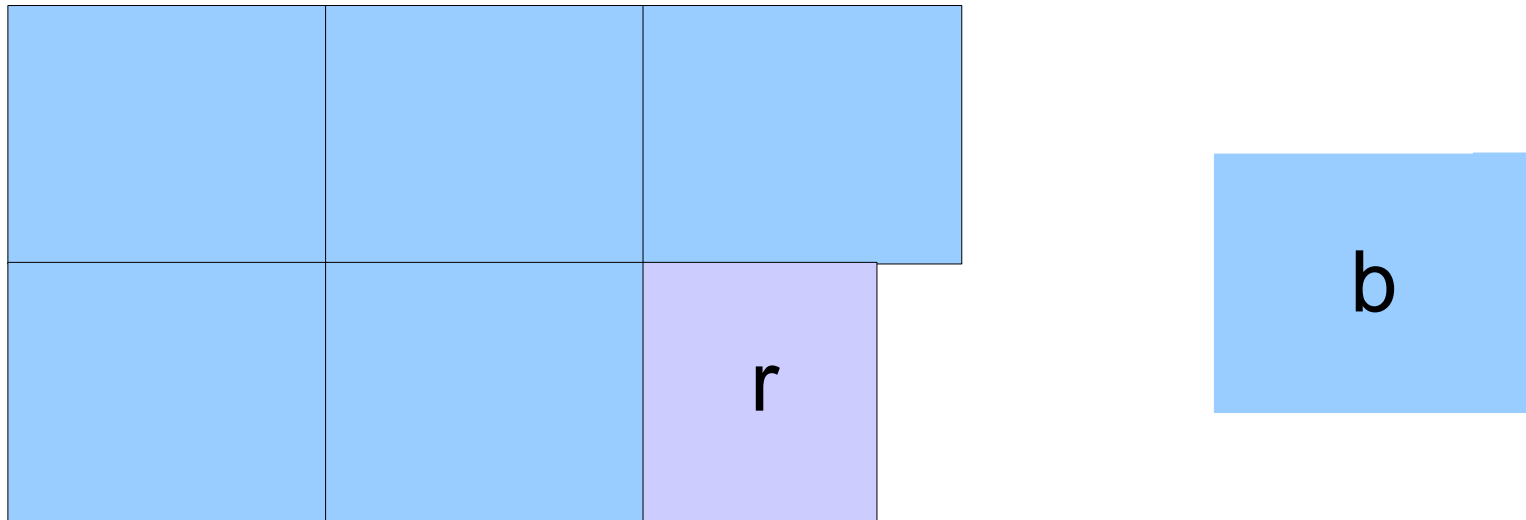
divide



Recursive Arithmetic

divide

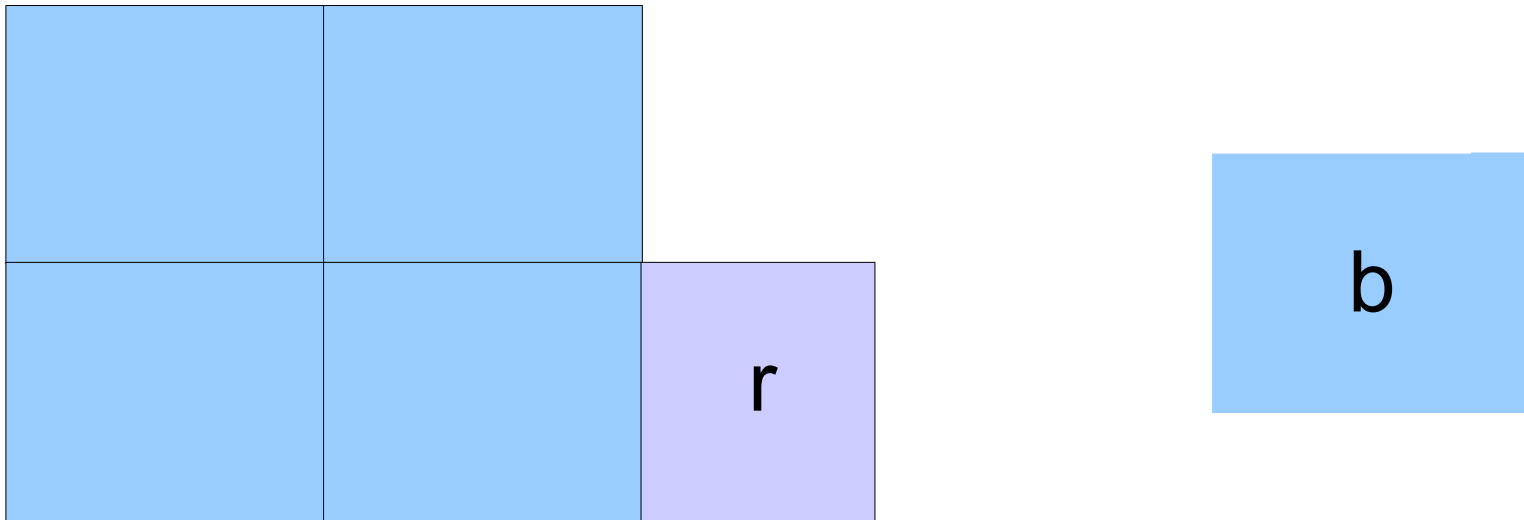
$$a / b = 5 \text{ remainder } r$$



Recursive Arithmetic

divide

$$a / b = 5 \text{ remainder } r$$

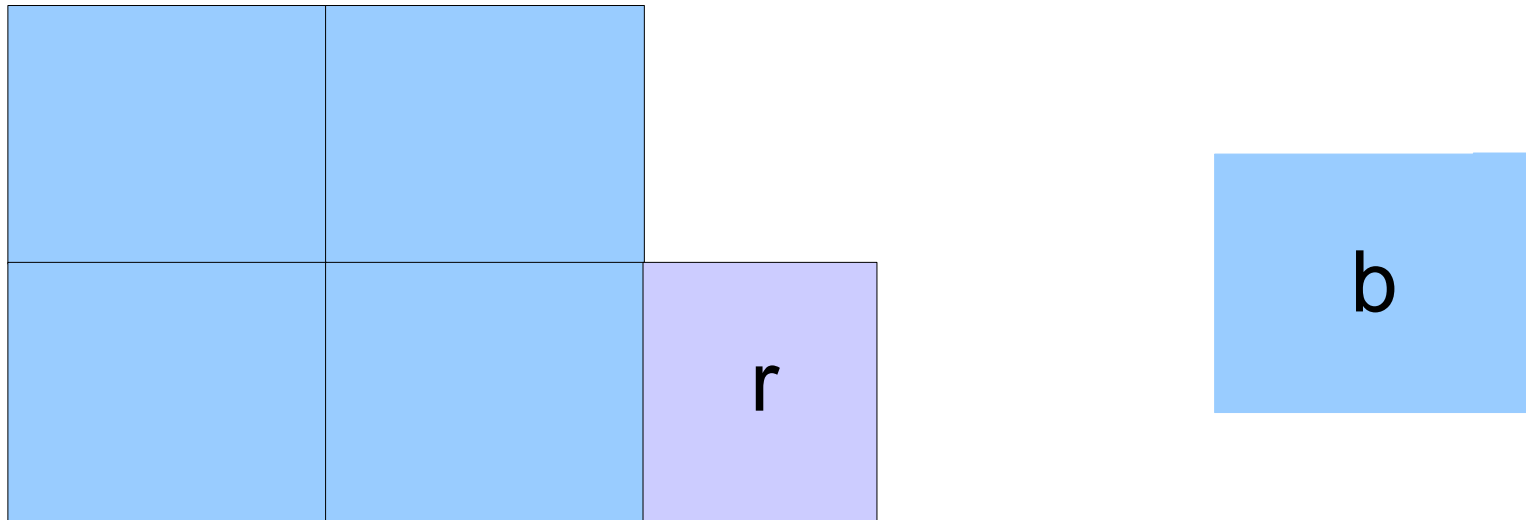


(minus a b)

Recursive Arithmetic

divide

$$a / b = 5 \text{ remainder } r$$

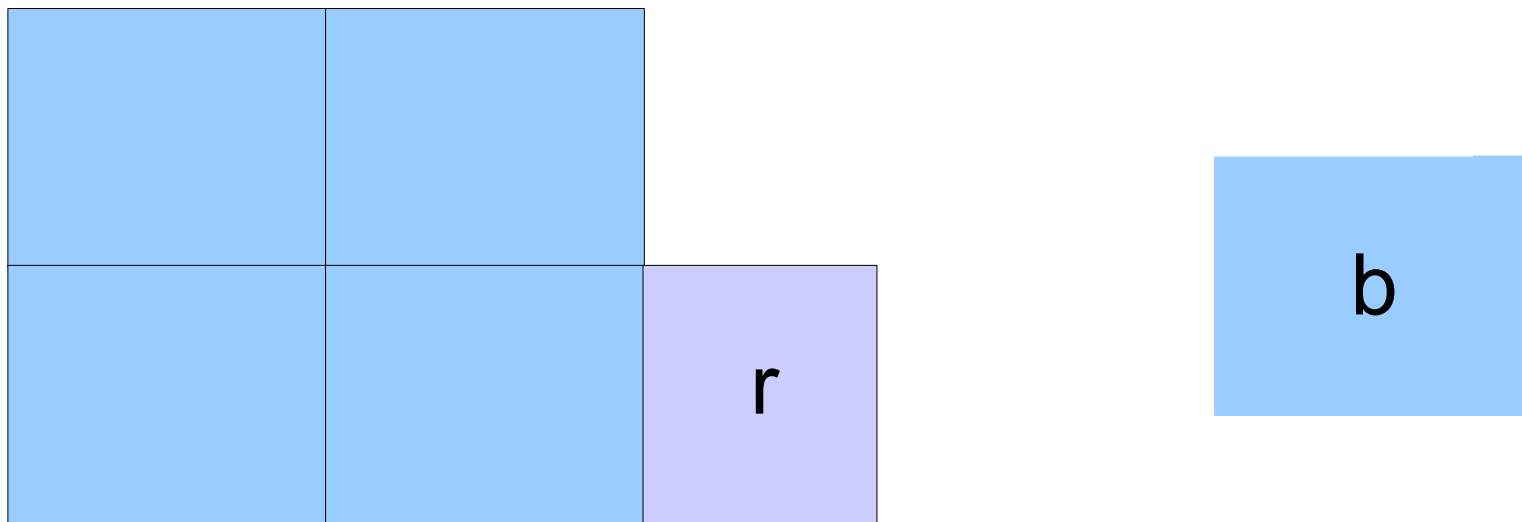


$$(\text{divide } (\text{minus } a \ b) \ b) = ?$$

Recursive Arithmetic

divide

$$a / b = 5 \text{ remainder } r$$

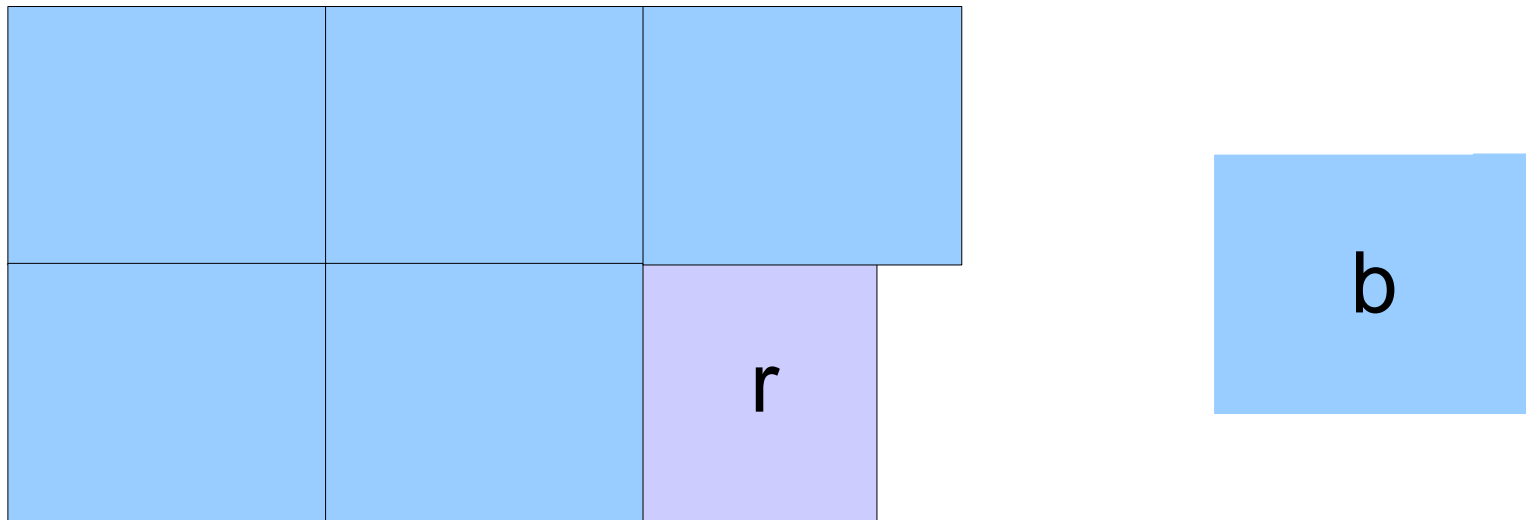


$$(\text{divide } (\text{minus } a \ b) \ b) = 4$$

Recursive Arithmetic

divide

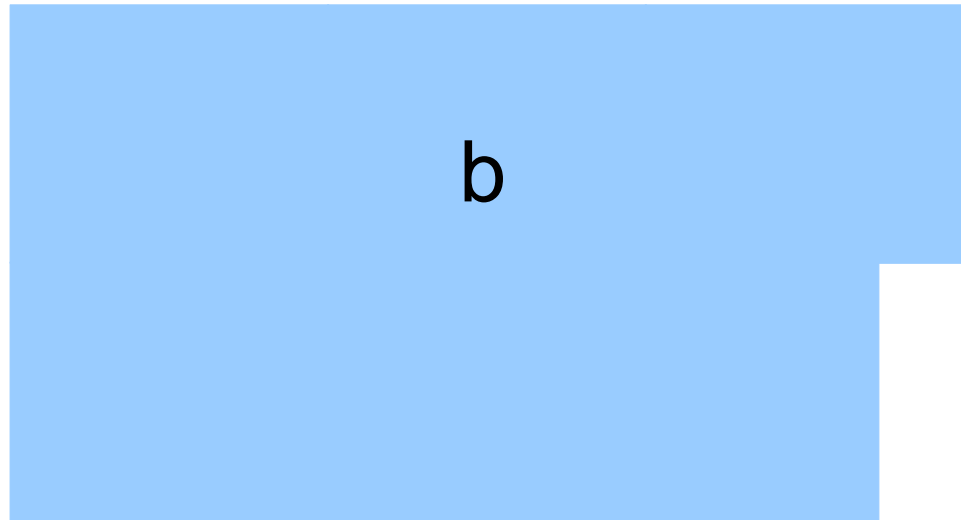
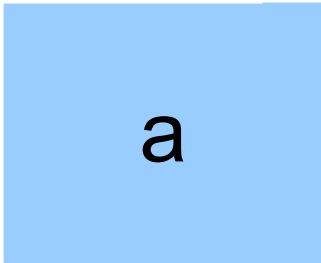
$$a / b = 5 \text{ remainder } r$$



$$(\text{add1 } (\text{divide } (\text{minus } a \ b) \ b)) = 5$$

Recursive Arithmetic

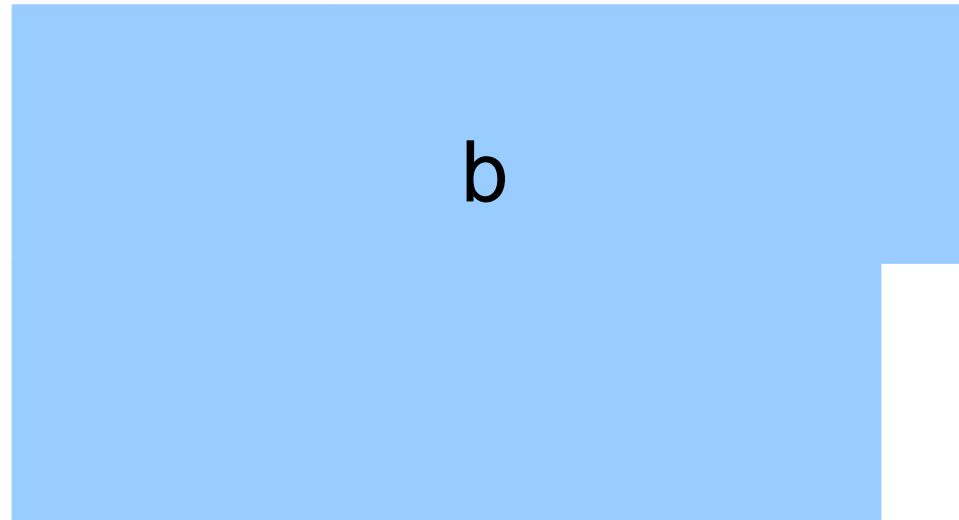
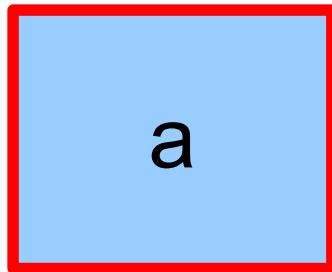
remainder



Recursive Arithmetic

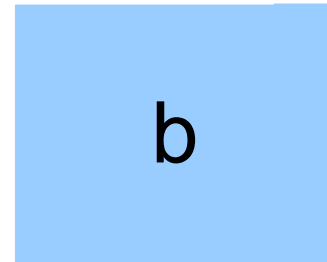
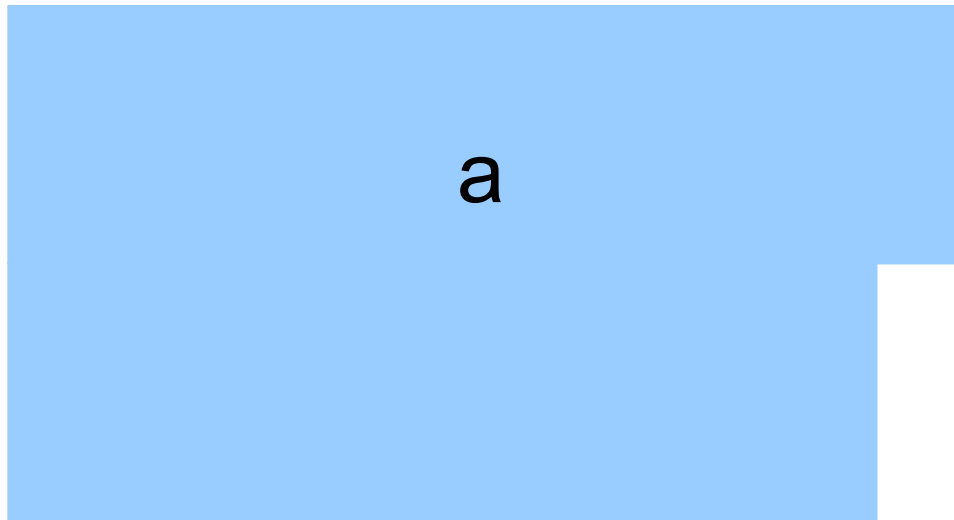
remainder

$$a / b = 0 \text{ remainder } a$$



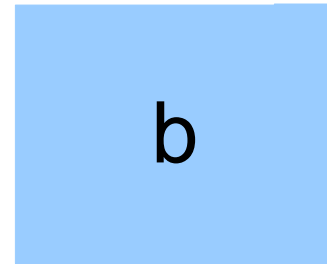
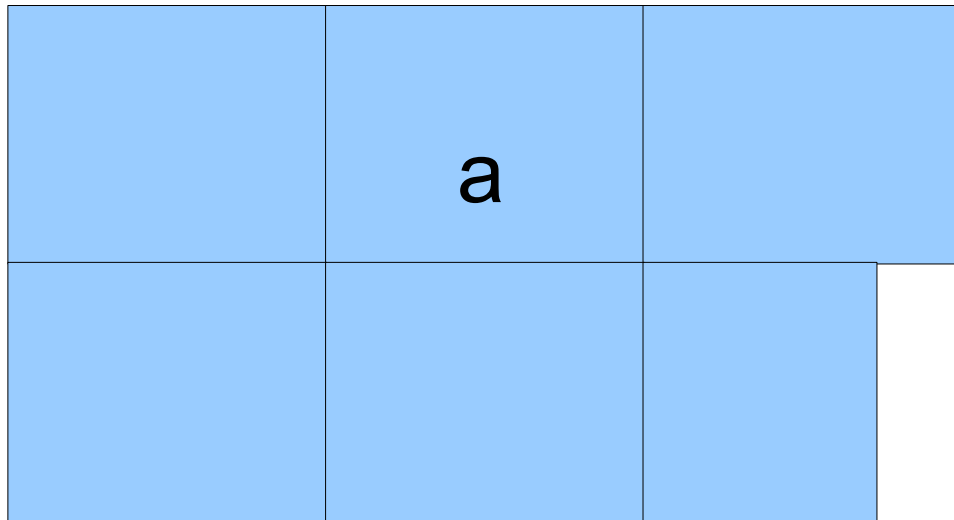
Recursive Arithmetic

remainder



Recursive Arithmetic

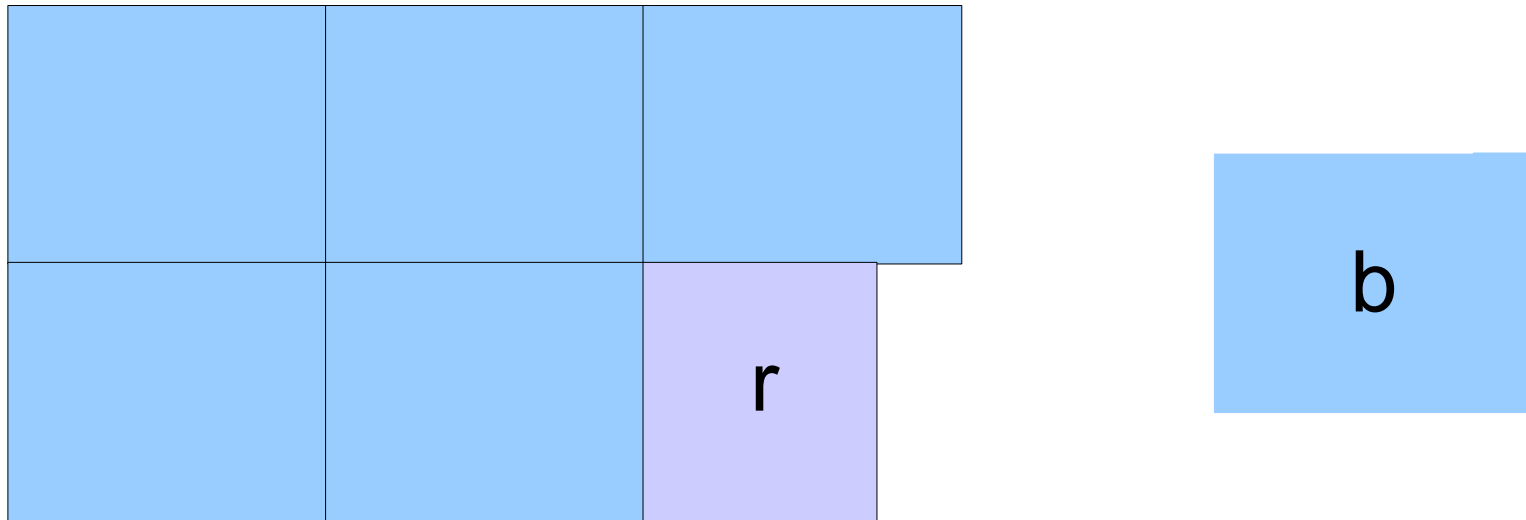
remainder



Recursive Arithmetic

remainder

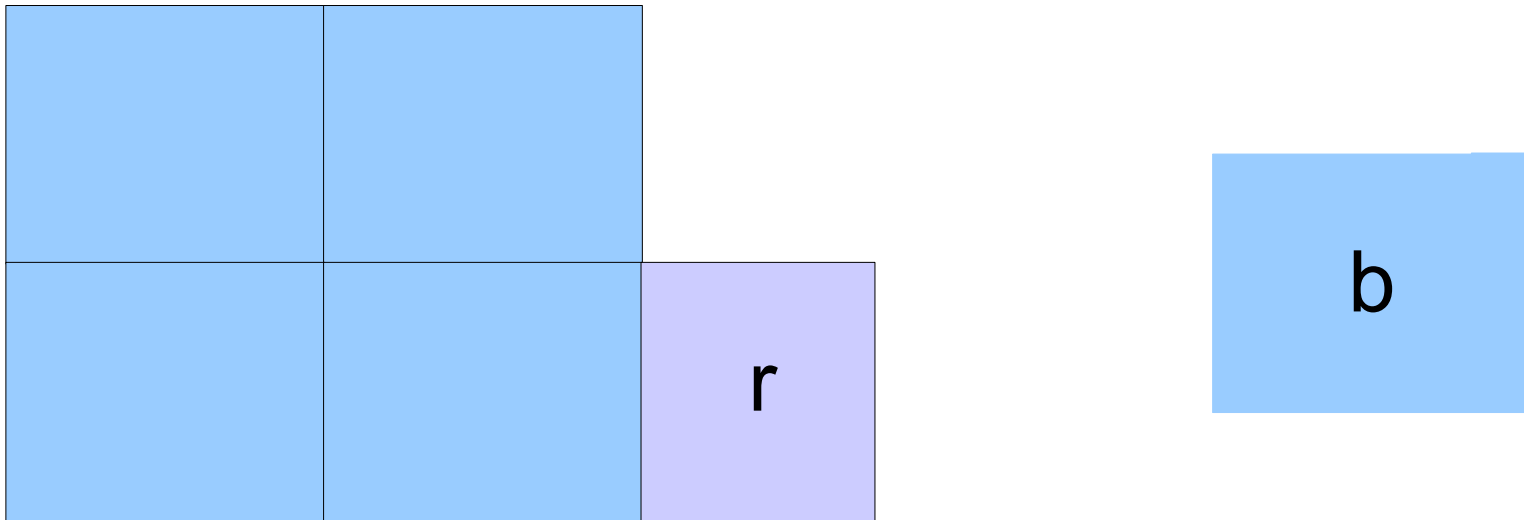
$$a / b = 5 \text{ remainder } r$$



Recursive Arithmetic

remainder

$$a / b = 5 \text{ remainder } r$$

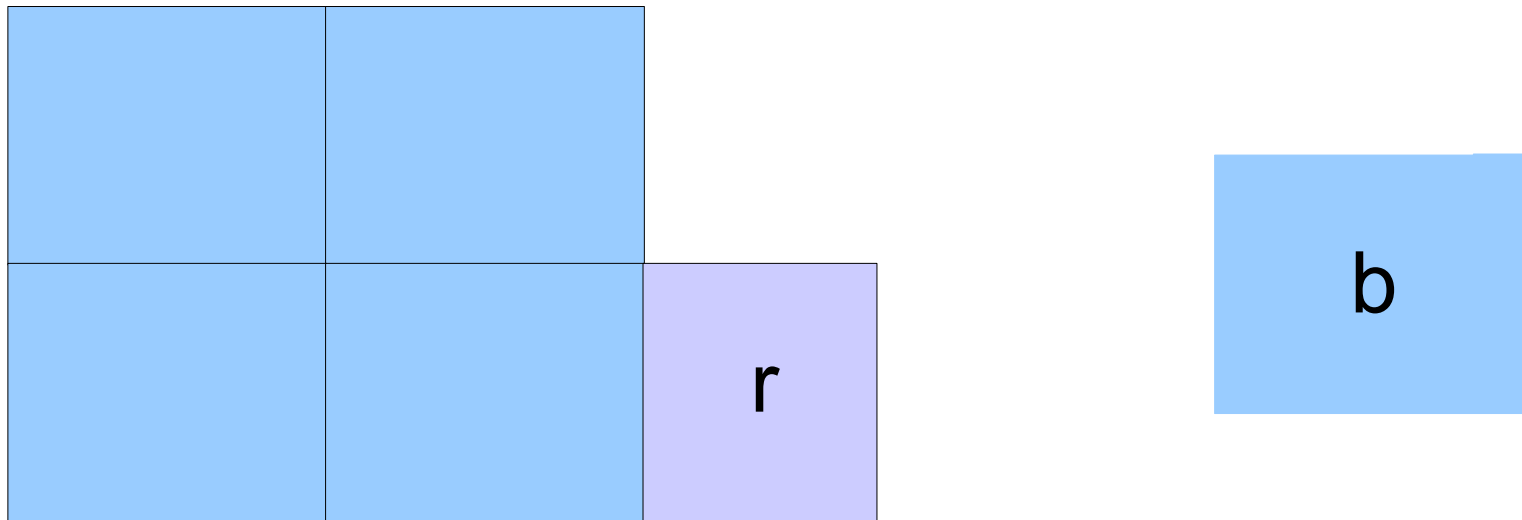


(minus a b)

Recursive Arithmetic

remainder

$$a / b = 5 \text{ remainder } r$$

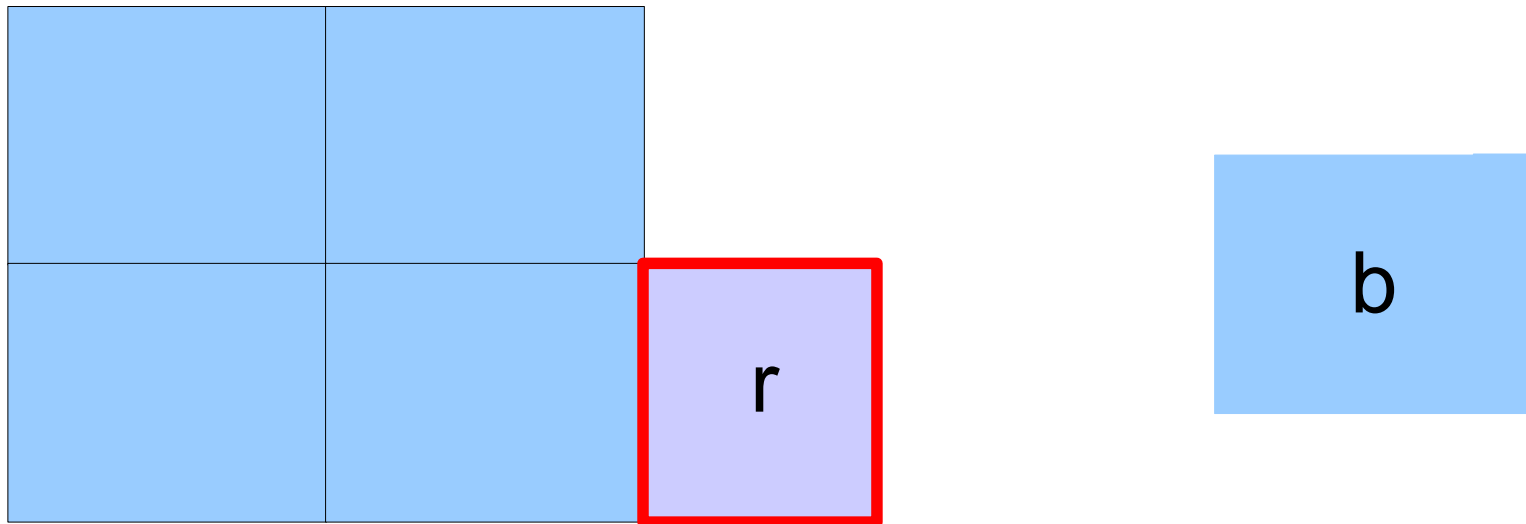


$$(\text{remainder } (\text{minus } a \ b) \ b) = ?$$

Recursive Arithmetic

remainder

$$a / b = 5 \text{ remainder } r$$



$$(\text{remainder } (\text{minus } a \ b) \ b) = r$$

Recursive Arithmetic

less-than?



0

Recursive Arithmetic

less-than?



0

#f

Recursive Arithmetic

less-than?

0



b

Recursive Arithmetic

less-than?

0

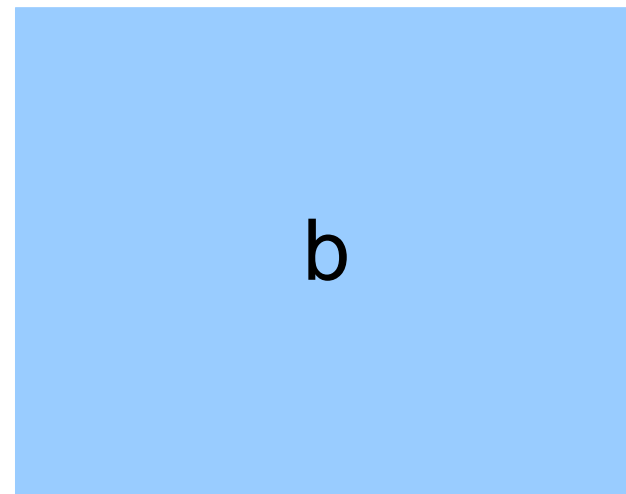


b

#t

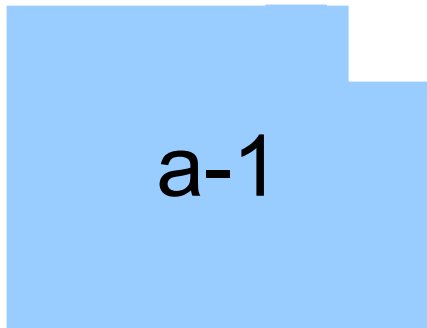
Recursive Arithmetic

less-than?



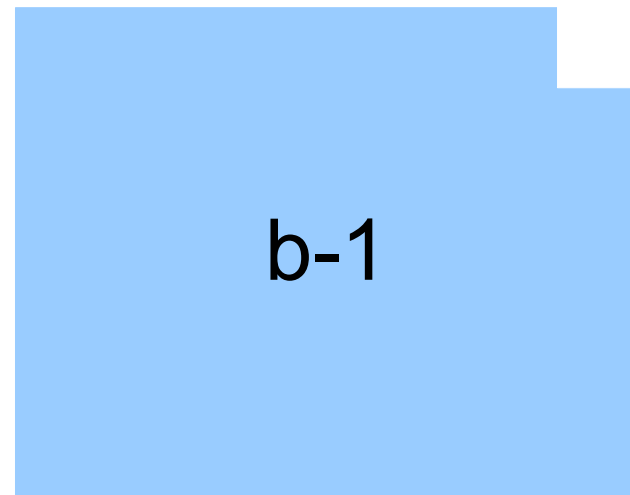
Recursive Arithmetic

less-than?



$a-1$

(sub1 a)

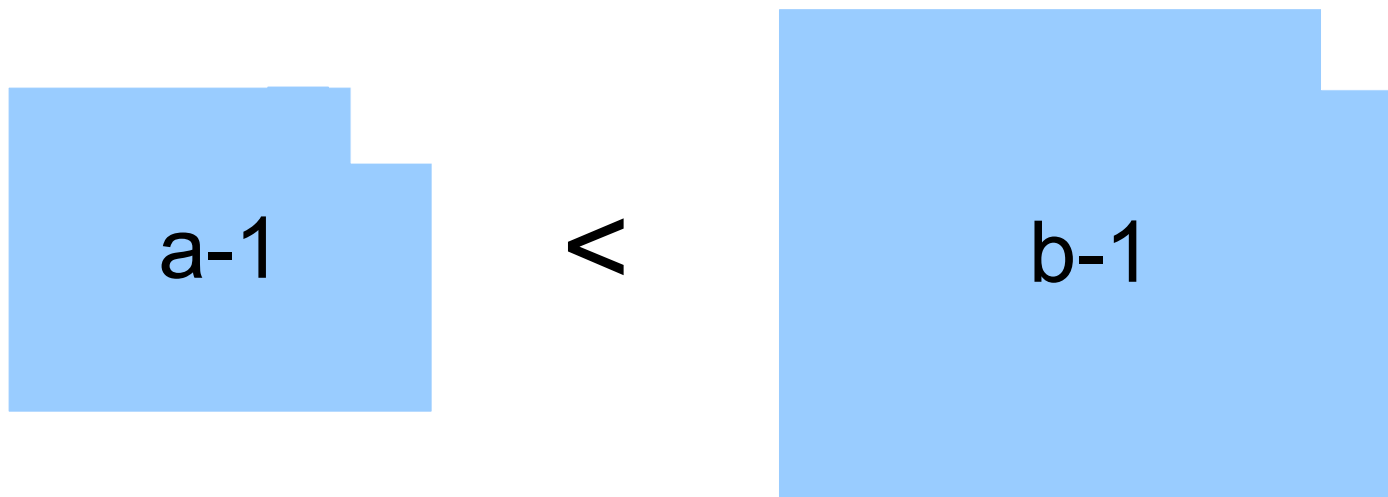


$b-1$

(sub1 b)

Recursive Arithmetic

less-than?



```
(less-than? (sub1 a) (sub1 b))
```