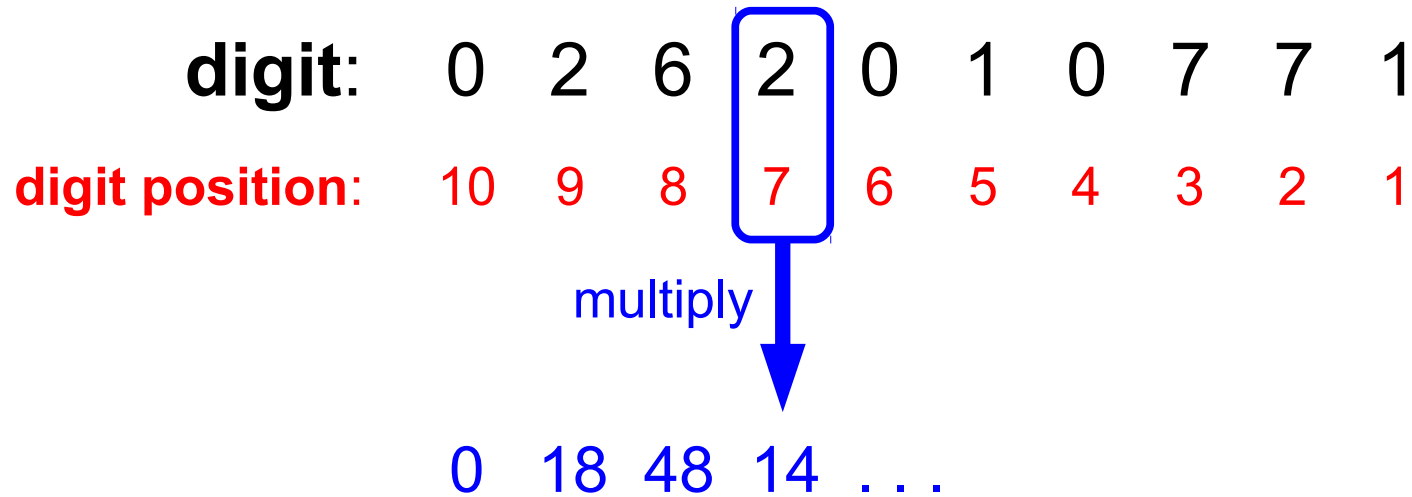


# Self-Verifying Numbers

ISBN # 0262010771



# Self-Verifying Numbers

ISBN # 0262010771

<b>digit:</b>	0	2	6	2	0	1	0	7	7	1
<b>digit position:</b>	10	9	8	7	6	5	4	3	2	1
	0	18	48	14	0	5	0	21	14	1

multiply



# Self-Verifying Numbers

ISBN # 0262010771

<b>digit:</b>	0	2	6	2	0	1	0	7	7	1
<b>digit position:</b>	10	9	8	7	6	5	4	3	2	1

0 18 48 14 0 5 0 21 14 1

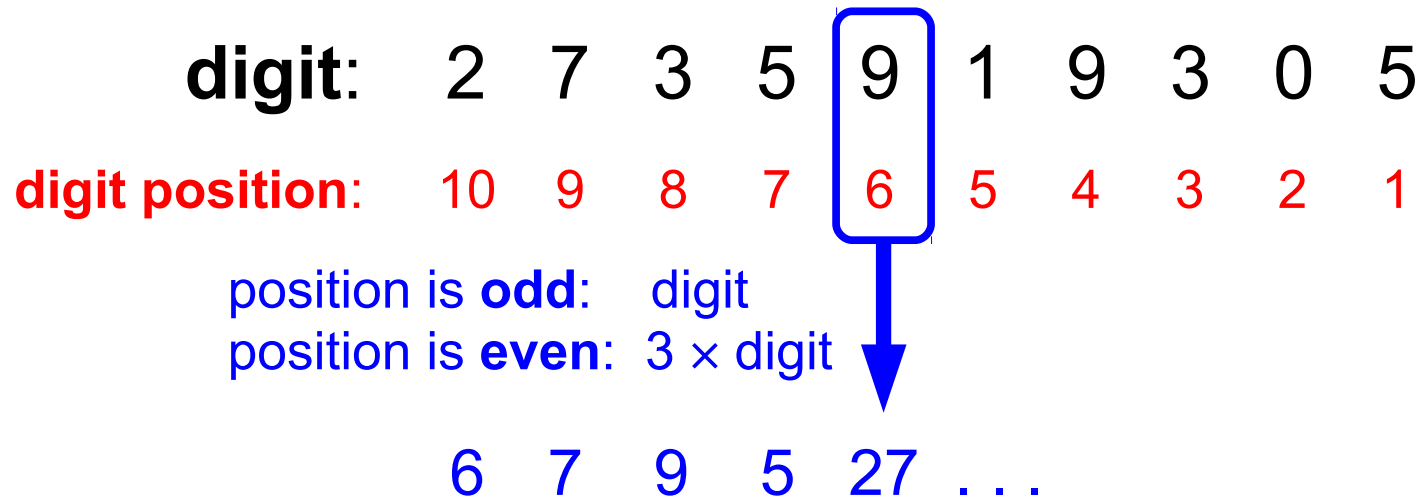
sum

121

divisible by 11 ?

# Self-Verifying Numbers

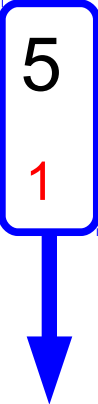
UPC # 2735919305



# Self-Verifying Numbers

UPC # 2735919305

<b>digit:</b>	2	7	3	5	9	1	9	3	0	5
<b>digit position:</b>	10	9	8	7	6	5	4	3	2	1
				position is <b>odd</b> :	digit					
				position is <b>even</b> :	$3 \times \text{digit}$					
	6	7	9	5	27	1	27	3	0	5



# Self-Verifying Numbers

UPC # 2735919305

<b>digit:</b>	2	7	3	5	9	1	9	3	0	5
<b>digit position:</b>	10	9	8	7	6	5	4	3	2	1

6 7 9 5 27 1 27 3 0 5

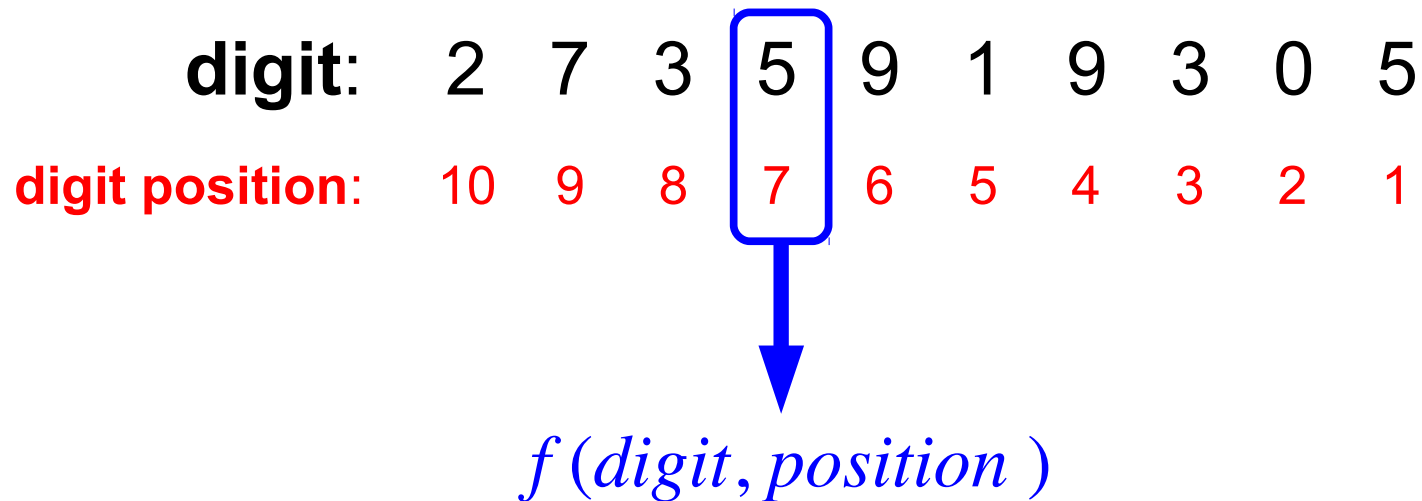
sum

90

divisible by 10 ?

# Self-Verifying Numbers

UPC # 2735919305



ISBN


```
(lambda (digit position)  
  (* digit position))
```

UPC

```
(lambda (digit position)  
  (if (odd? position)  
      digit  
      (* 3 digit)))
```

# Mapping Across One List

List of  $x$  values: ( 2 7 3 5 9 1 9 3 0 5 )



$f(x)$

Result: (  $f(2)$   $f(7)$   $f(3)$   $f(5)$   $f(9)$  ...  $f(5)$  )



# Mapping Across Two Lists

List of  $x$  values: ( 2 7 3 5 9 1 9 3 0 5 )

List of  $y$  values: ( 1 2 3 4 5 6 7 8 9 0 )



$f(x, y)$

Result: (  $f(2,1)$   $f(7,2)$   $f(3,3)$   $f(5,4)$  ...  $f(5,0)$  )

# Credit Card Numbers

6011 3026 3145 2178

position is **odd**: digit  
position is **even** and digit < 5:  $2 \times \text{digit}$   
position is **even** and digit  $\geq 5$ :  $2 \times \text{digit} + 1$

```
(lambda (digit position)
  (cond
    [(odd? position) digit]
    [(< digit 5) (* 2 digit)]
    [else (+ 1 (* 2 digit))]))
```

divisor: **10**