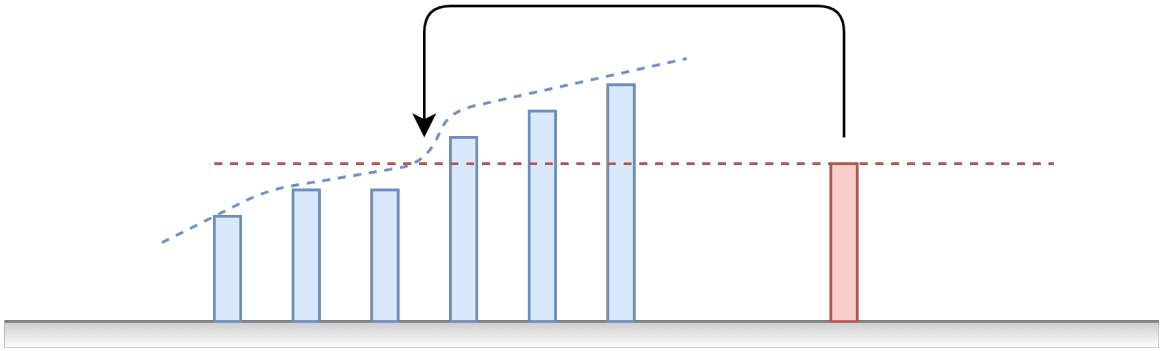
Insertion sort

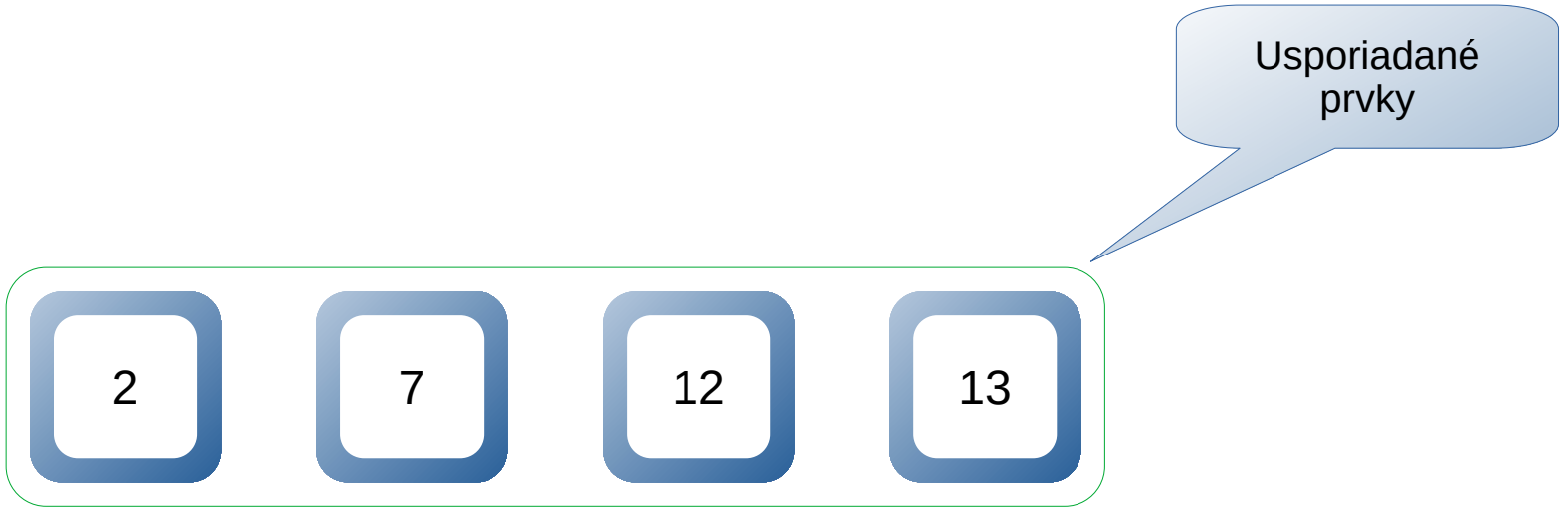
Programovacie techniky

Vladislav Novák

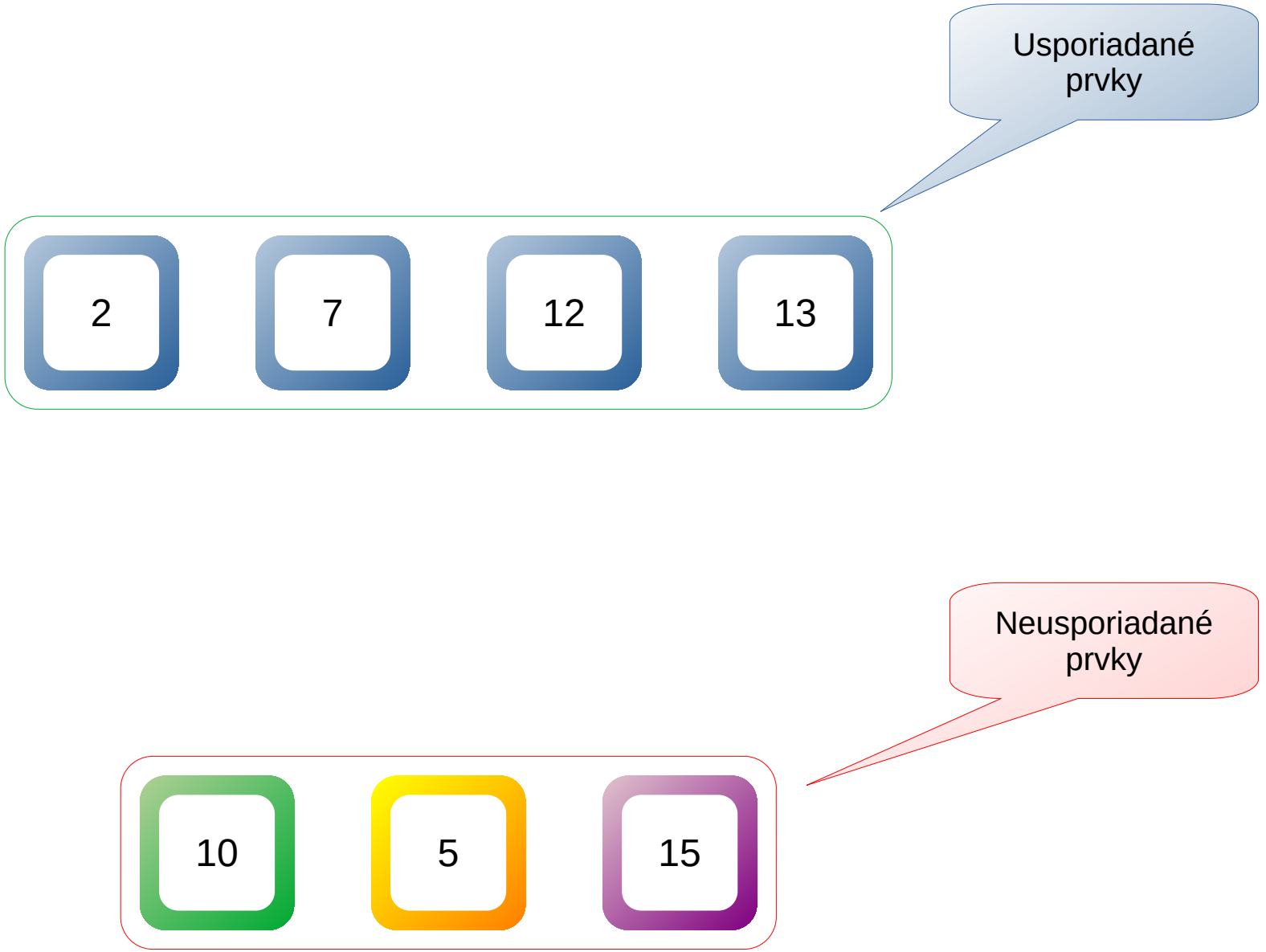
Princíp insertion sort



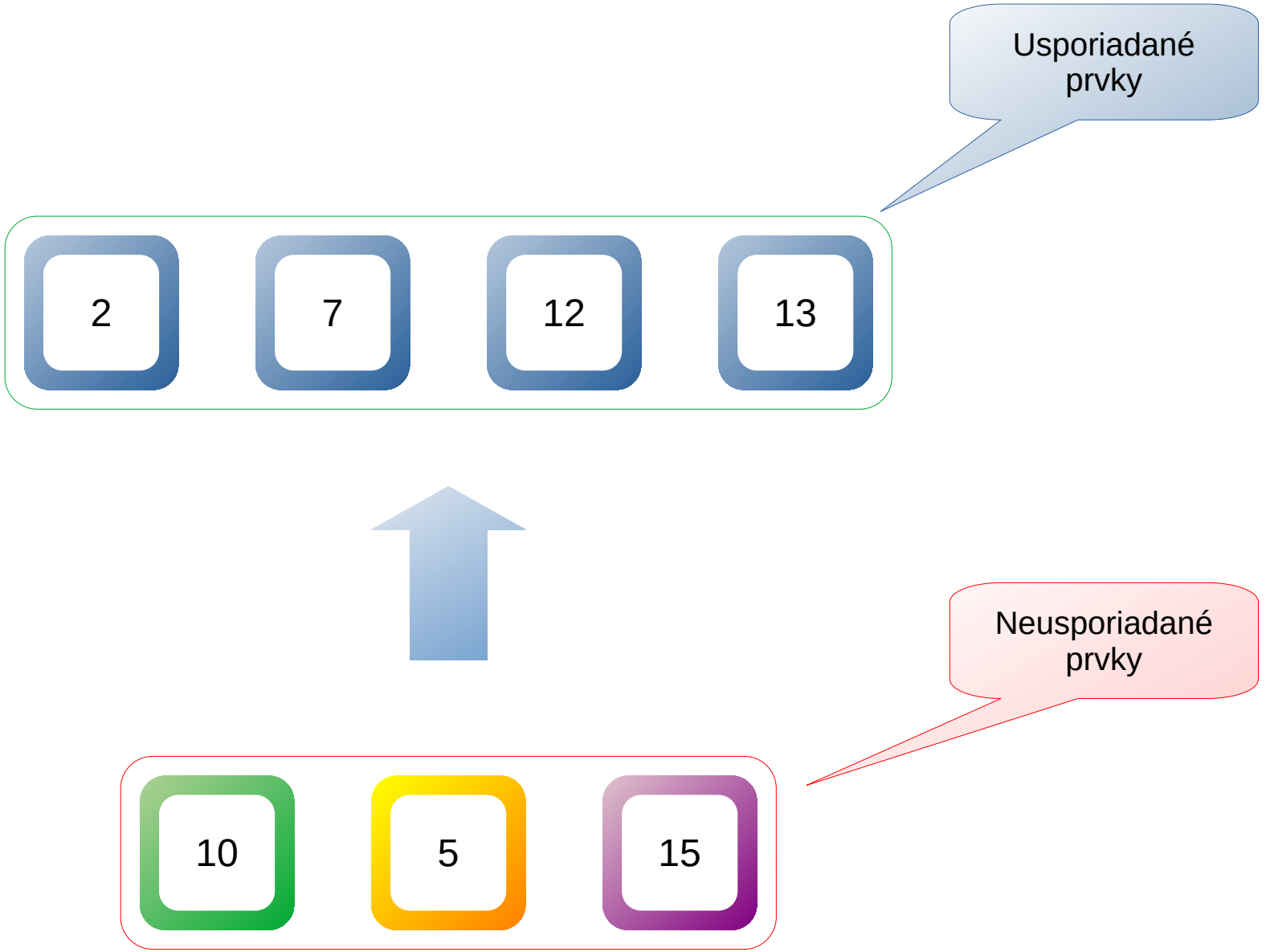
Insertion sort - úvod



Insertion sort - úvod



Insertion sort - úvod



Vladislav Novák

Insertion sort - úvod

Insertion sort - úvod

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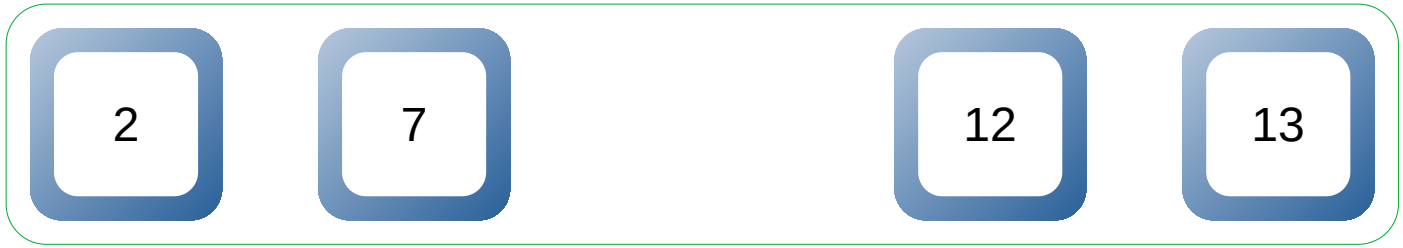

Insertion sort - úvod

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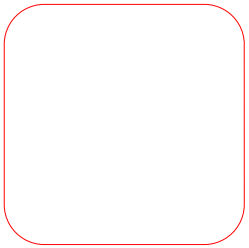

Insertion sort - úvod

Insertion sort - úvod

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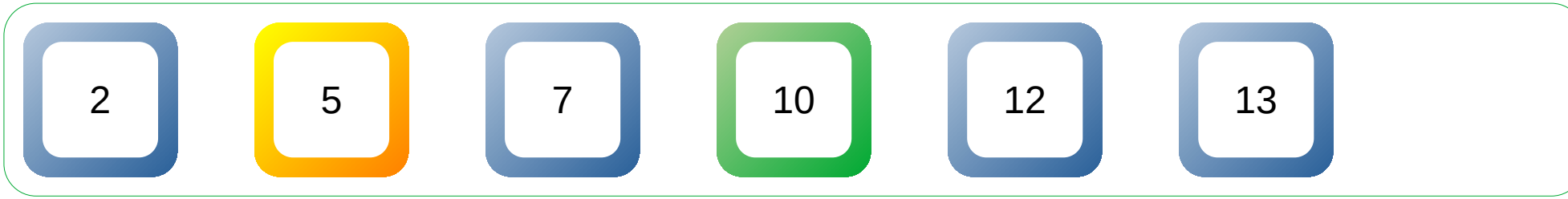
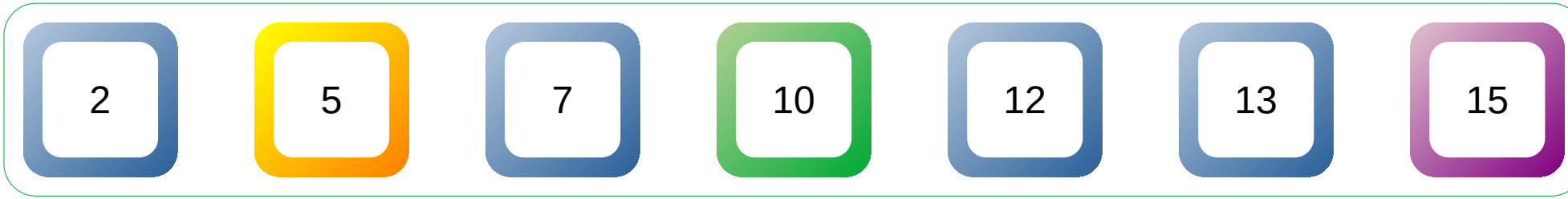
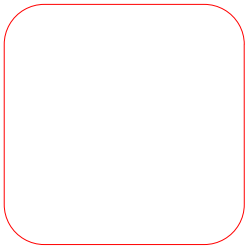
Insertion sort - úvod



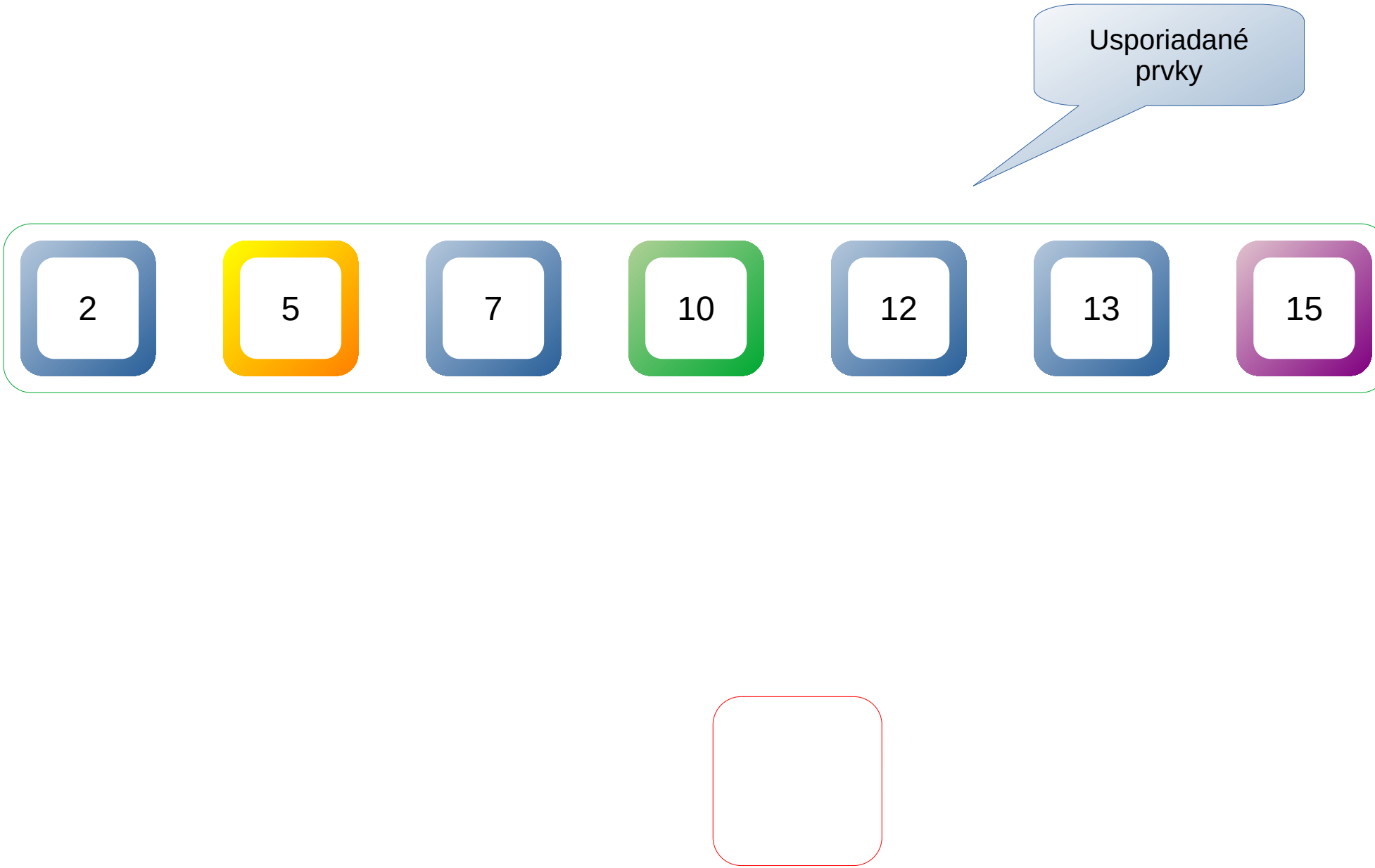
Vladislav Novák

Insertion sort - úvod





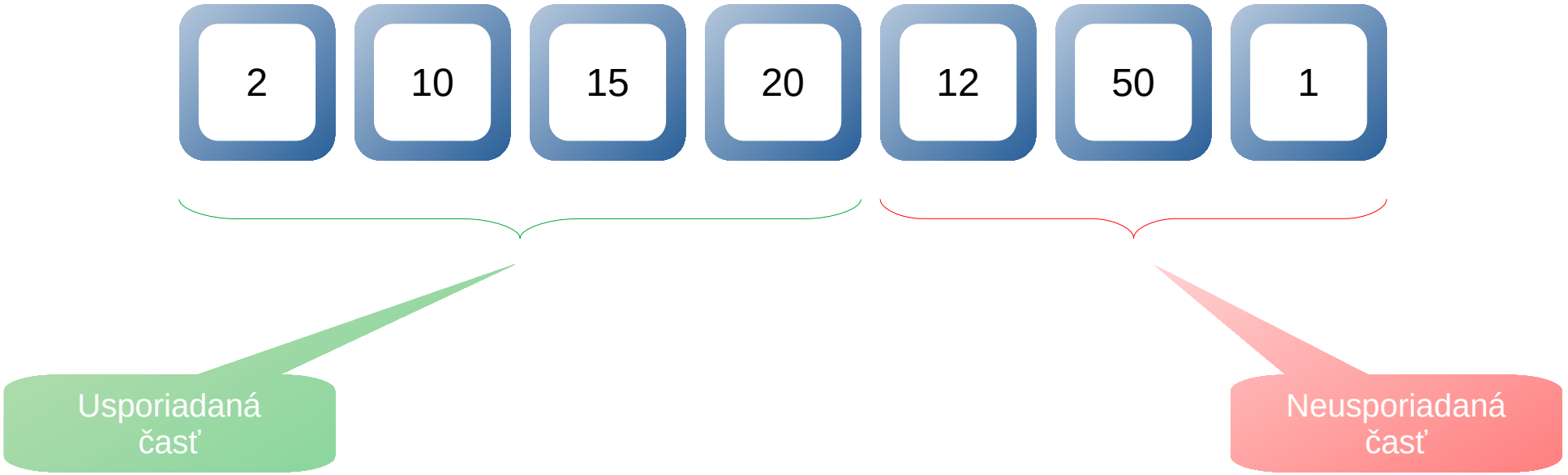
Insertion sort - úvod



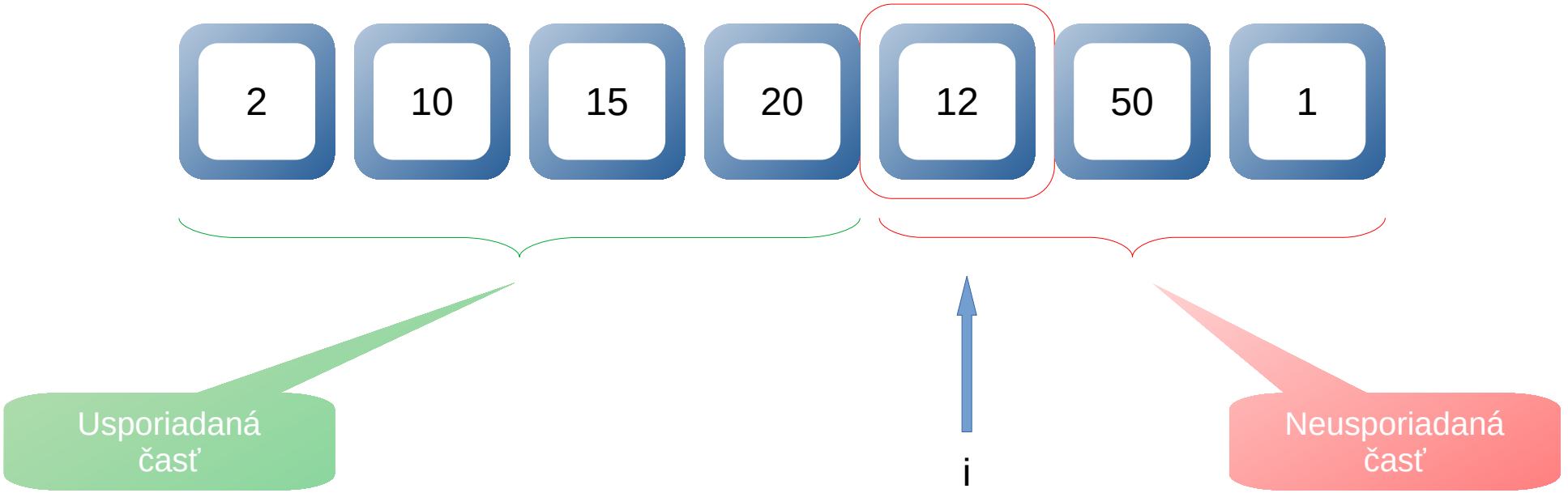
Implementácia na poli

(skočíme do stredu vykonávania algoritmu)

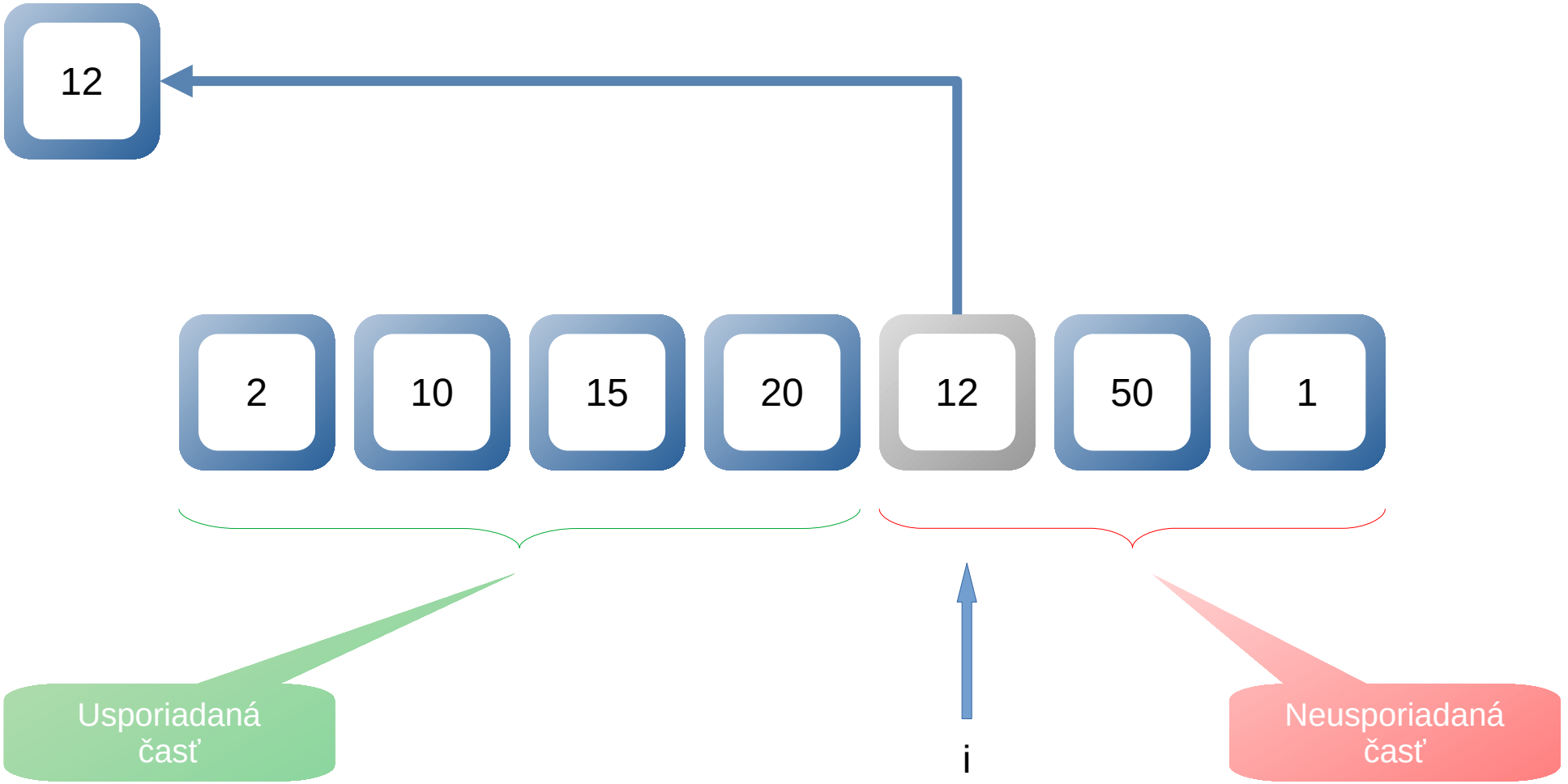
Insertion sort - pole



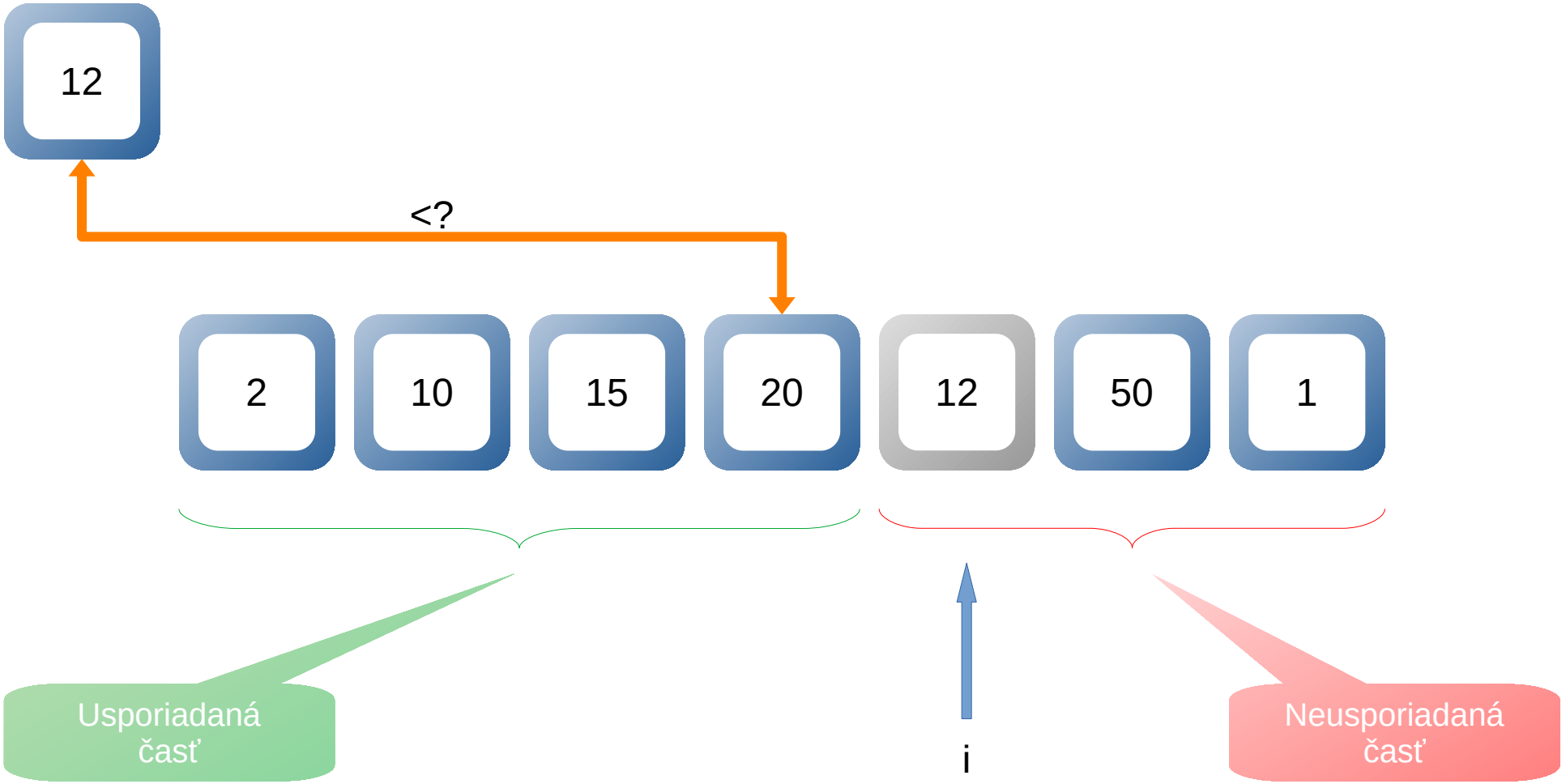
Insertion sort - pole



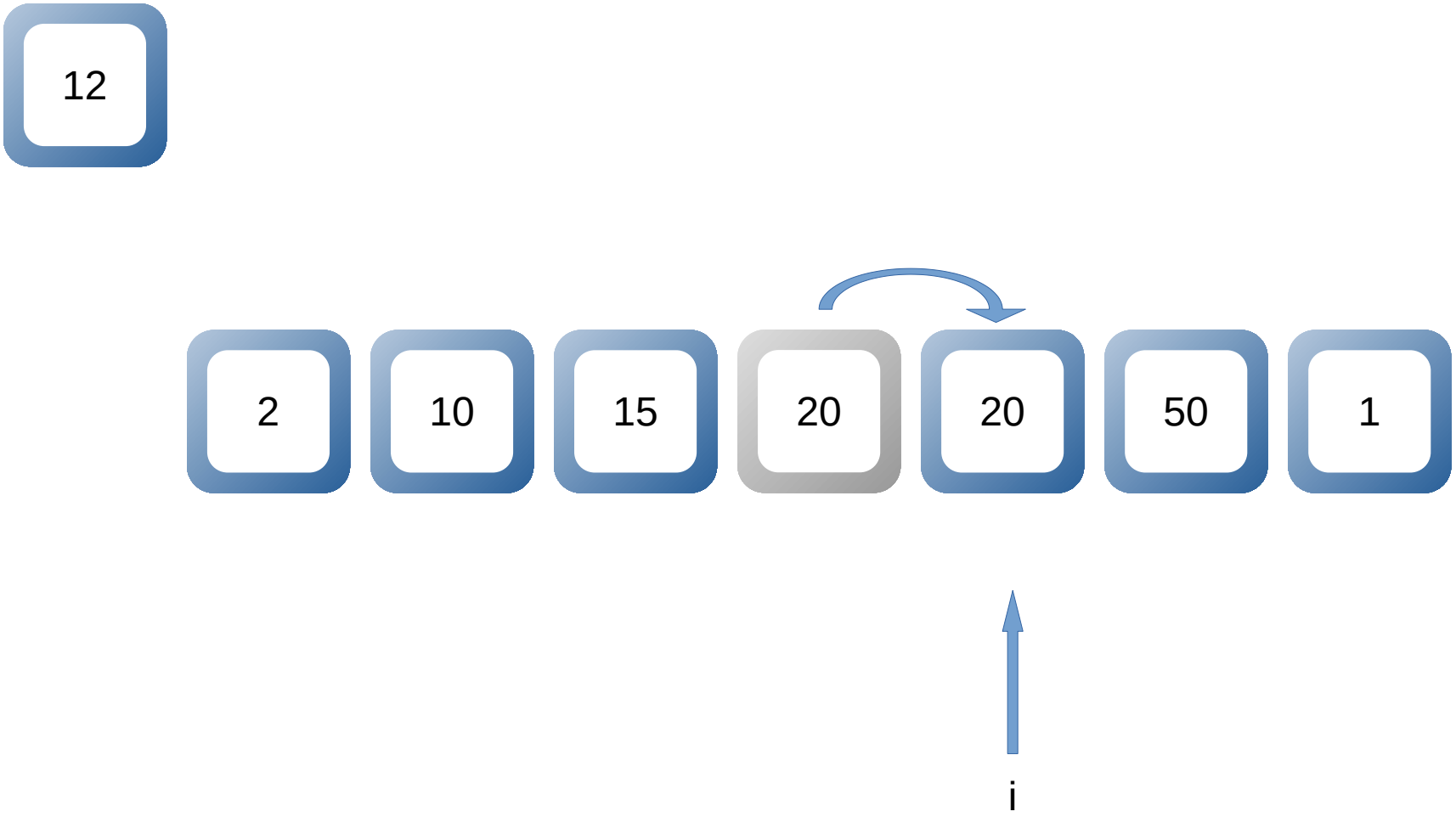
Insertion sort - pole



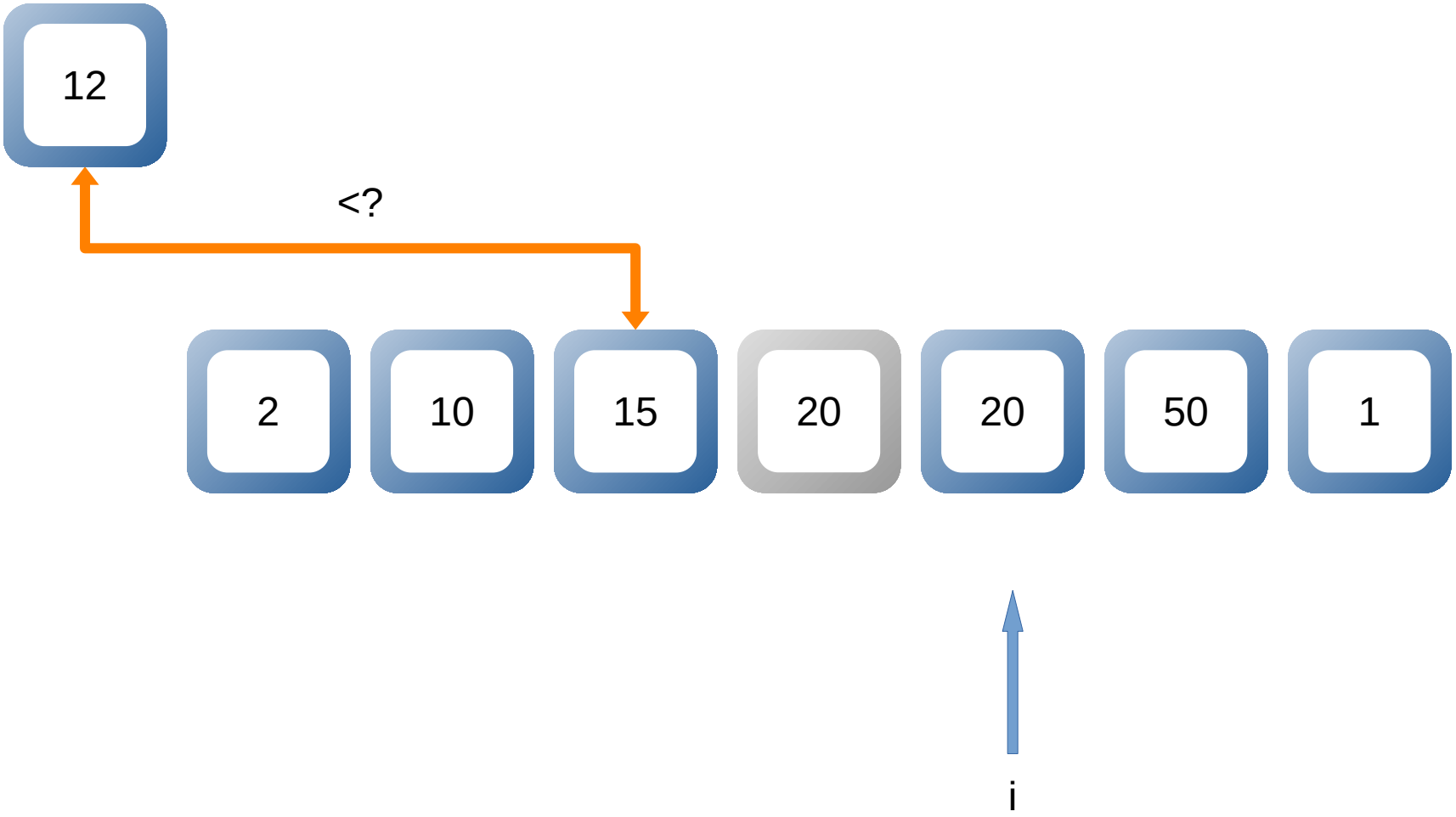
Insertion sort - pole



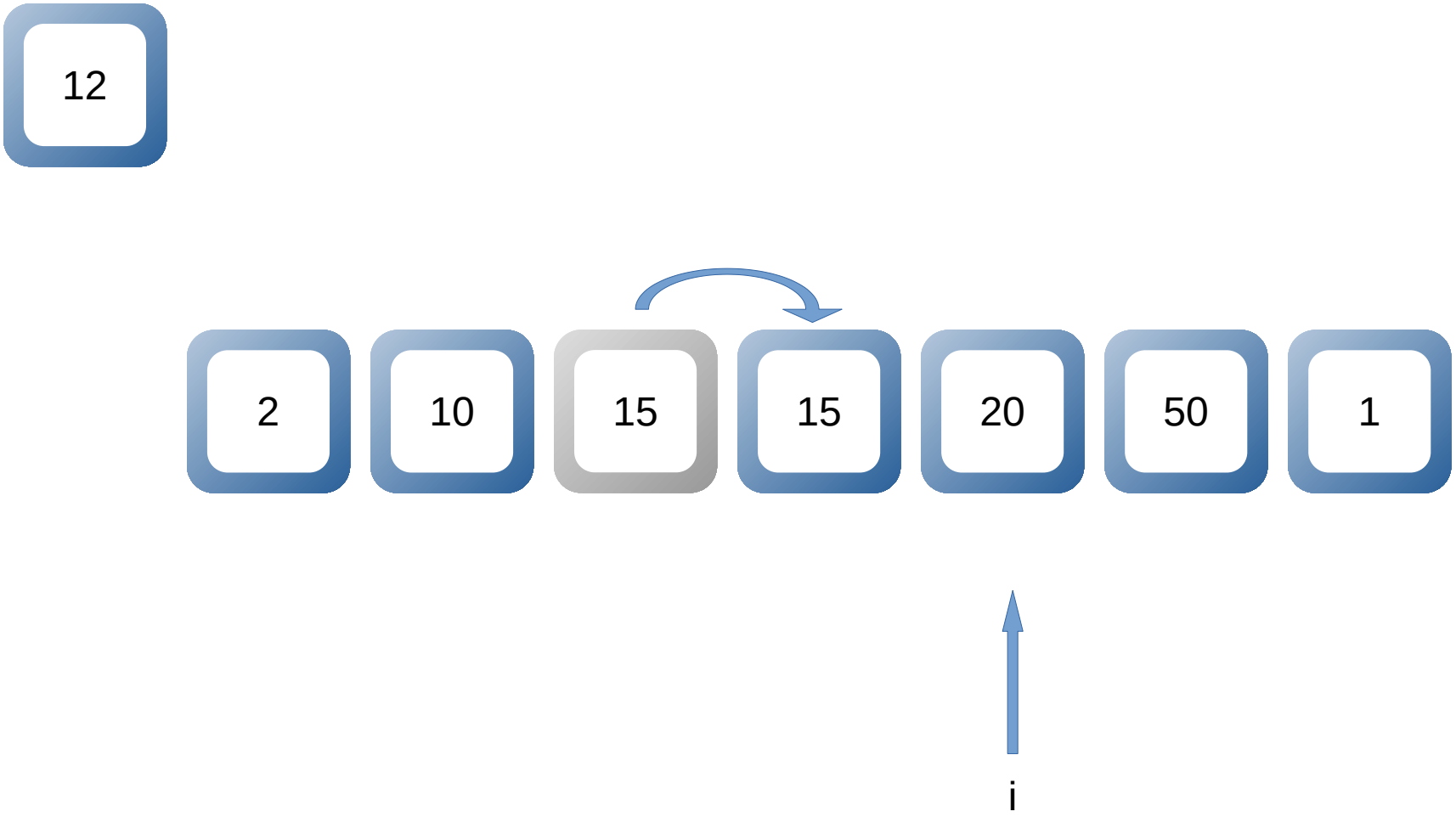
Insertion sort - pole



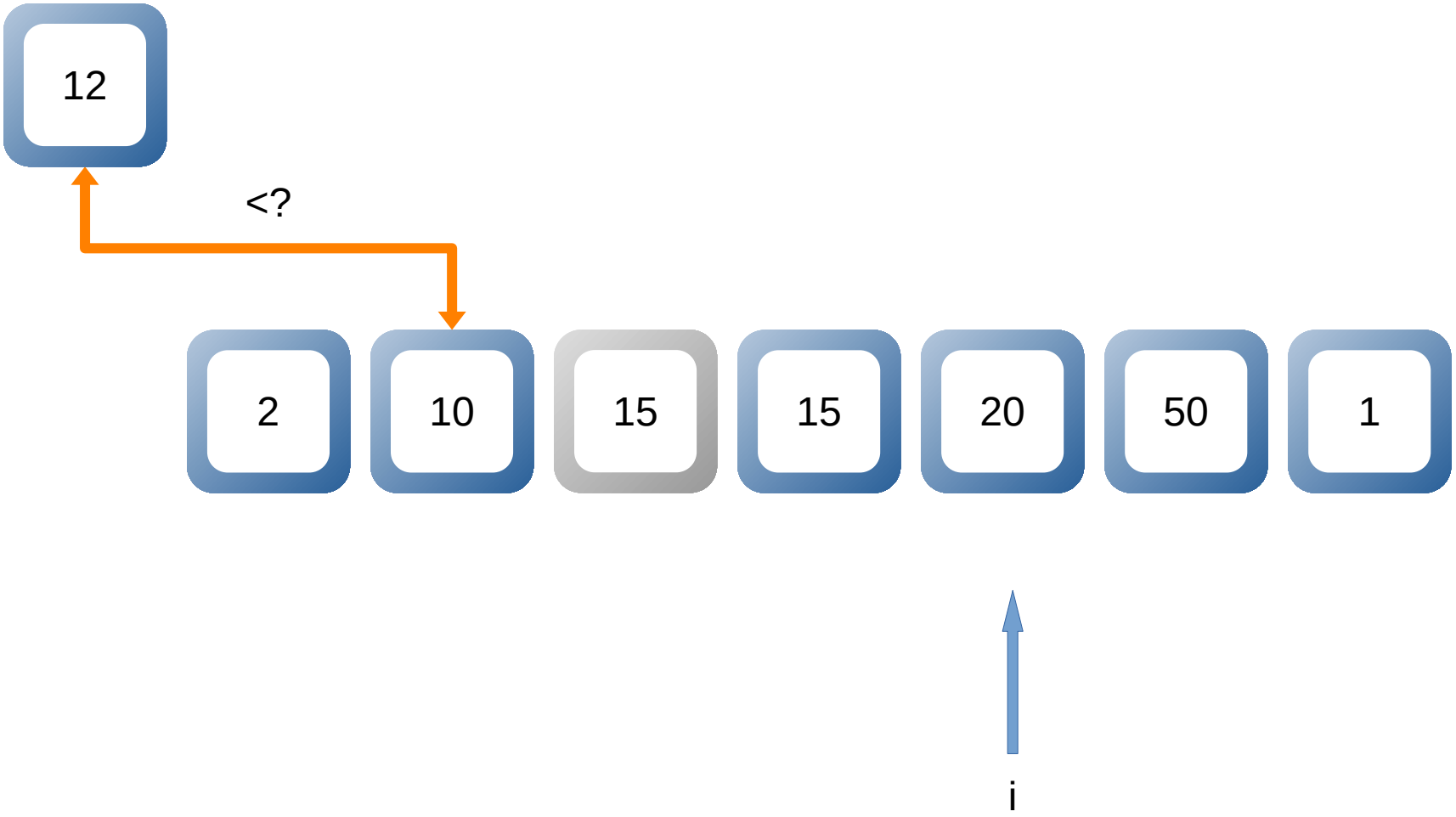
Insertion sort - pole



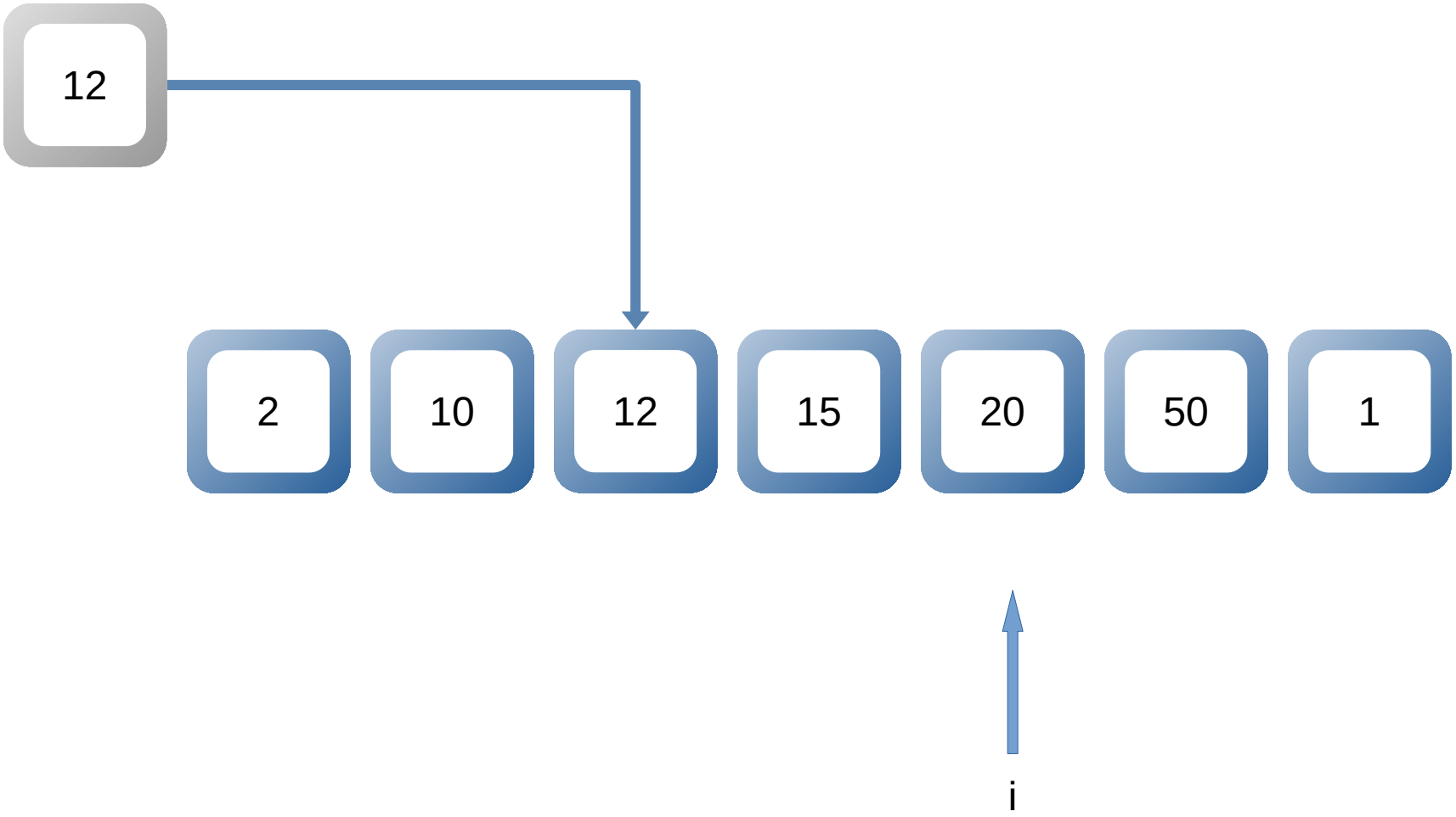
Insertion sort - pole



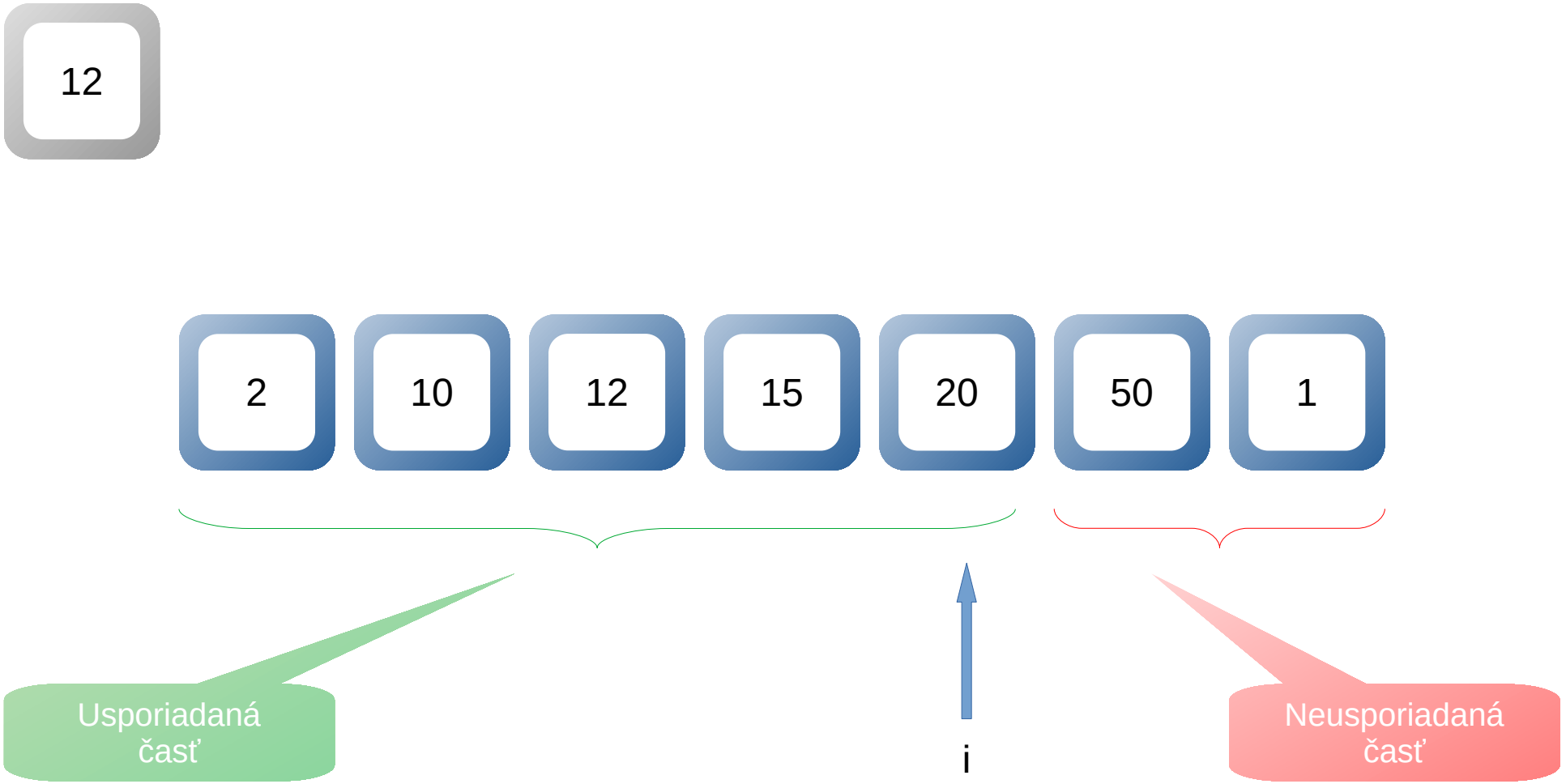
Insertion sort - pole



Insertion sort - pole



Insertion sort - pole



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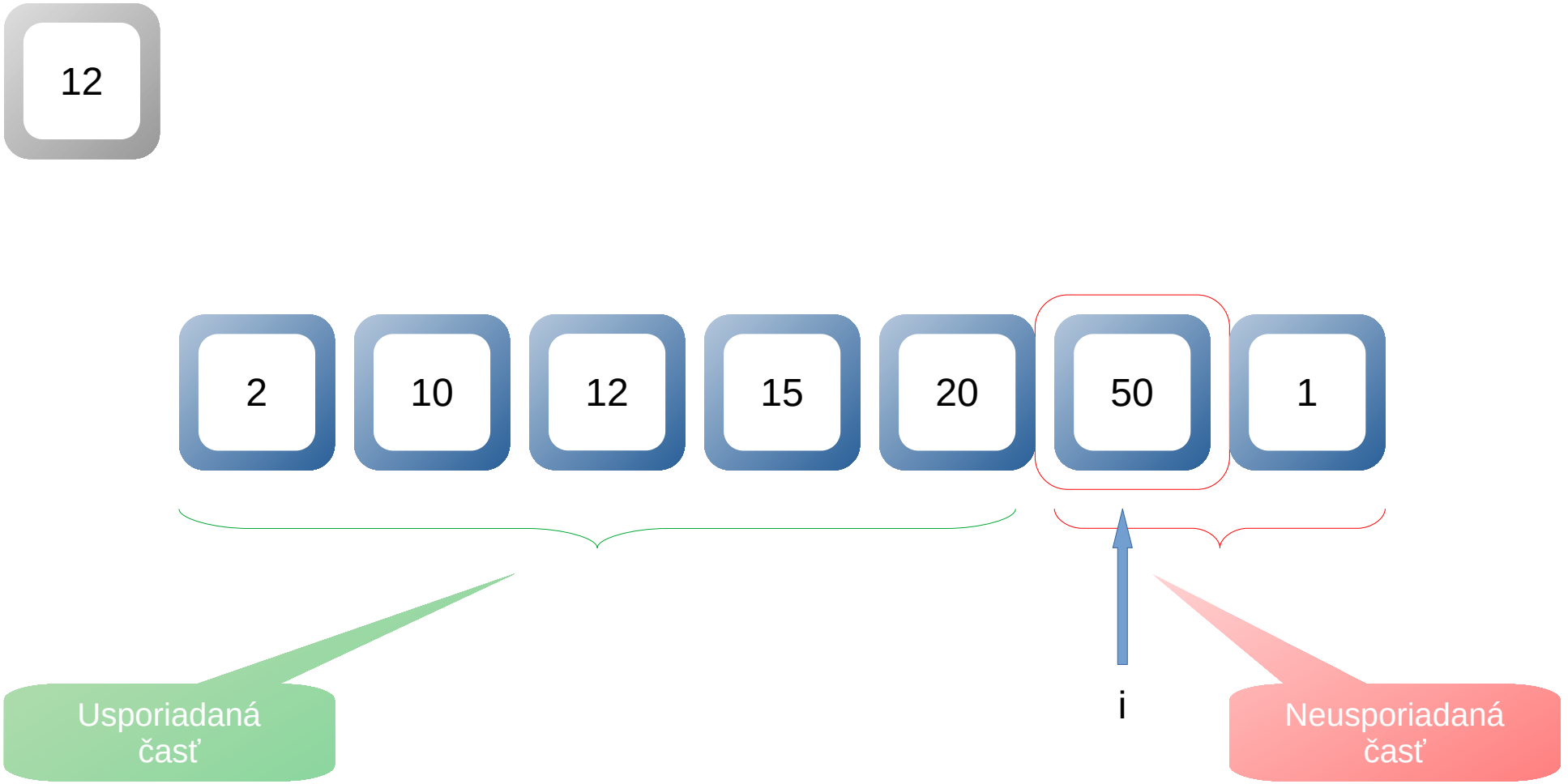
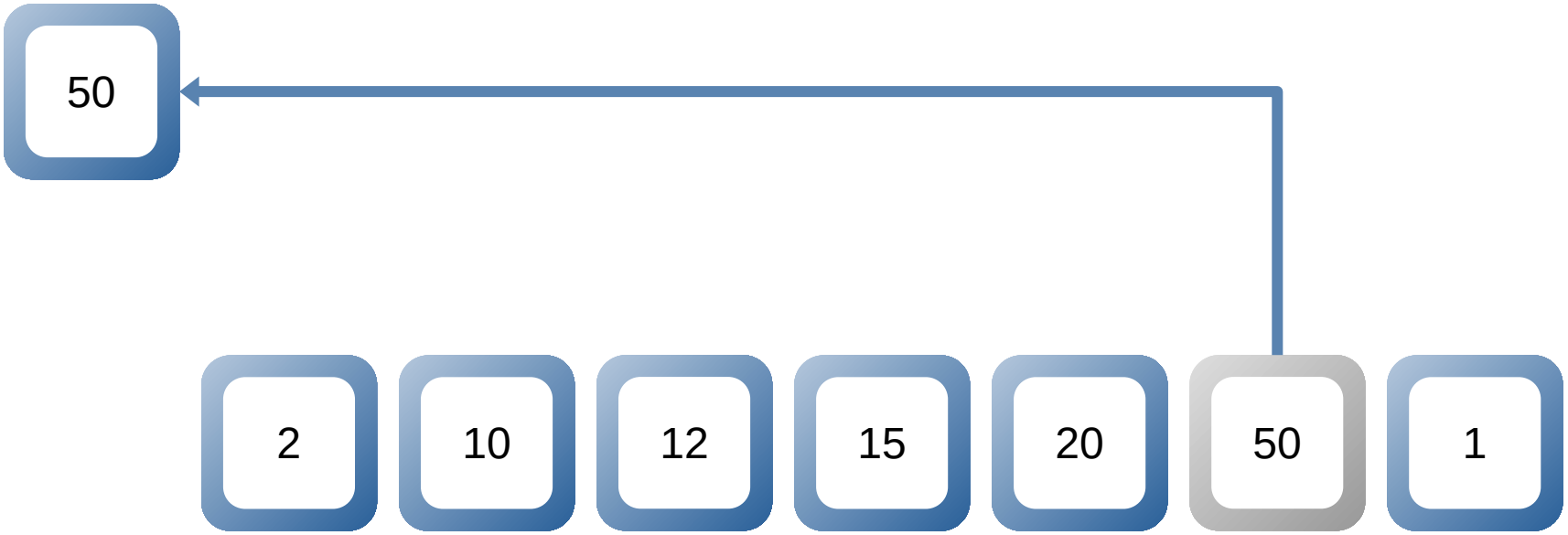


Insertion sort - pole



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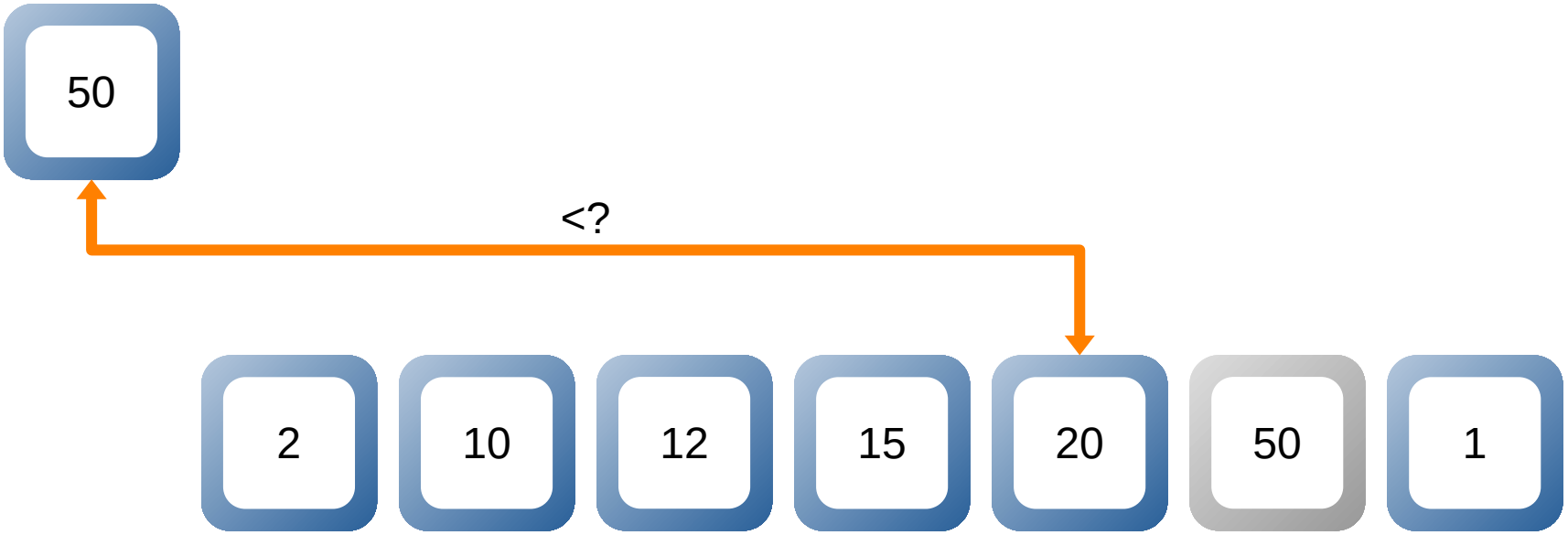

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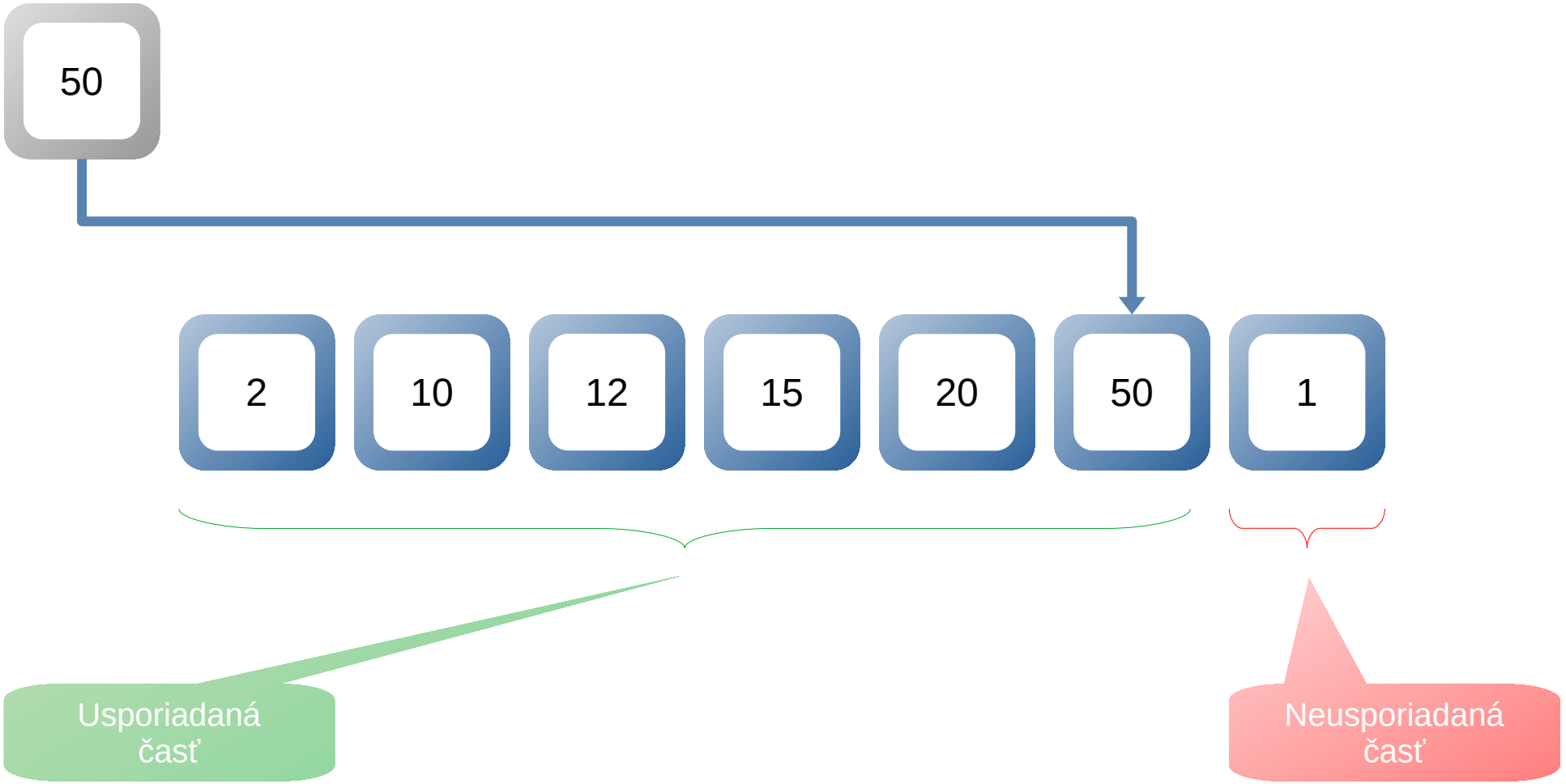
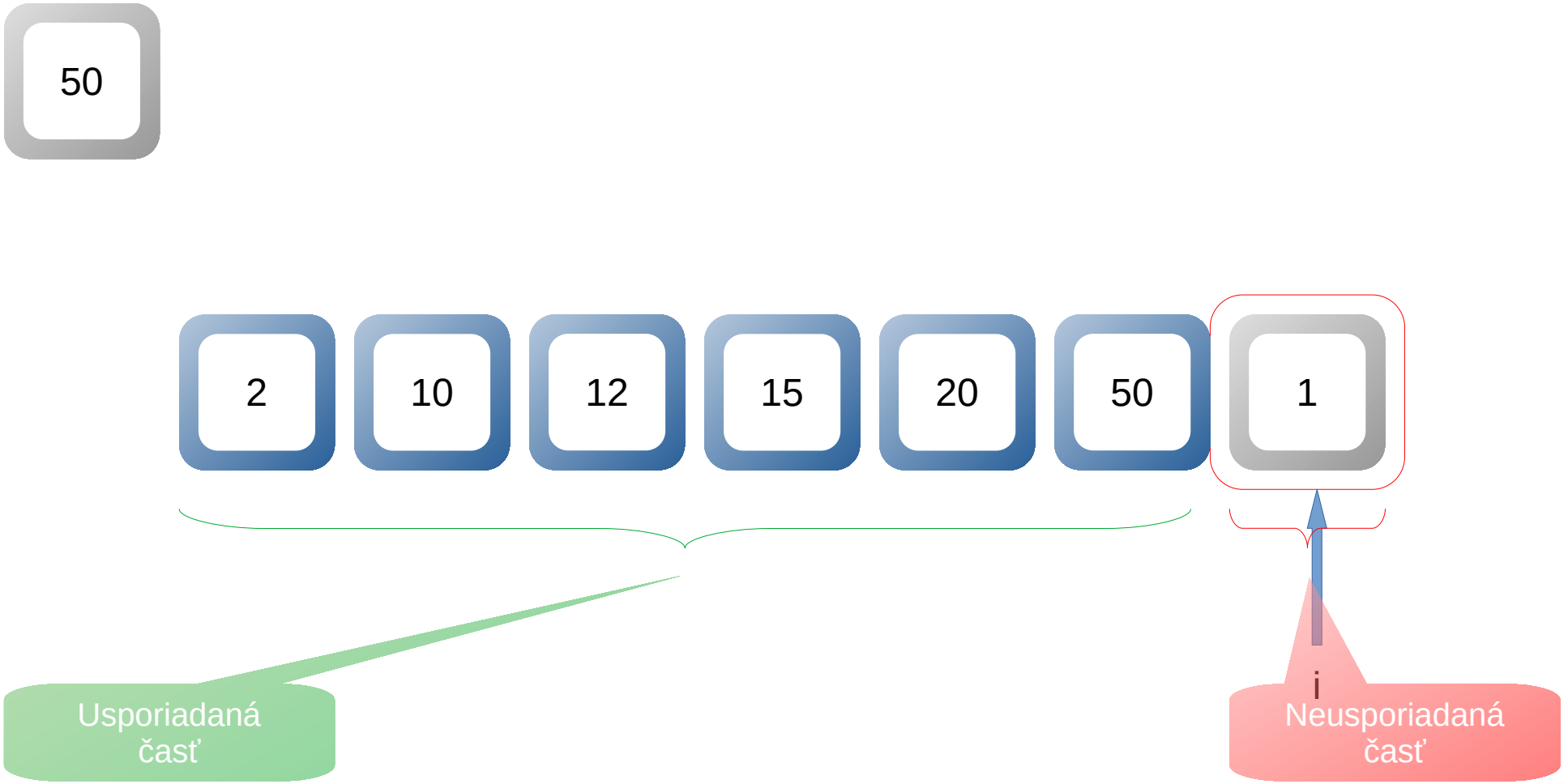
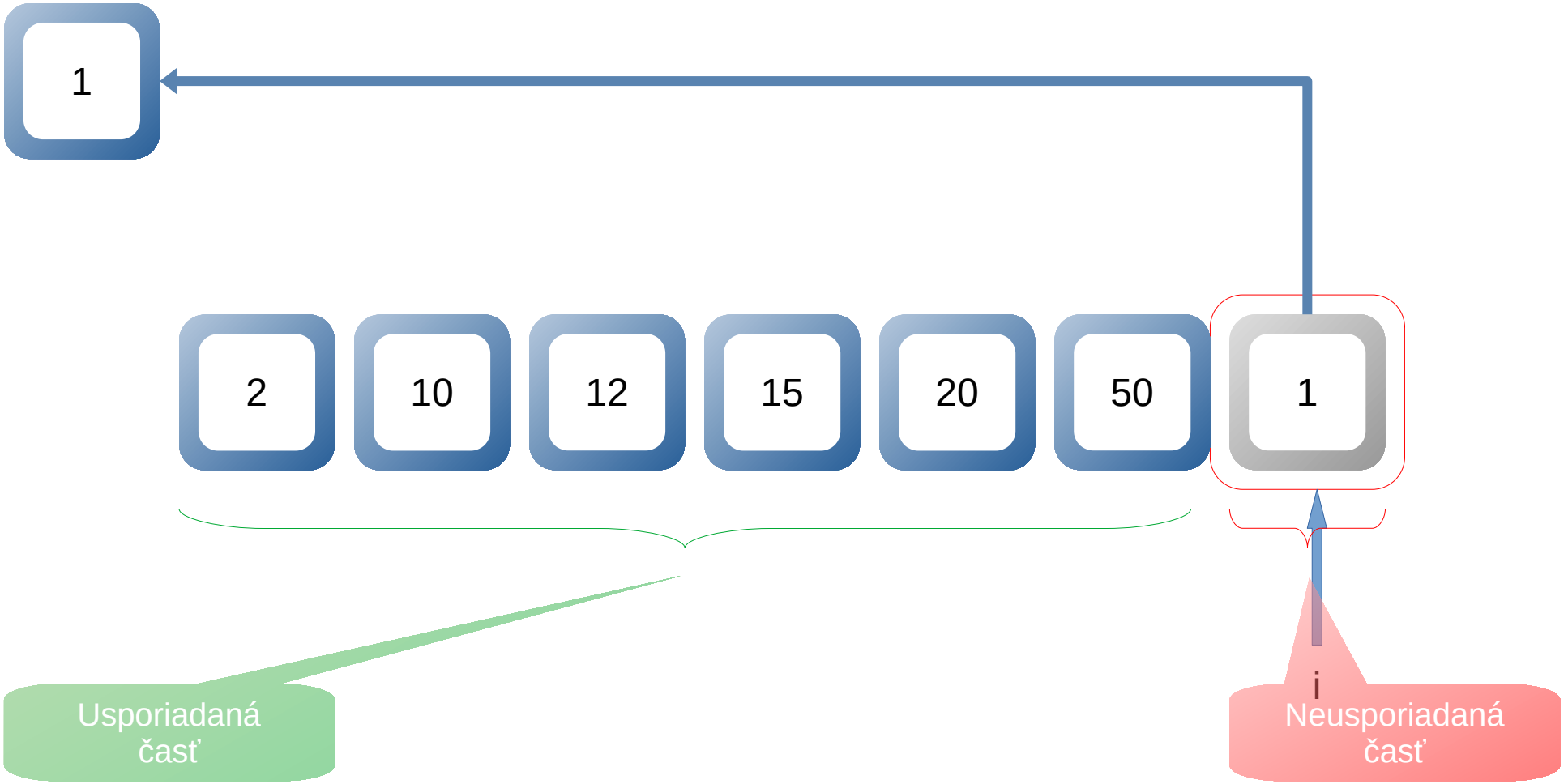


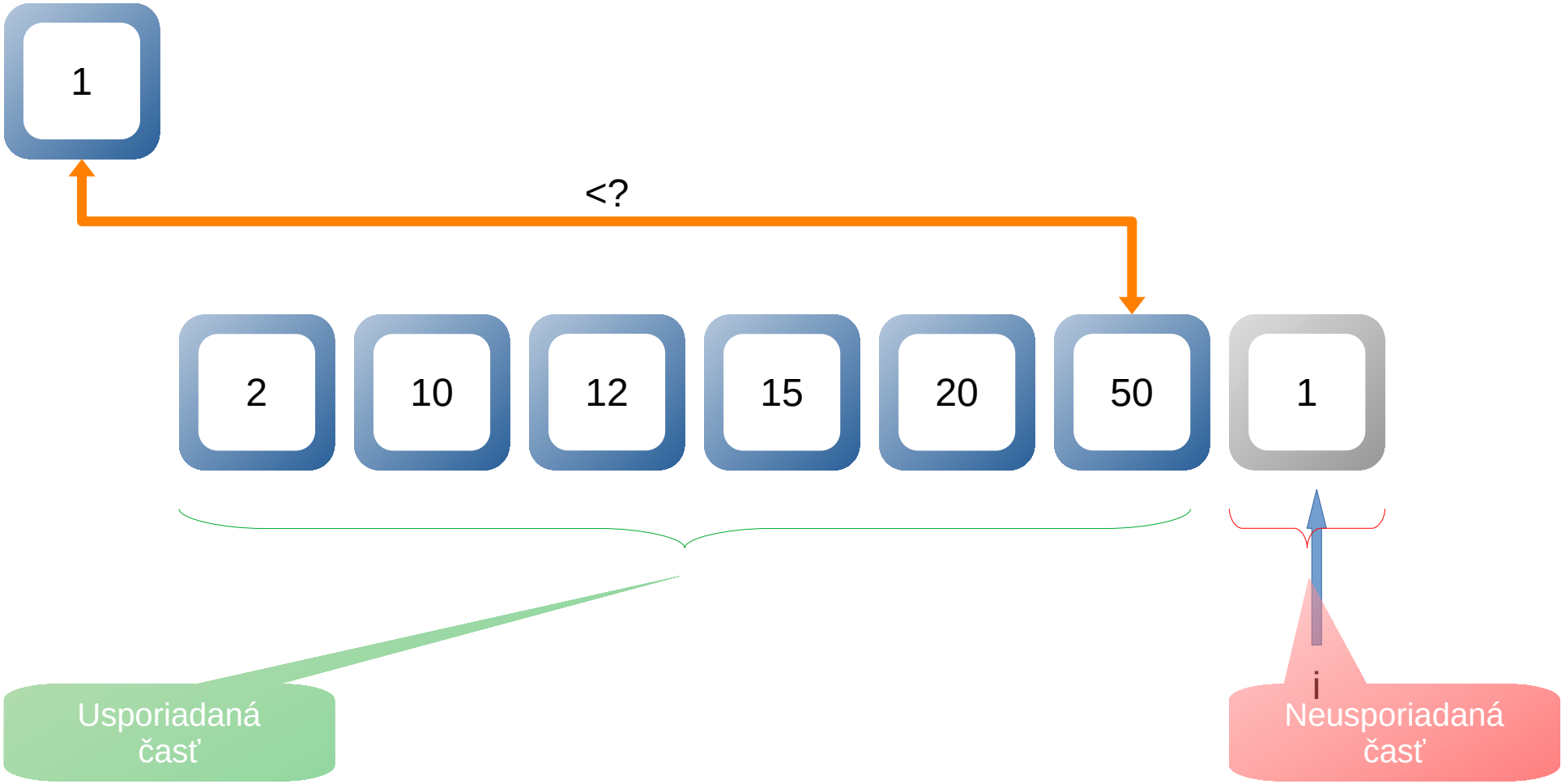
Insertion sort - pole



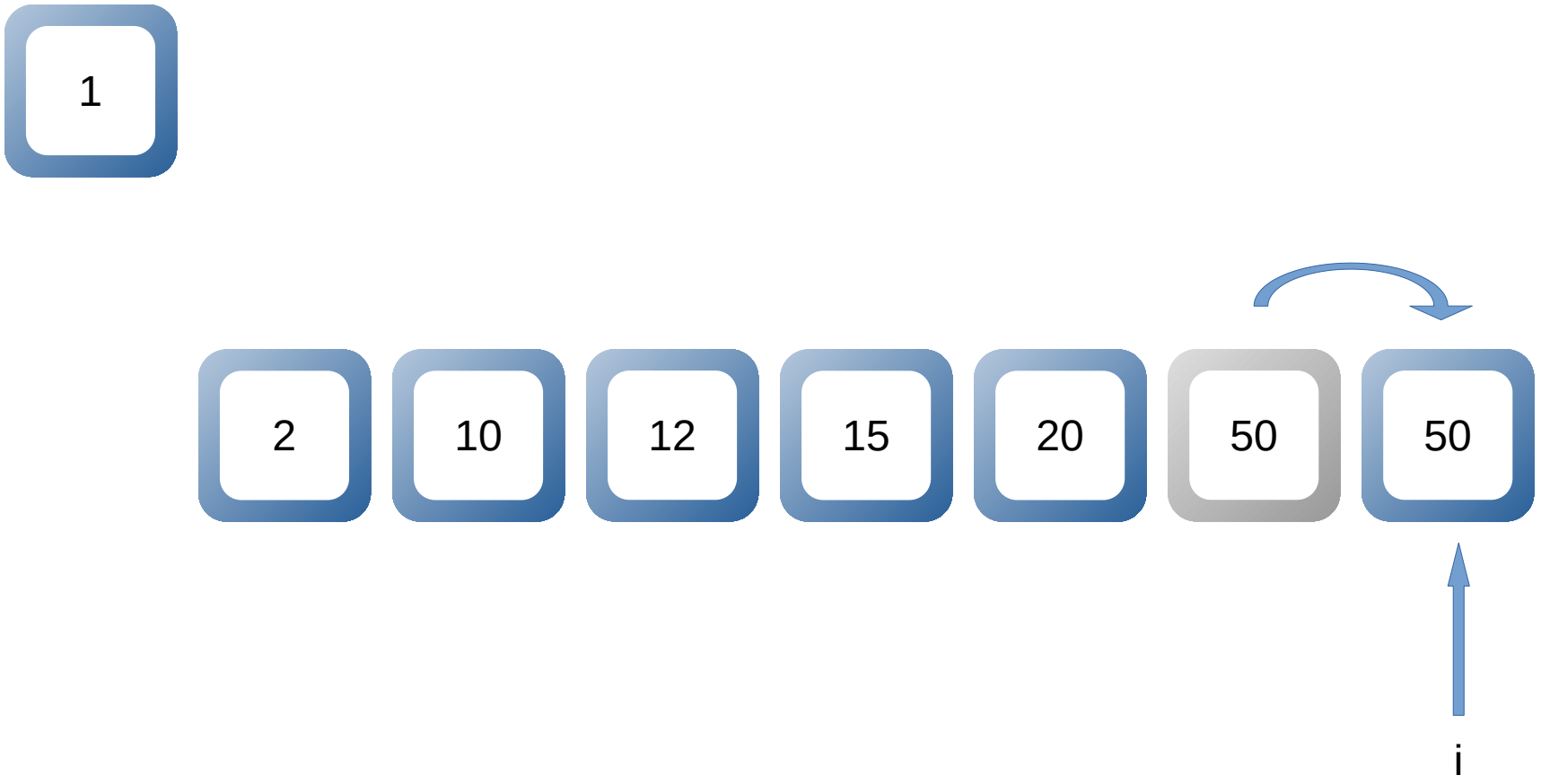
Insertion sort - pole



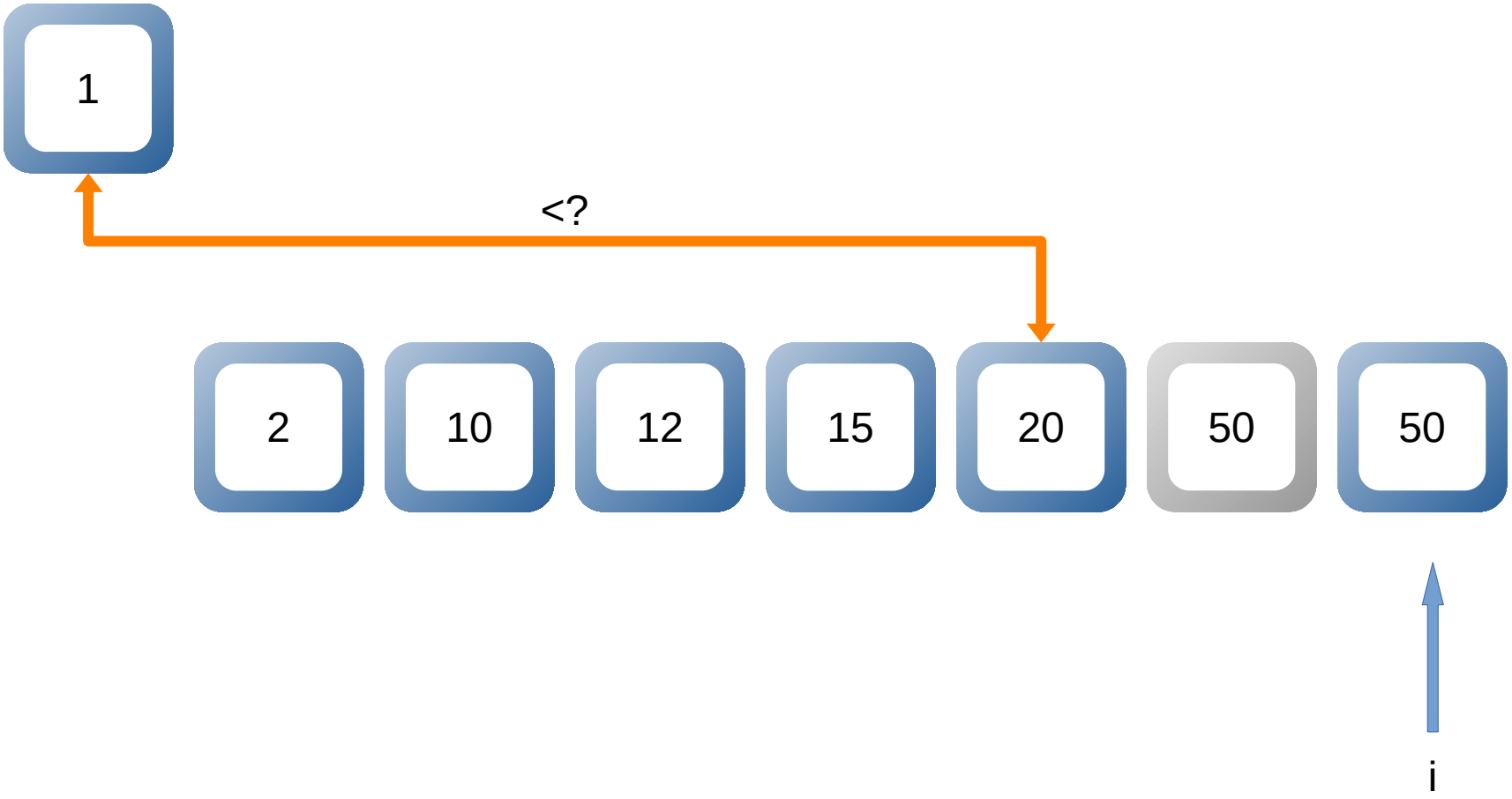
Insertion sort - pole



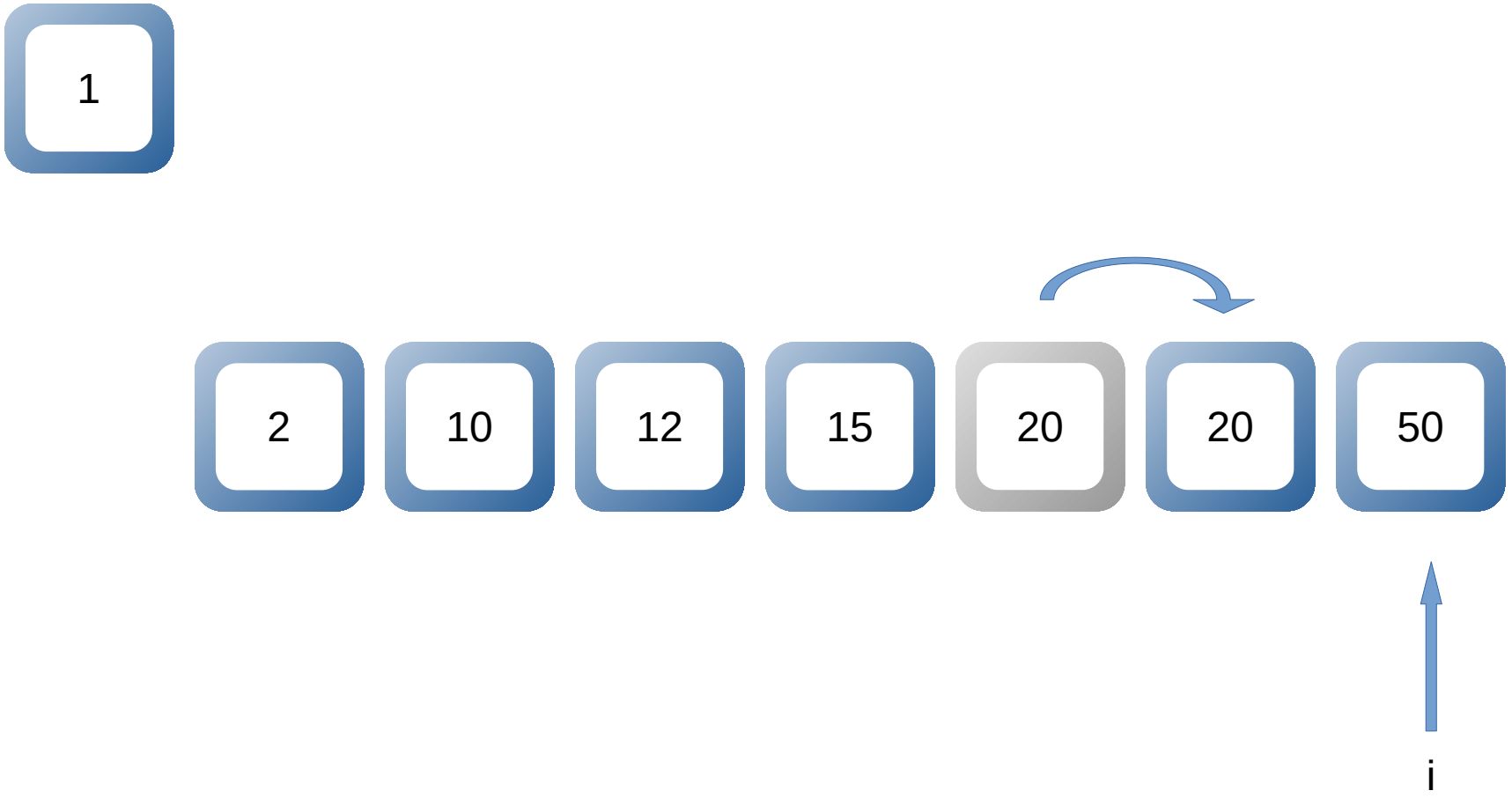
Insertion sort - pole



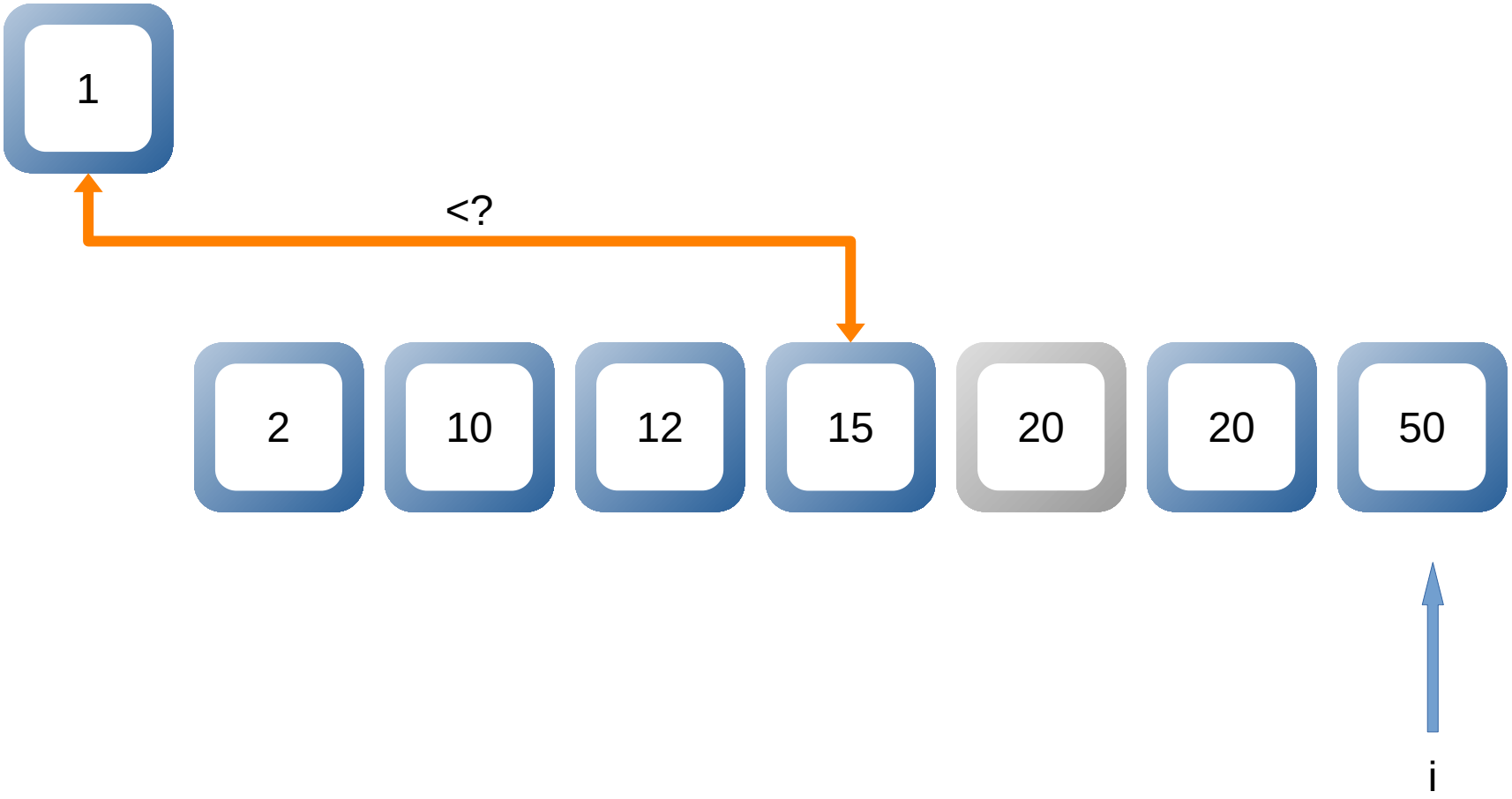
Insertion sort - pole



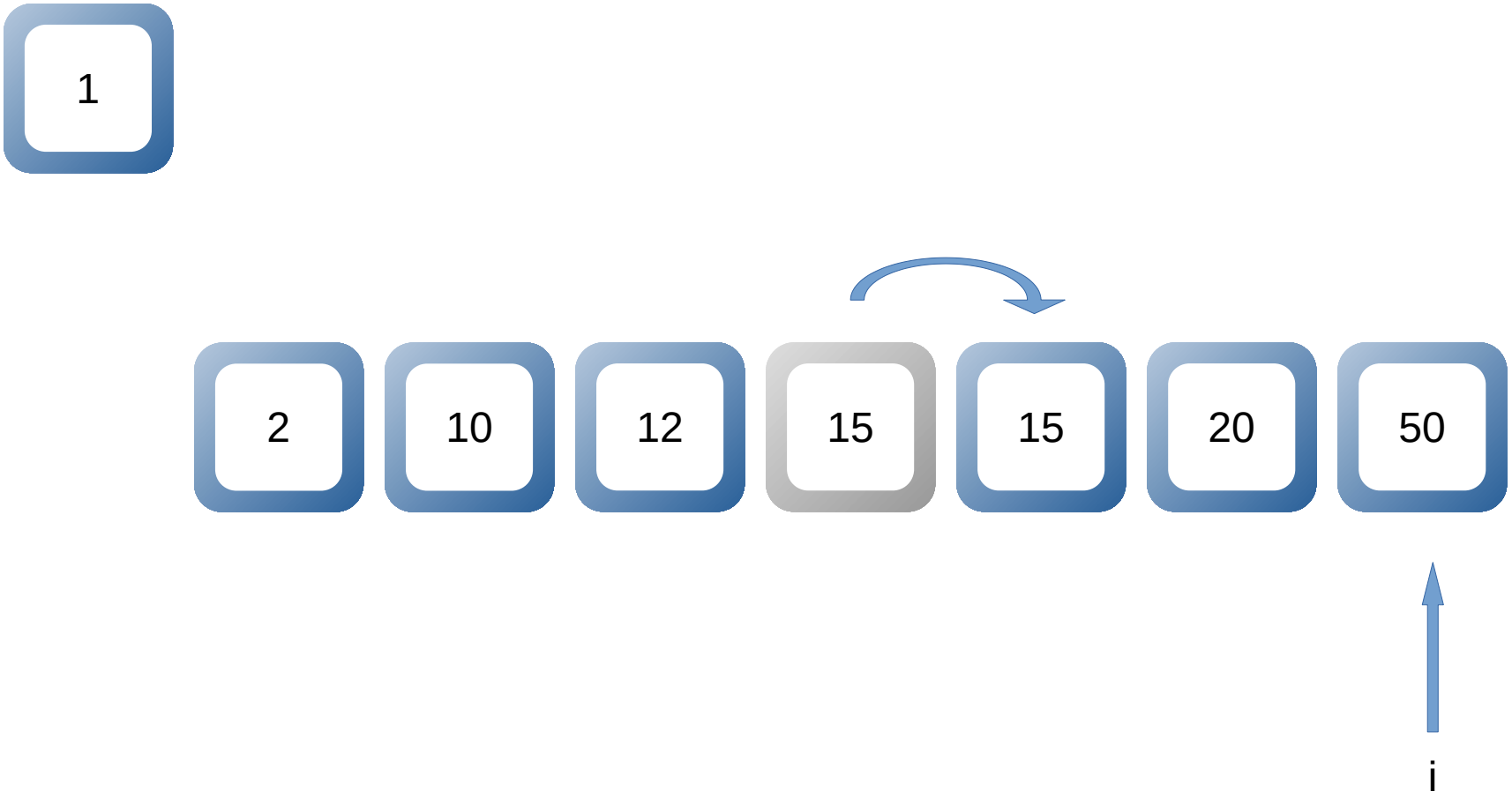
Insertion sort - pole



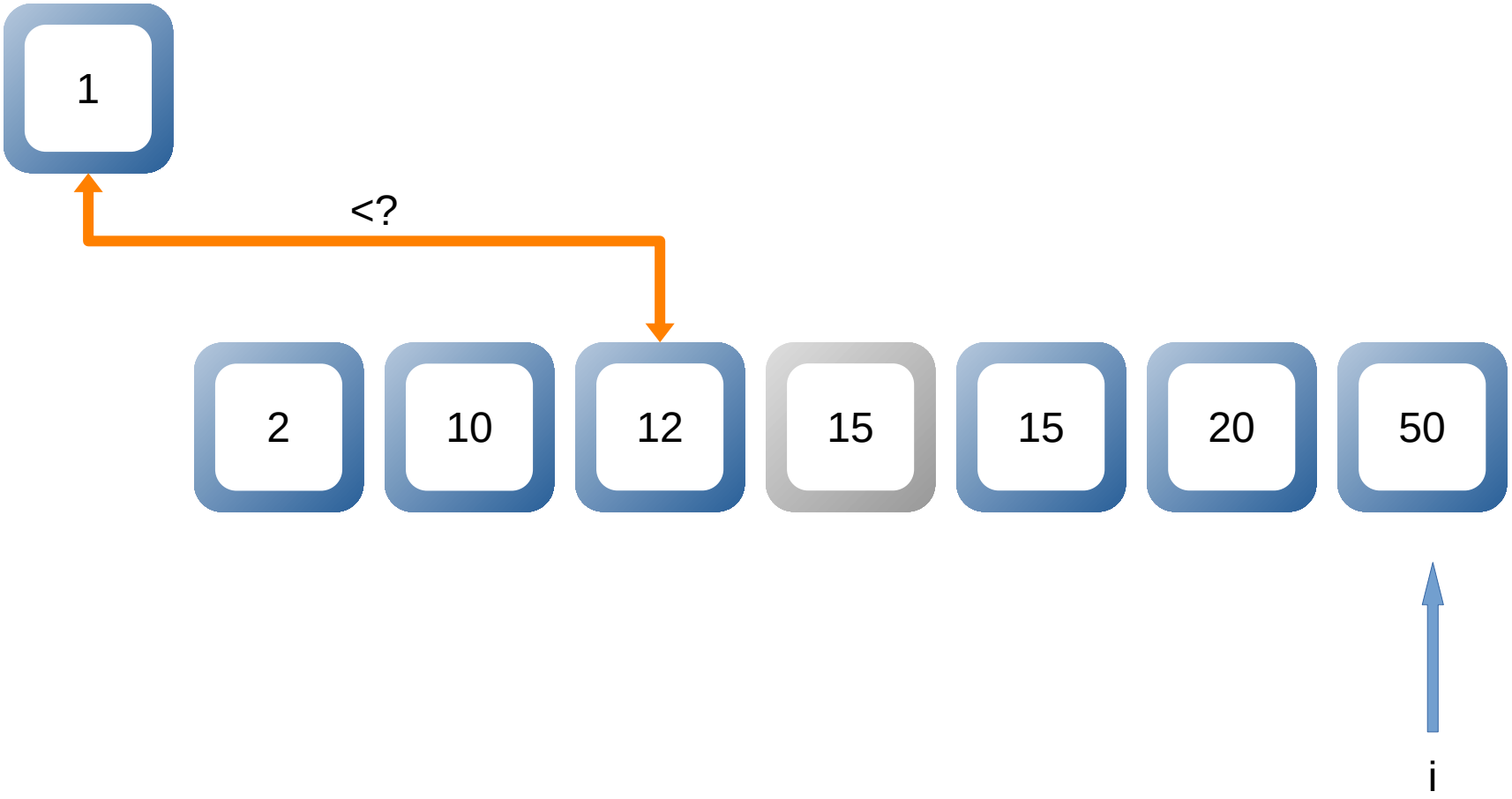
Insertion sort - pole



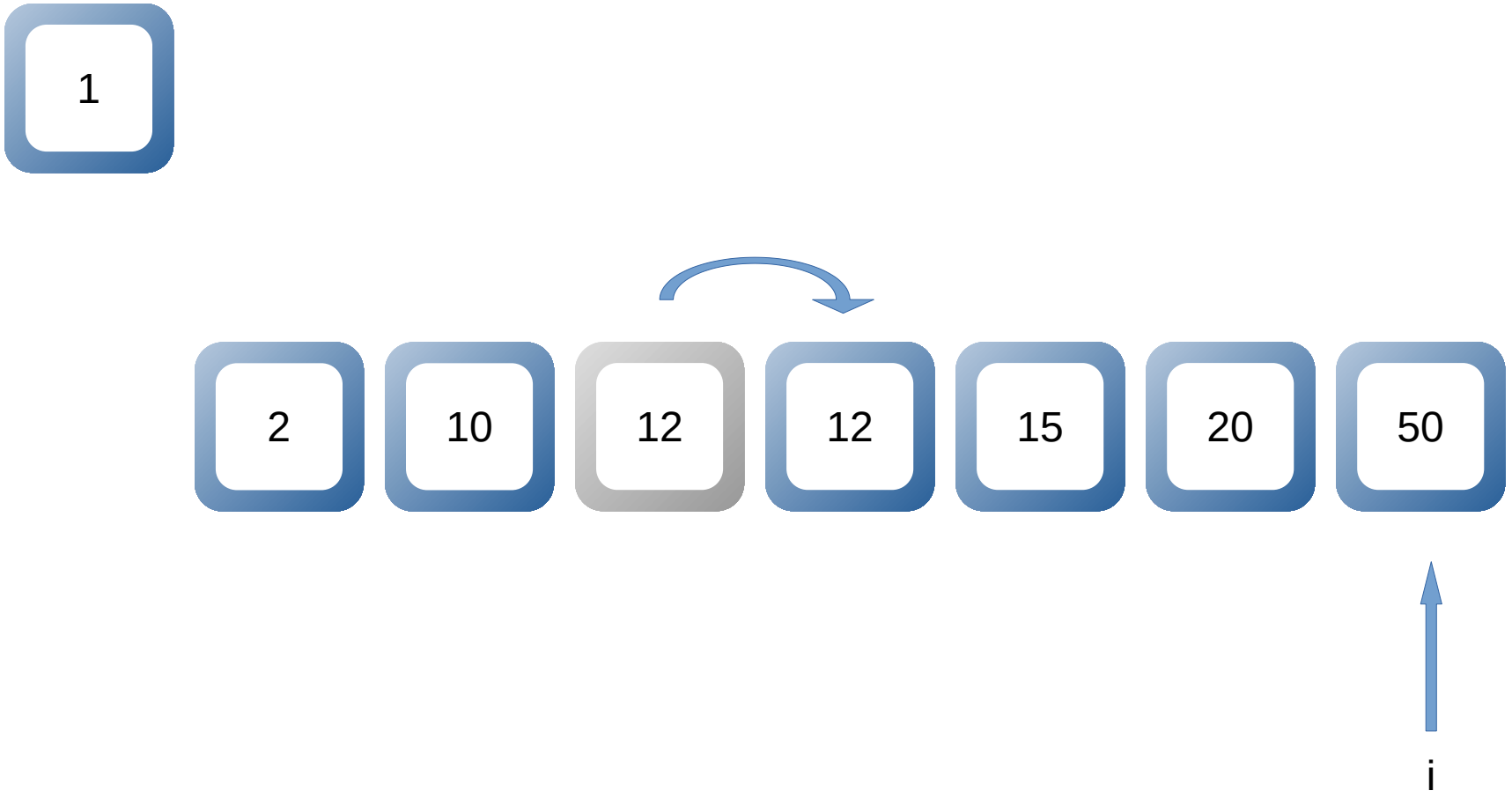
Insertion sort - pole



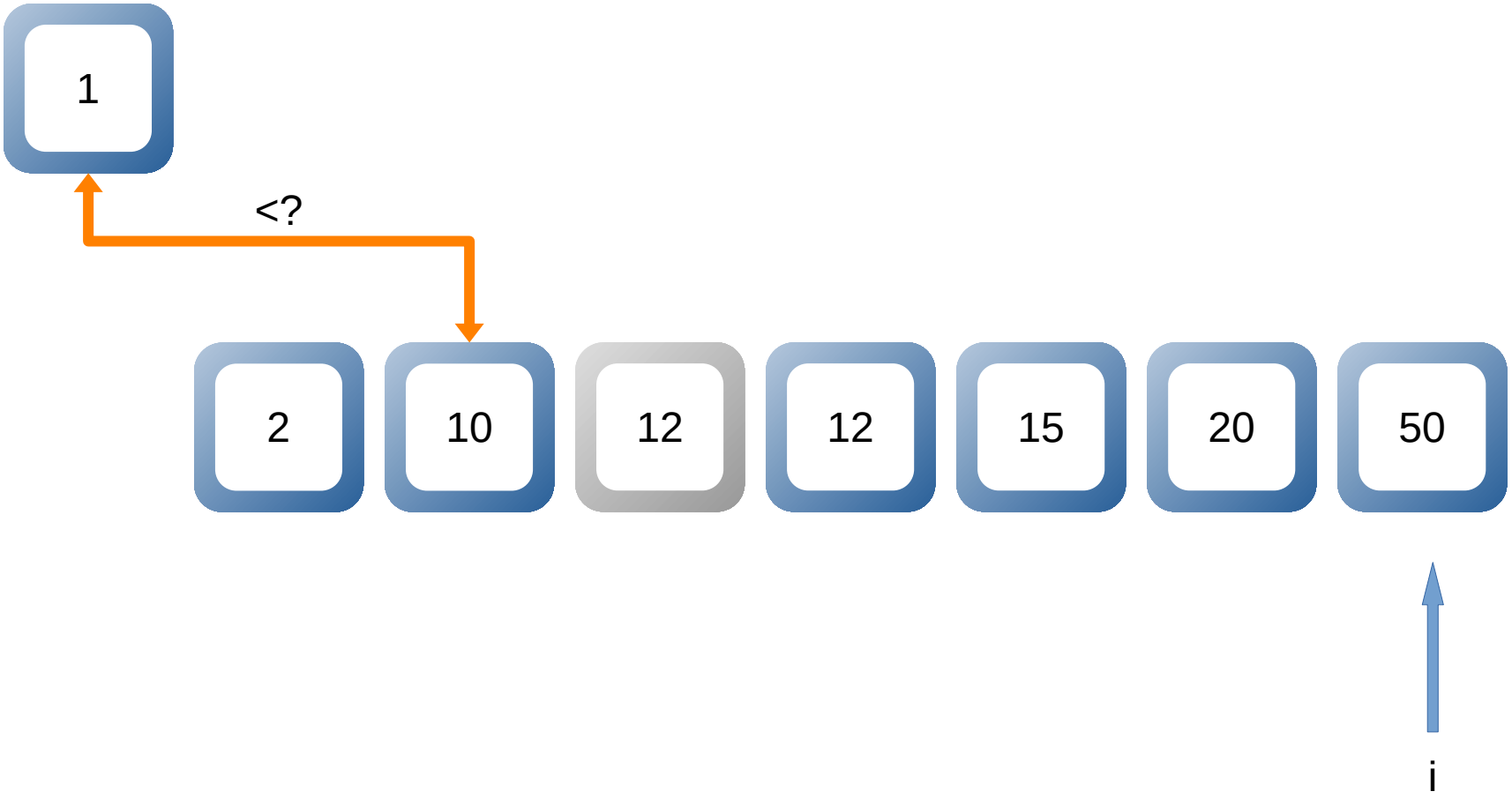
Insertion sort - pole



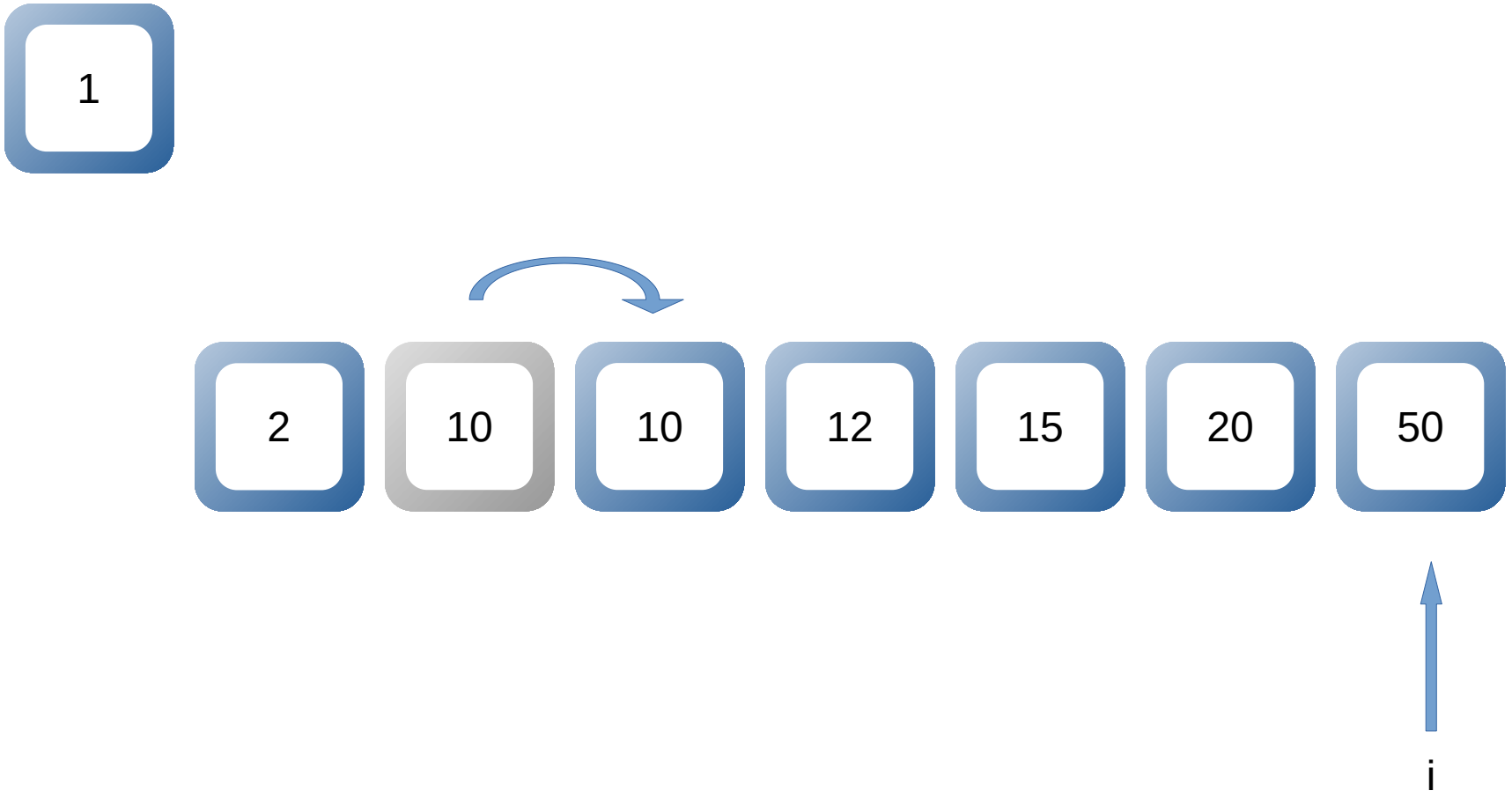
Insertion sort - pole



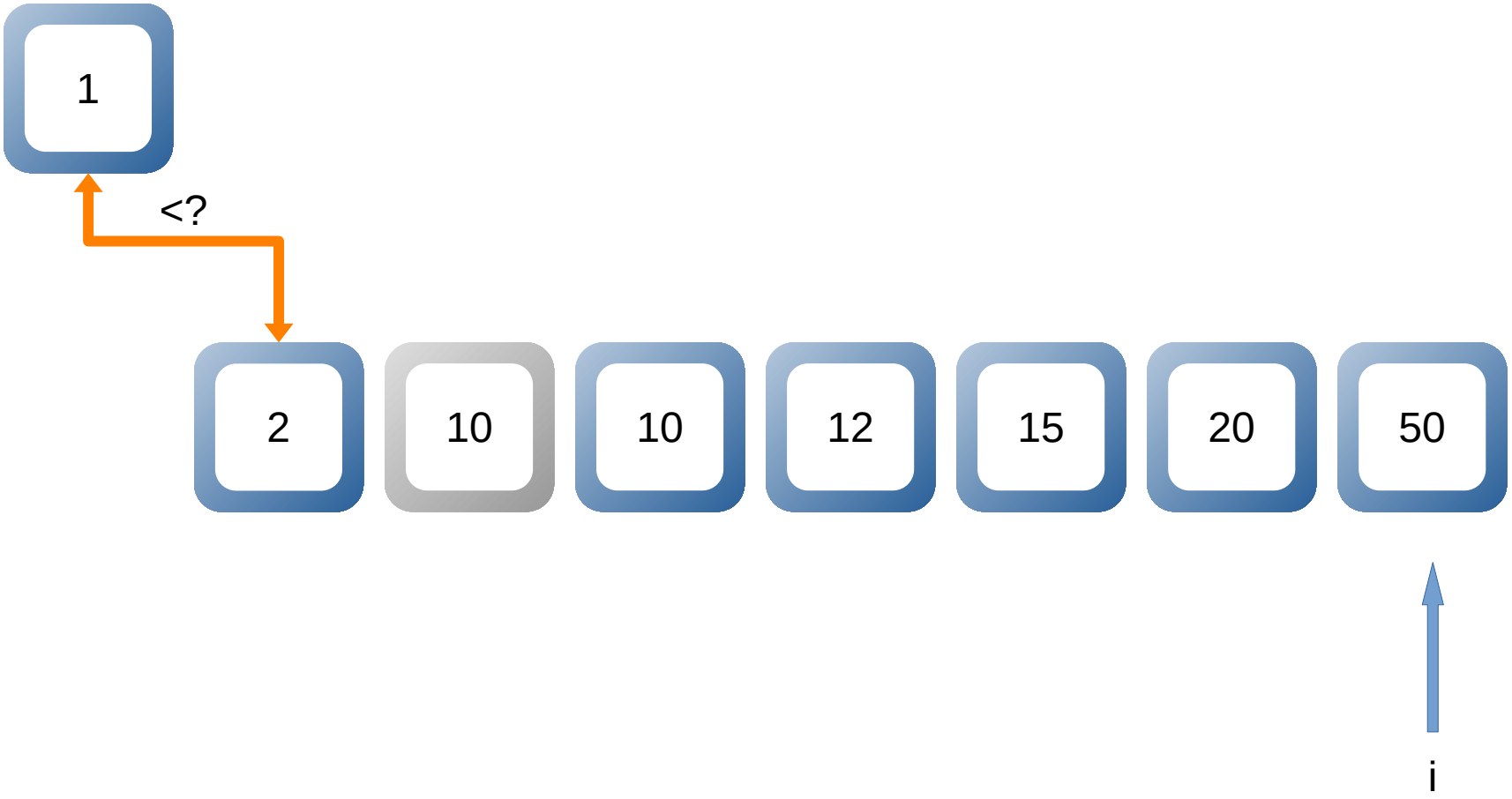
Insertion sort - pole



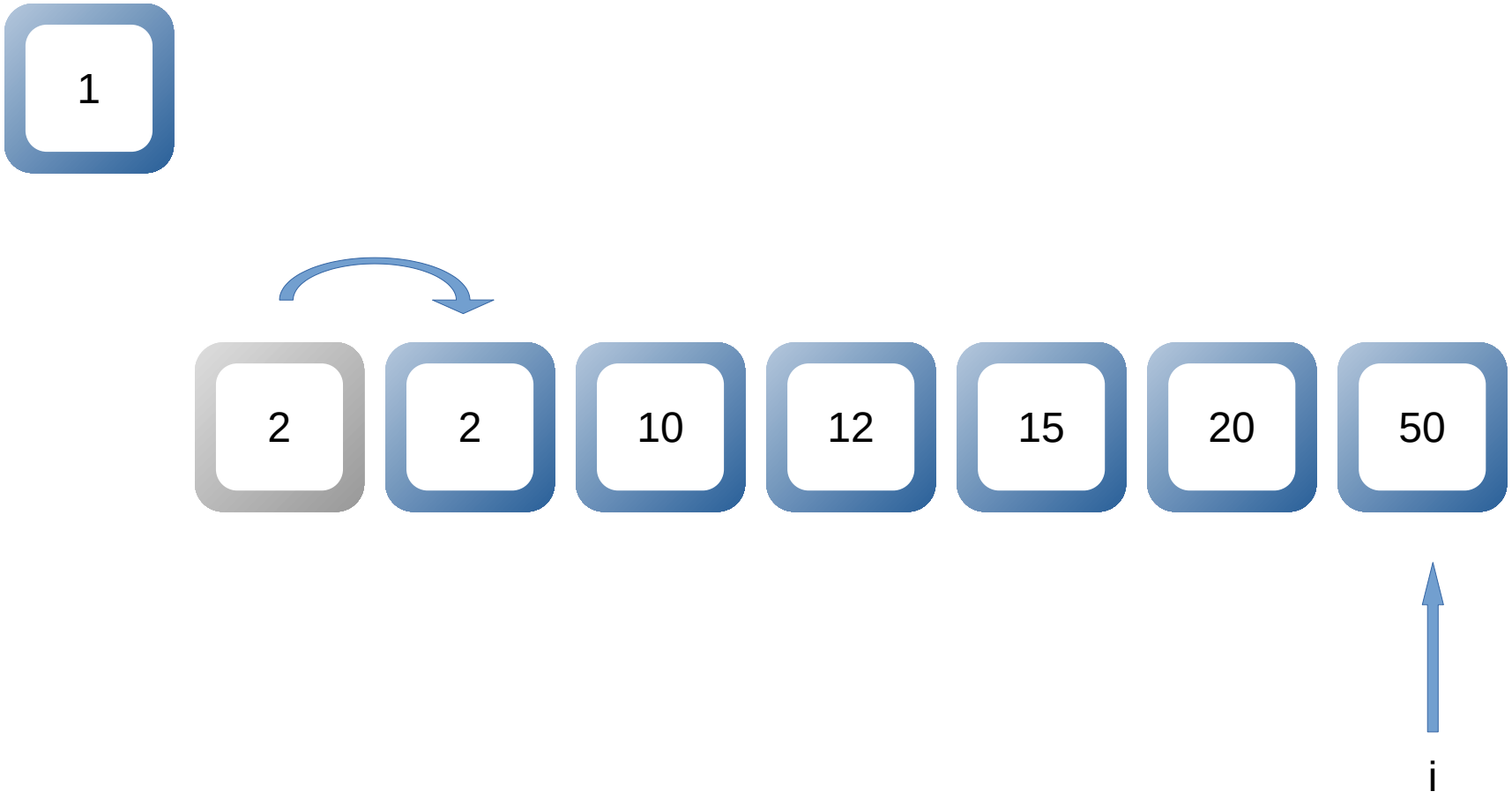
Insertion sort - pole



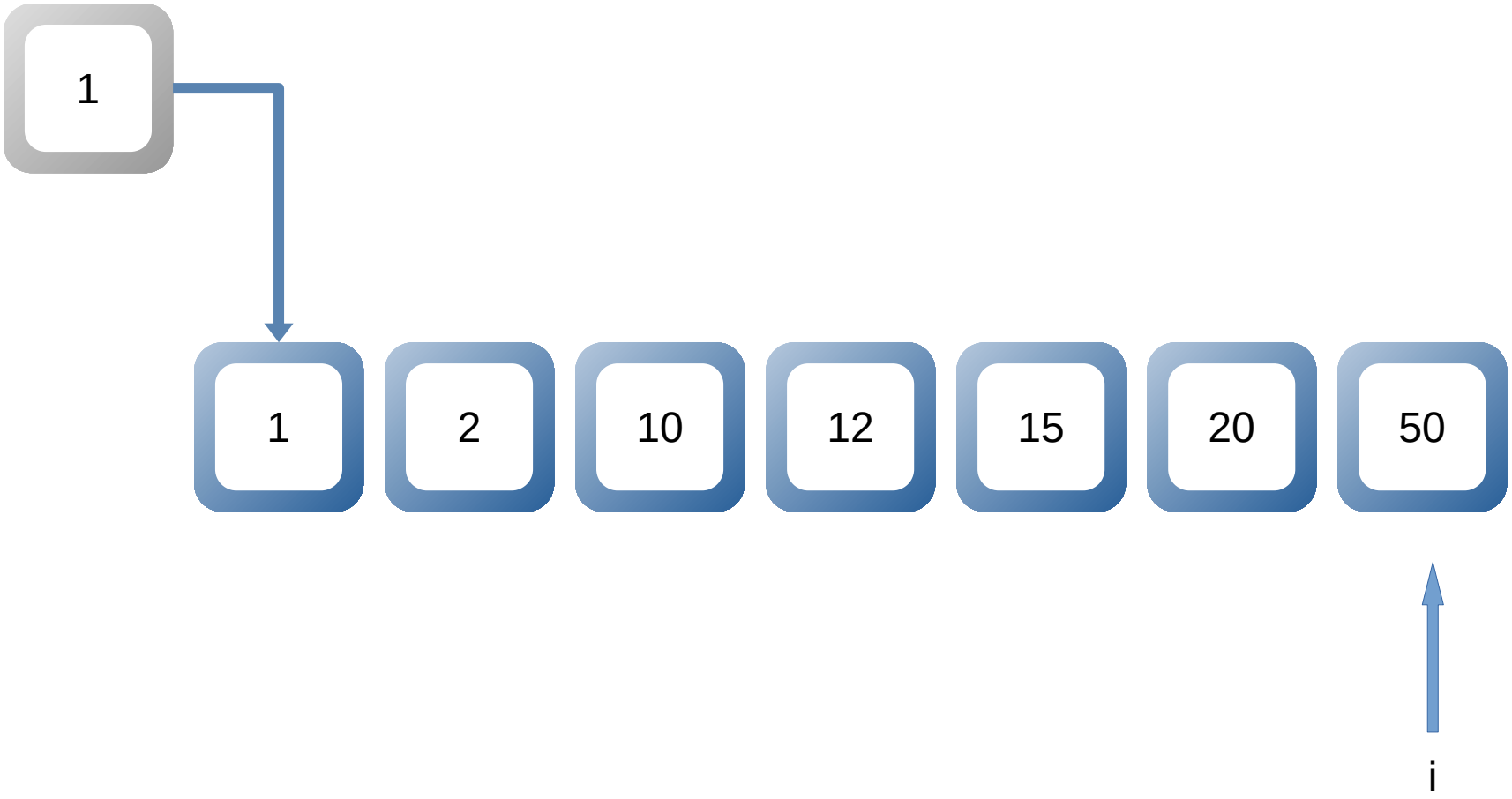
Insertion sort - pole



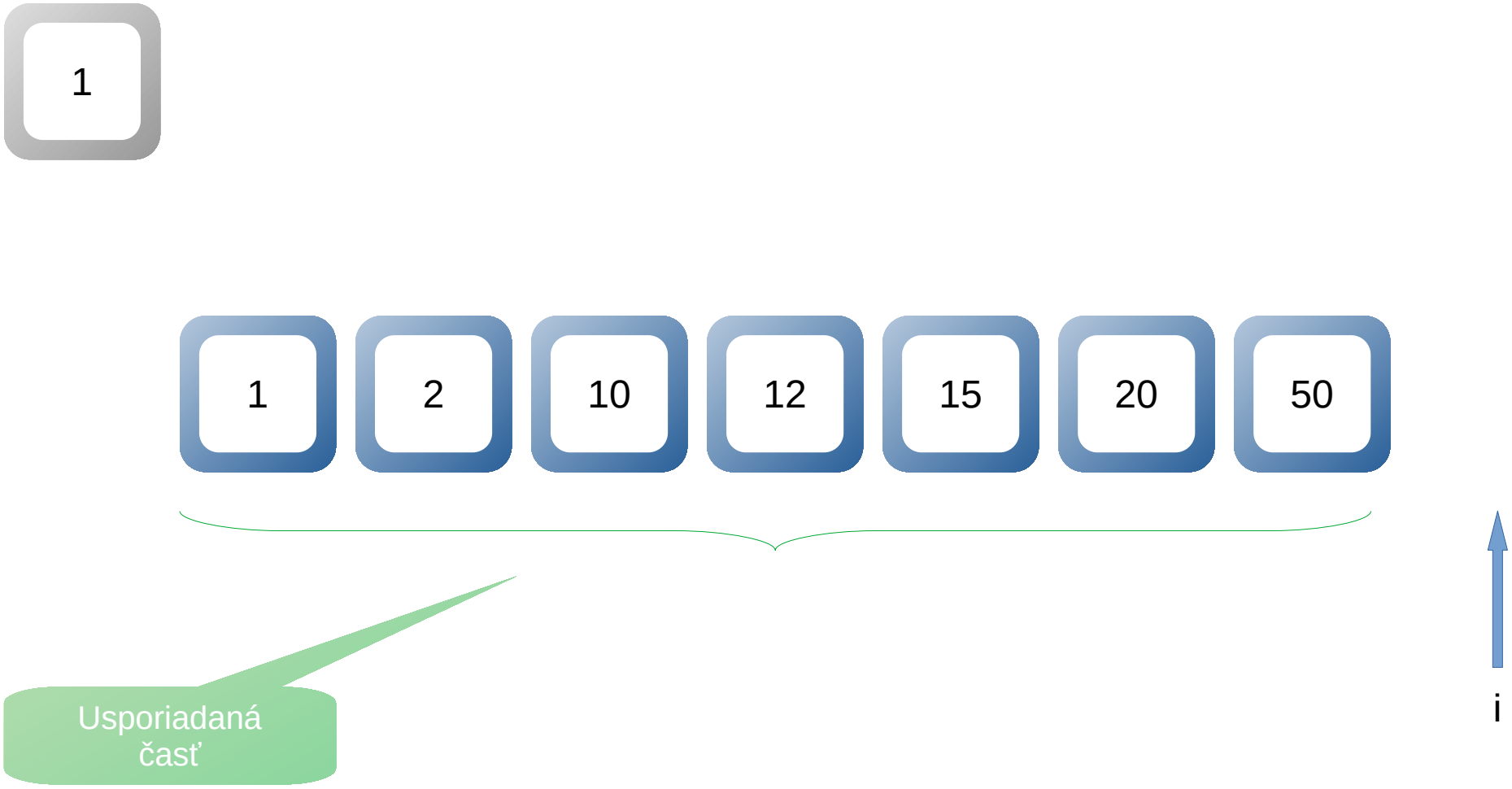
Insertion sort - pole



Insertion sort - pole



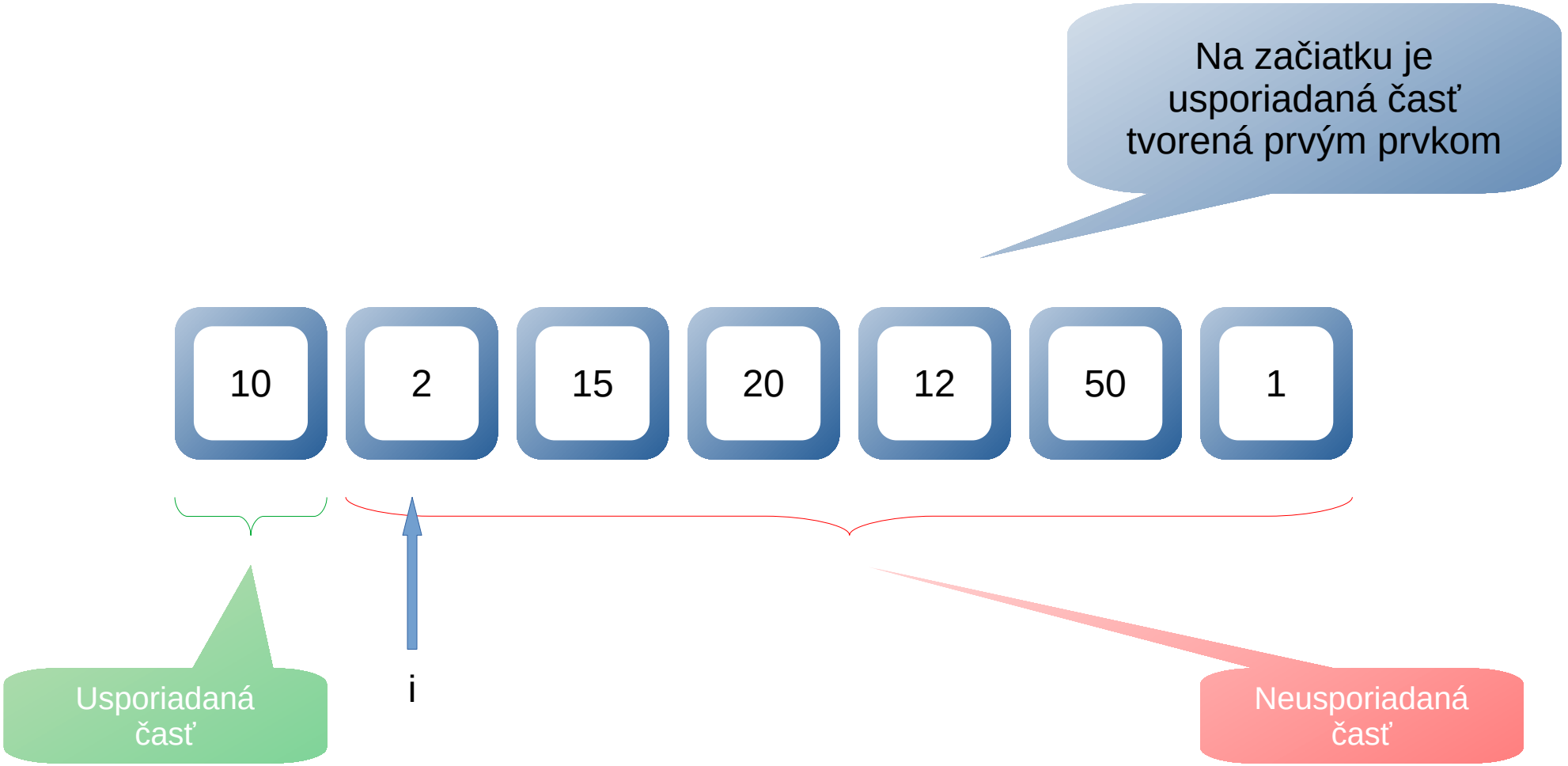
Insertion sort - pole



Implementácia na poli

(od začiatku)

Insertion sort - pole



Insertion sort - pole

Na začiatku je usporiadaná časť tvorená prvým prvkom

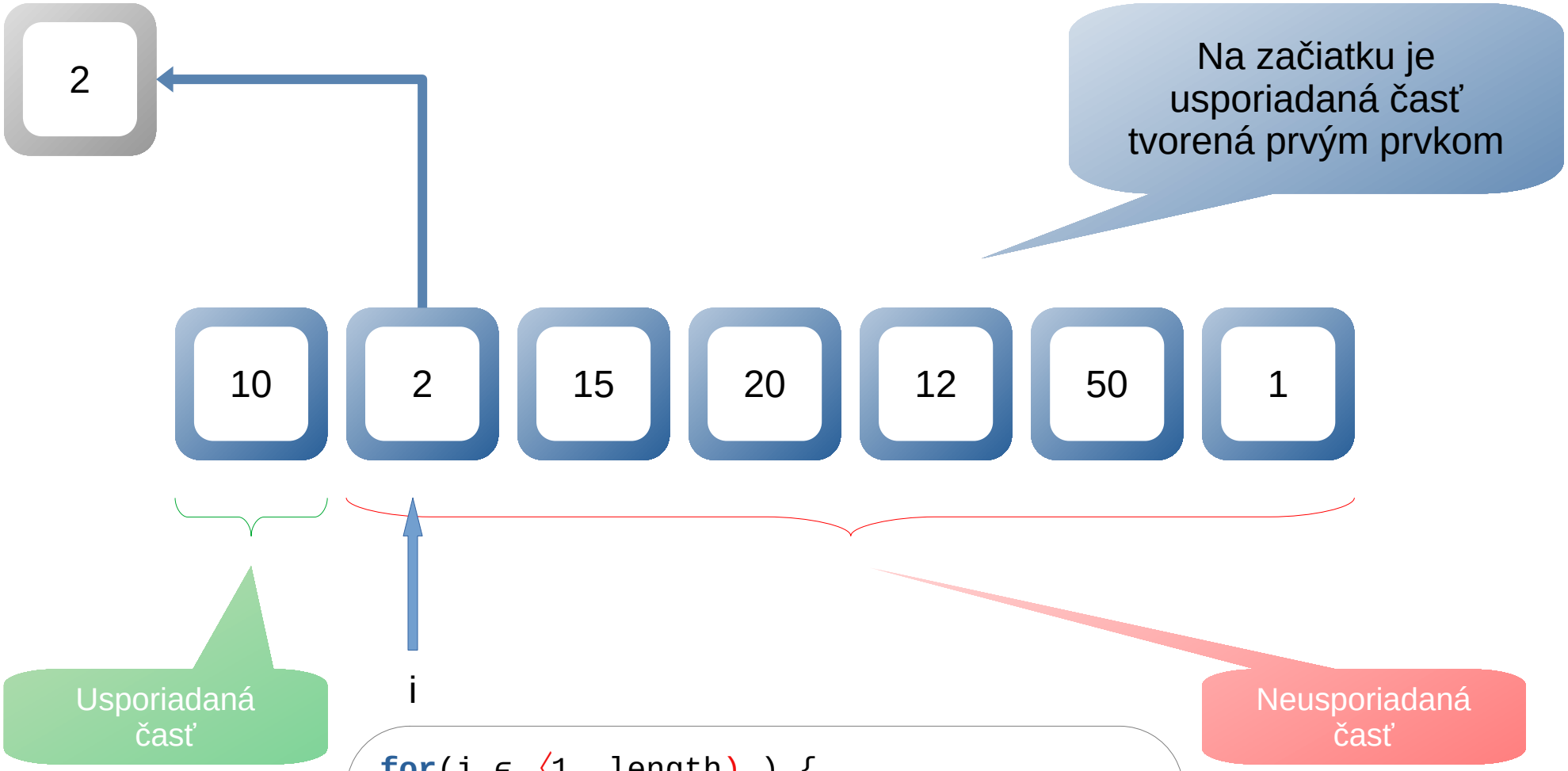
Usporiadaná časť

i

Neusporiadaná časť

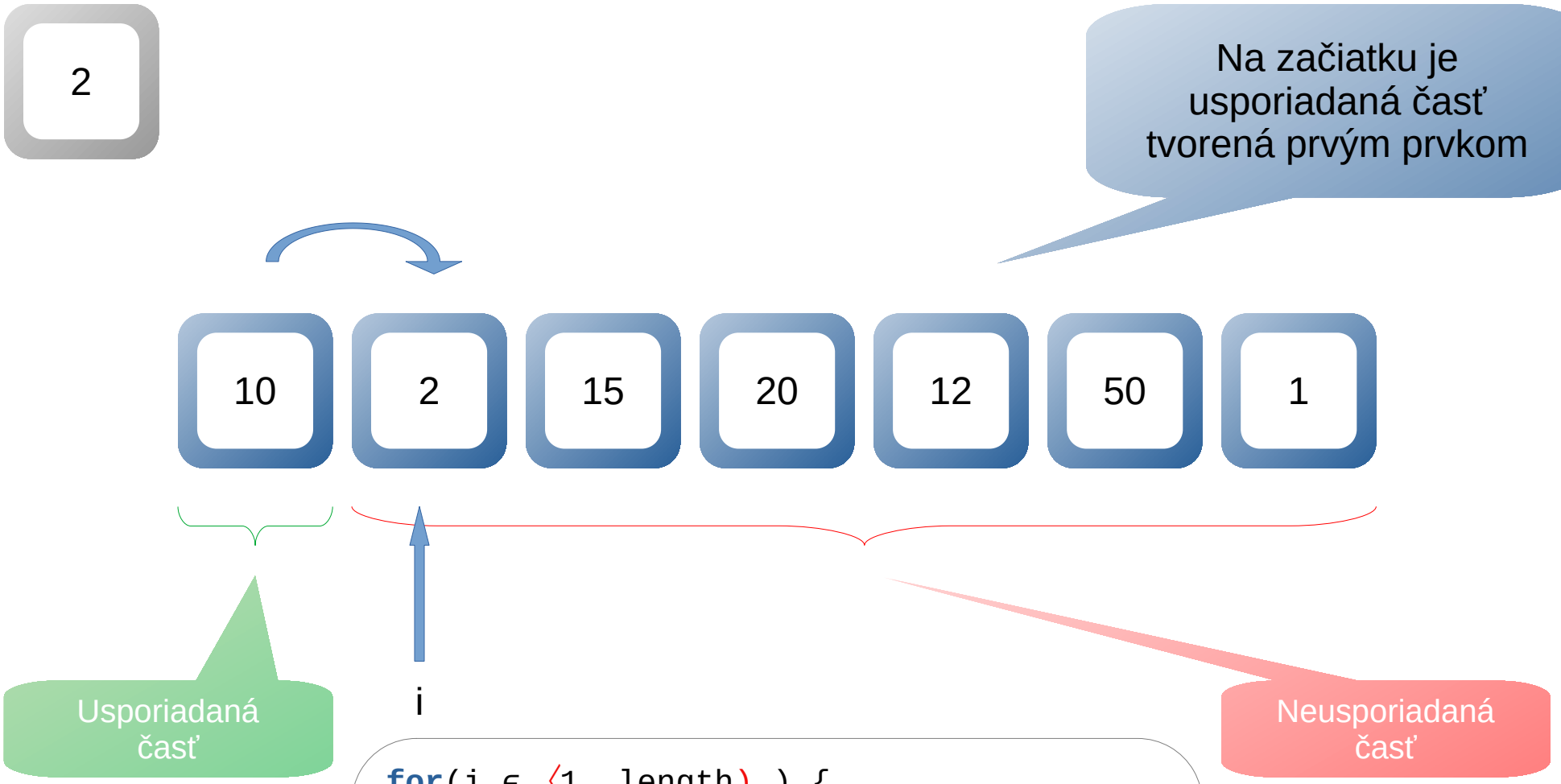
```
for(i ∈ ⟨1, length) ) {




}
```

Insertion sort - pole



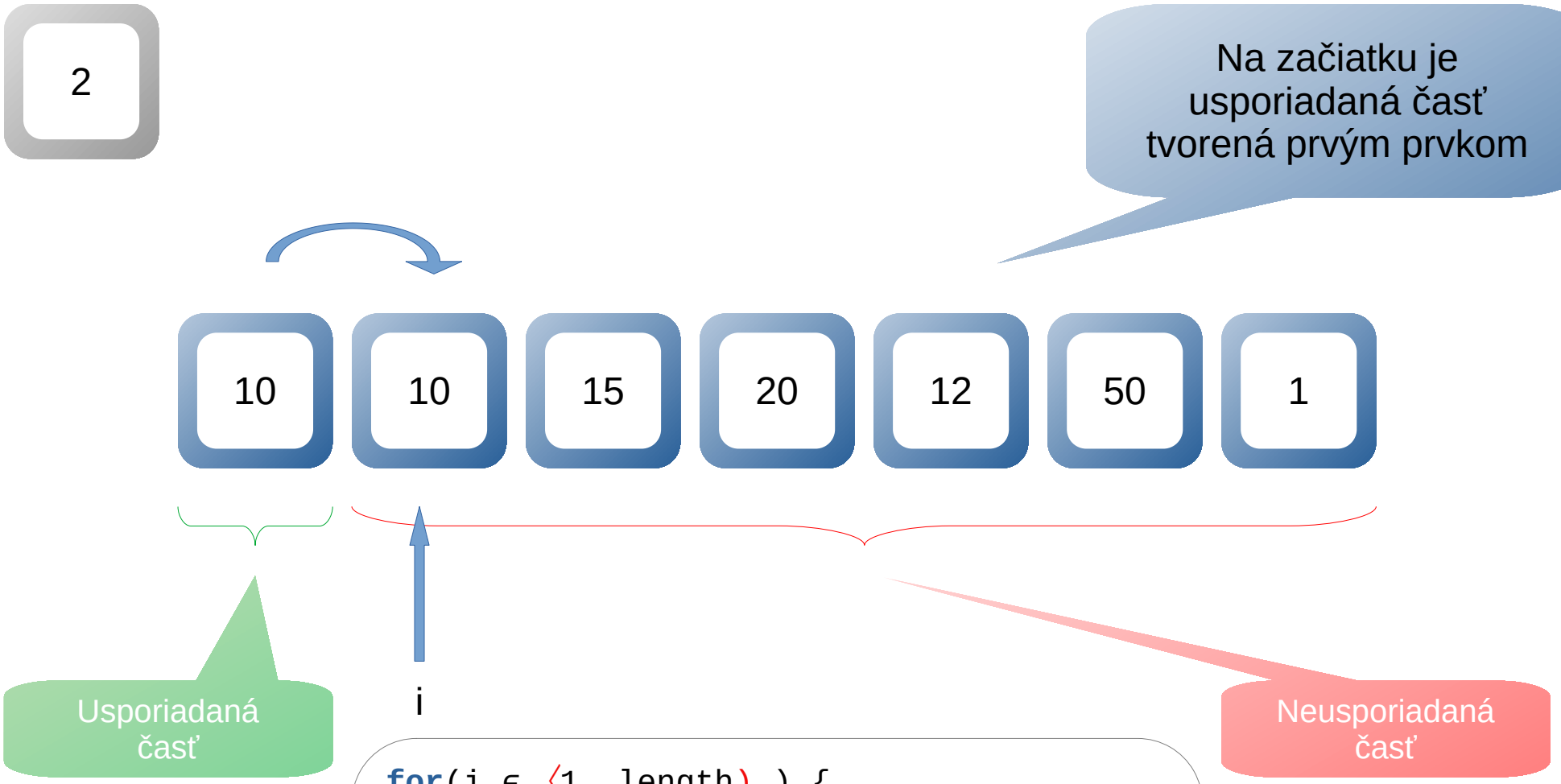

```
for(i ∈ ⟨1, length) ) {
    current = data[i]




}
```

Insertion sort - pole



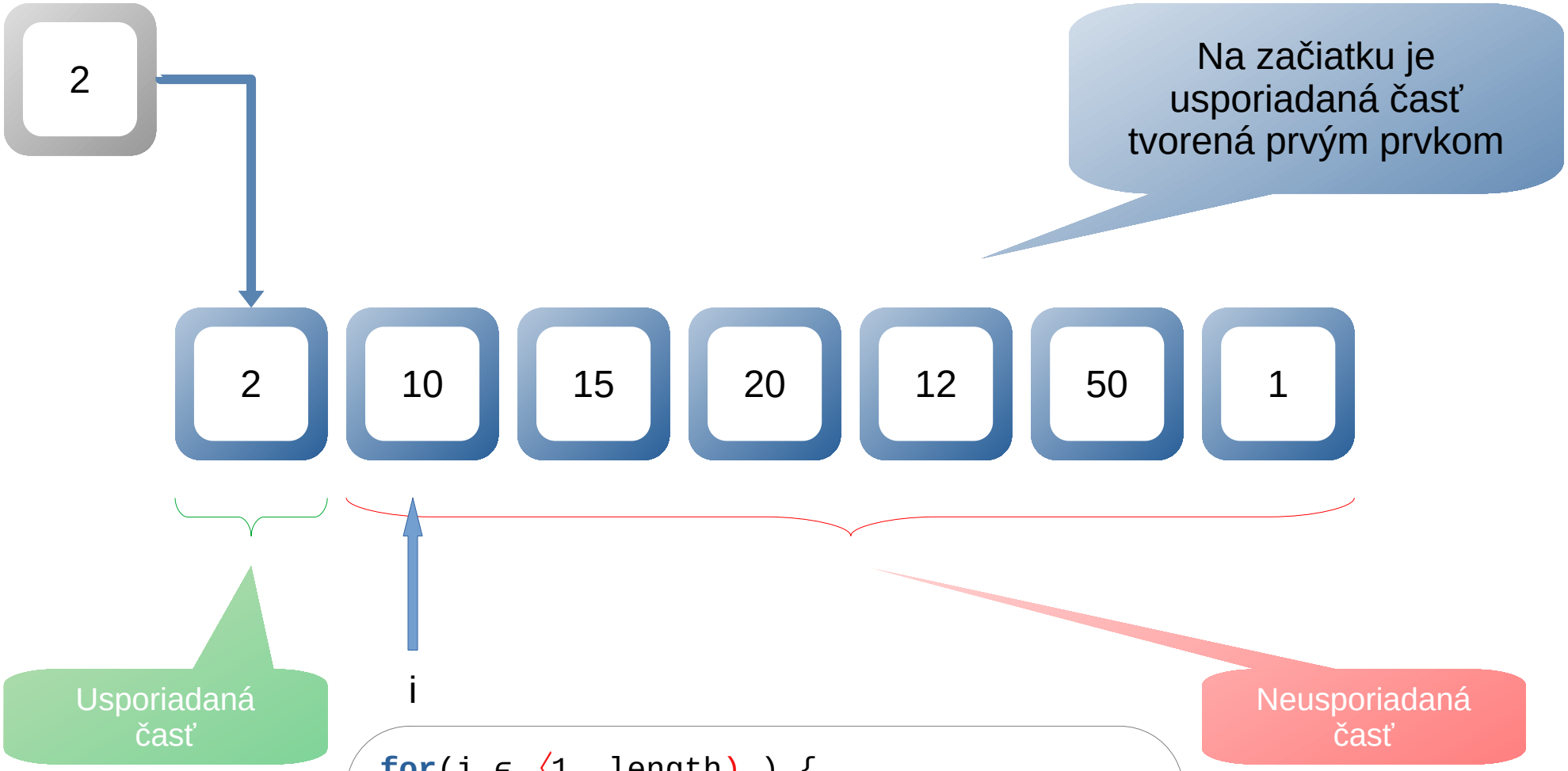

```
for(i ∈ ⟨1, length) ) {
    current = data[i]
    j = .....
    while(.........................) {
        data[j] = data[j-1]
        -- j
    }

}
```

Insertion sort - pole



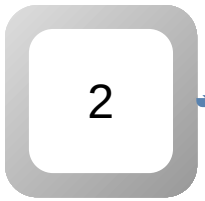

```
for(i ∈ ⟨1, length) ) {
    current = data[i]
    j = .....
    while(.........................) {
        data[j] = data[j-1]
        -- j
    }

}
```

Insertion sort - pole




```
for(i ∈ ⟨1, length) ) {
    current = data[i]
    j = .....
    while(.........................) {
        data[j] = data[j-1]
        -- j
    }
    data[j] = current
}
```

Insertion sort - pole



Na začiatku je usporiadaná časť tvorená prvým prvkom

Usporiadaná časť

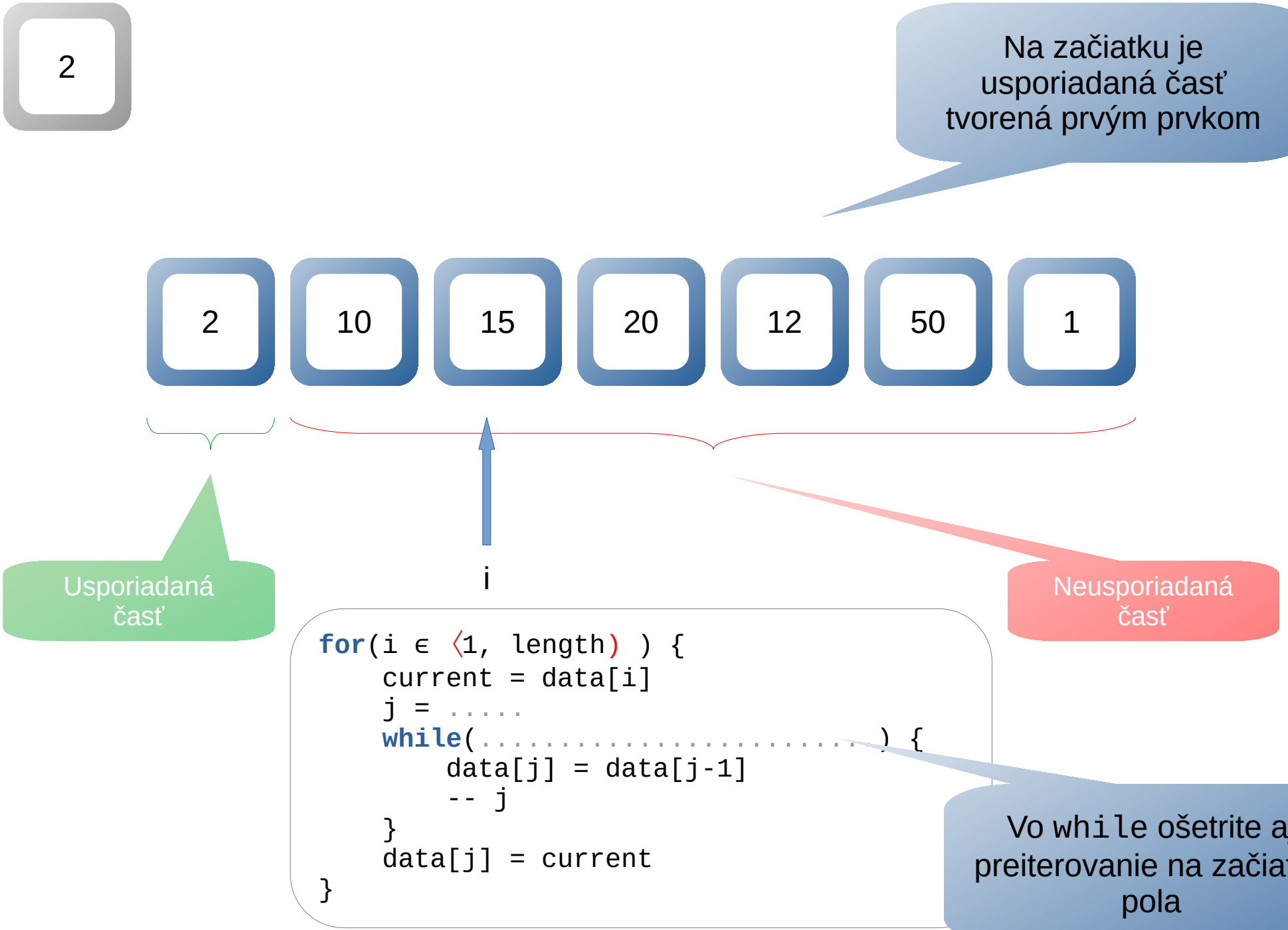
i

Neusporiadaná časť

```
for(i ∈ ⟨1, length) ) {
    current = data[i]
    j = .....
    while(.........................) {
        data[j] = data[j-1]
        -- j
    }
    data[j] = current
}
```

Vo `while` ošetrite aj preiterovanie na začiatok pola

Insertion sort - pole



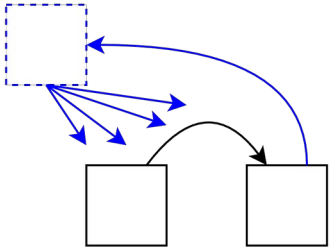
Insertion sort - pole

Implementácia?

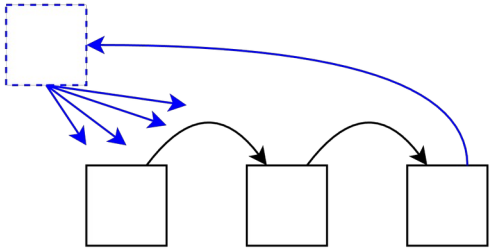
Vladislav Novák

Počet kopírovaní (maximálny počet)

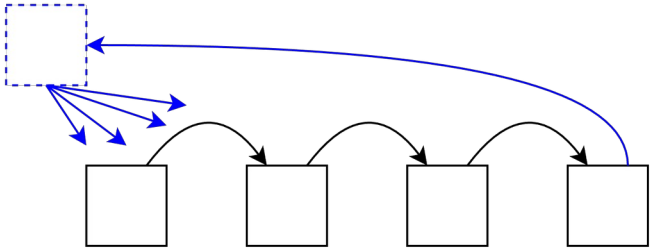
0 | n' = 1



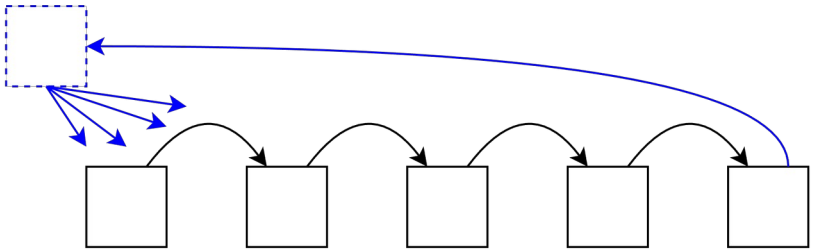
1 + 2 = 3 | n' = 2 | 0 + 3 = 3



2 + 2 = 4 | n' = 3 | 0 + 3 + 4 = 7



3 + 2 = 5 | n' = 4 | 0 + 3 + 4 + 5 = 12

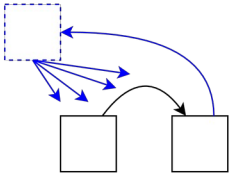


4 + 2 = 6 | n' = 5 | 0 + 3 + 4 + 5 + 6 = 18

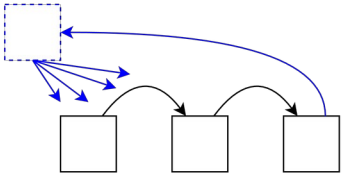
Vladislav Novák

Počet kopírovaní (maximálny počet)

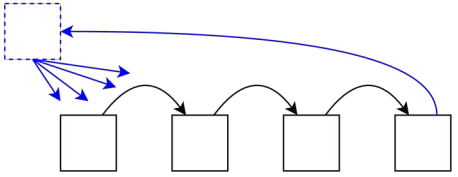
0 | n' = 1



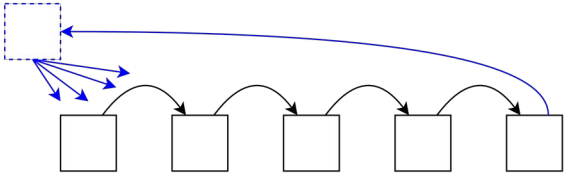
1 + 2 = 3 | n' = 2 | 0 + 3 = 3



2 + 2 = 4 | n' = 3 | 0 + 3 + 4 = 7



3 + 2 = 5 | n' = 4 | 0 + 3 + 4 + 5 = 12



4 + 2 = 6 | n' = 5 | 0 + 3 + 4 + 5 + 6 = 18

n' = 6 | 0 + 3 + 4 + 5 + 6 + 7 = 25

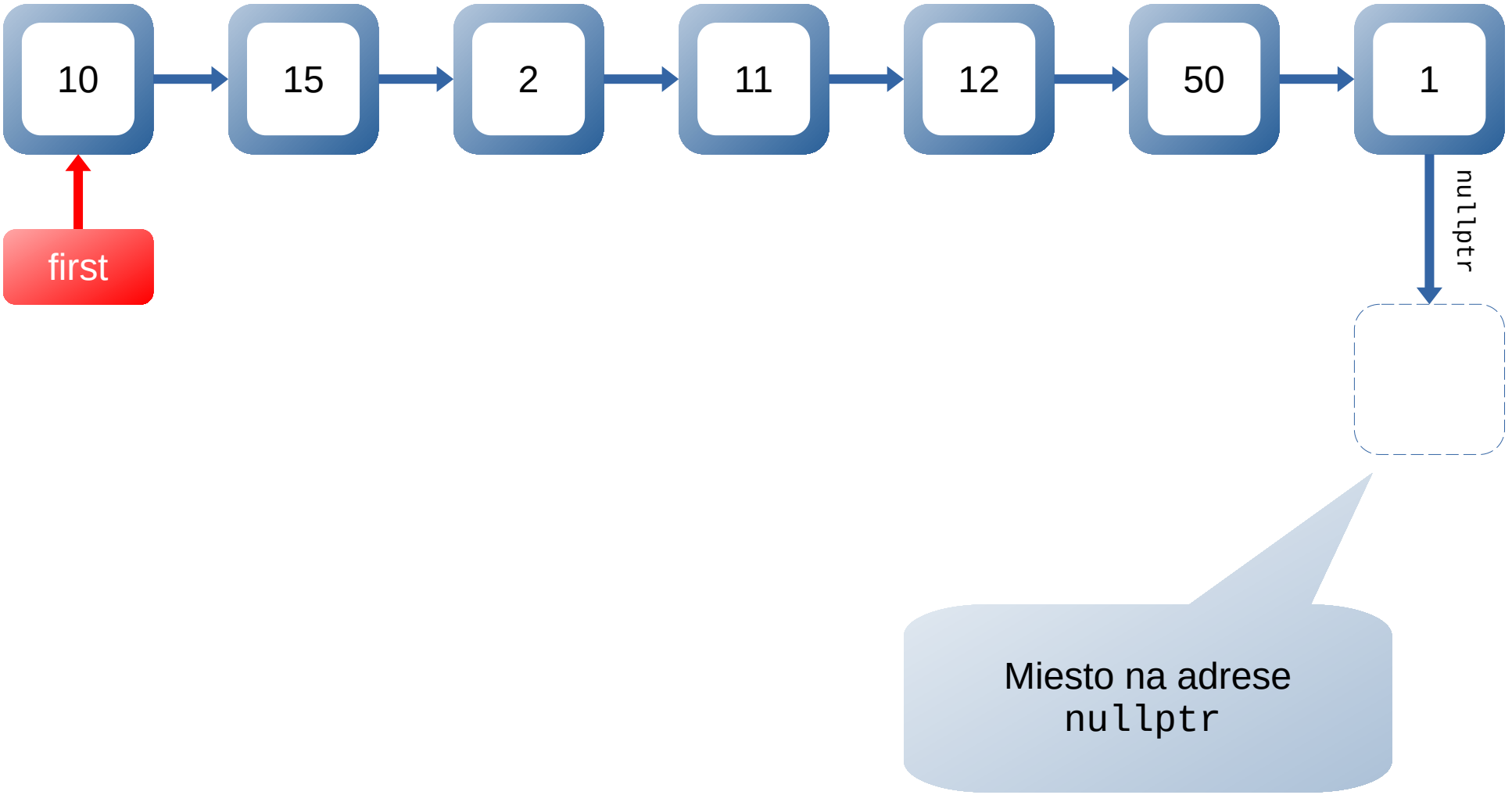
n' = 7 | 0 + 3 + 4 + 5 + 6 + 7 + 8 = 33

$$\sum_{x=3}^{n+1} = \frac{(3+(n+1))(n-1)}{2} = \frac{(n+4)(n-1)}{2} = \frac{n^2+3n-4}{2} = 1/2n^2 + 3/2n - 2 \sim n^2$$

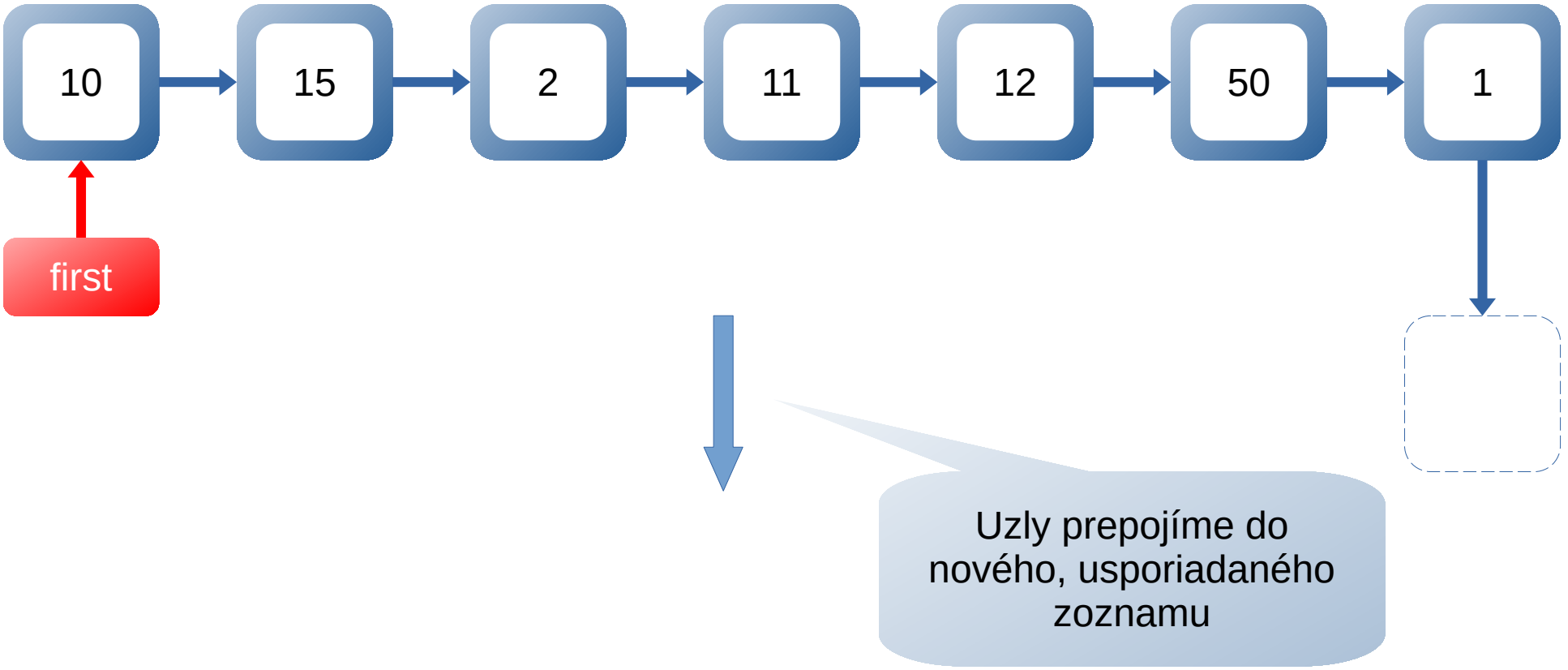
Vladislav Novák

Zreťazený zoznam

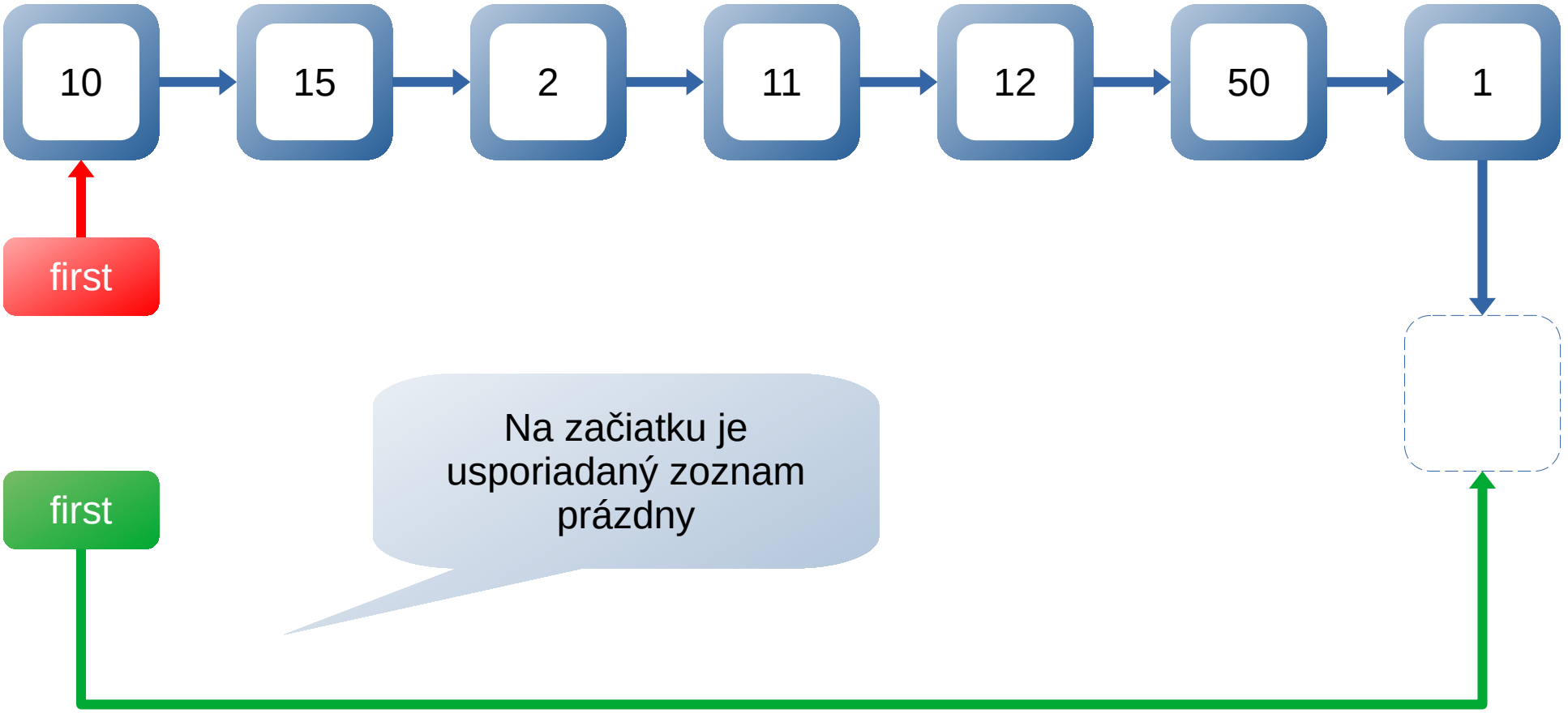
Insertion sort – zreťazený zoznam



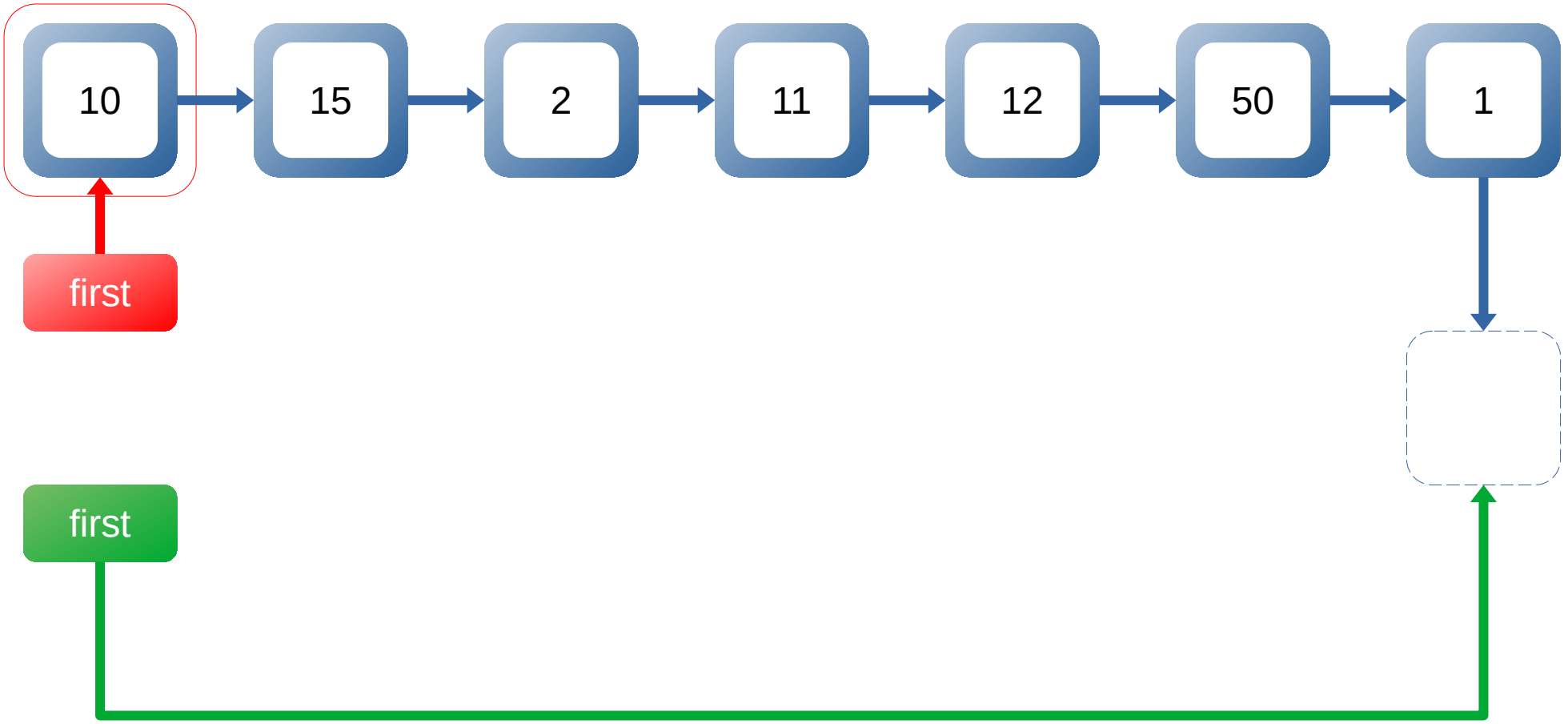
Insertion sort – zreťazený zoznam



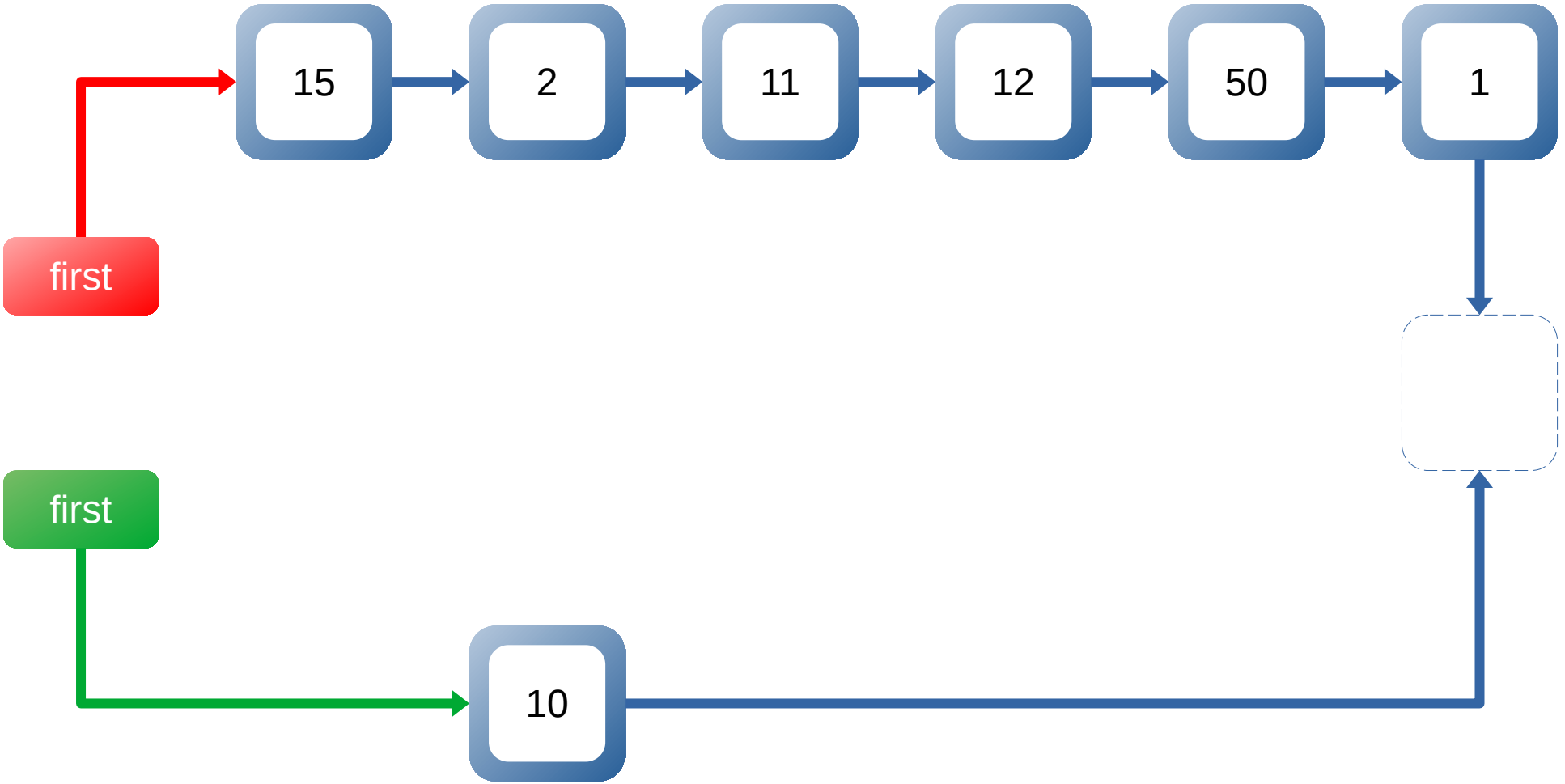
Insertion sort – zreťazený zoznam



Insertion sort – zreťazený zoznam

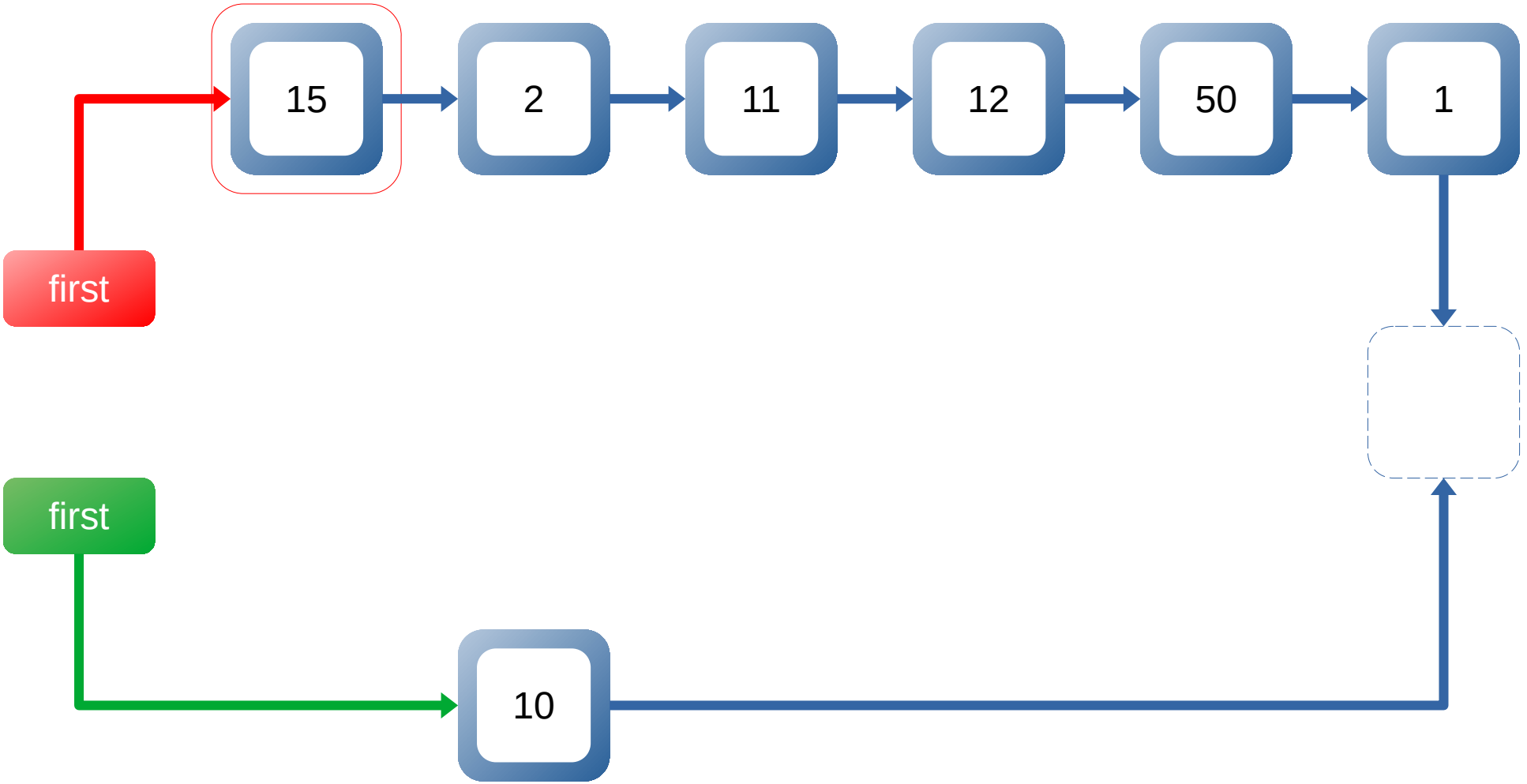


Insertion sort – zreťazený zoznam

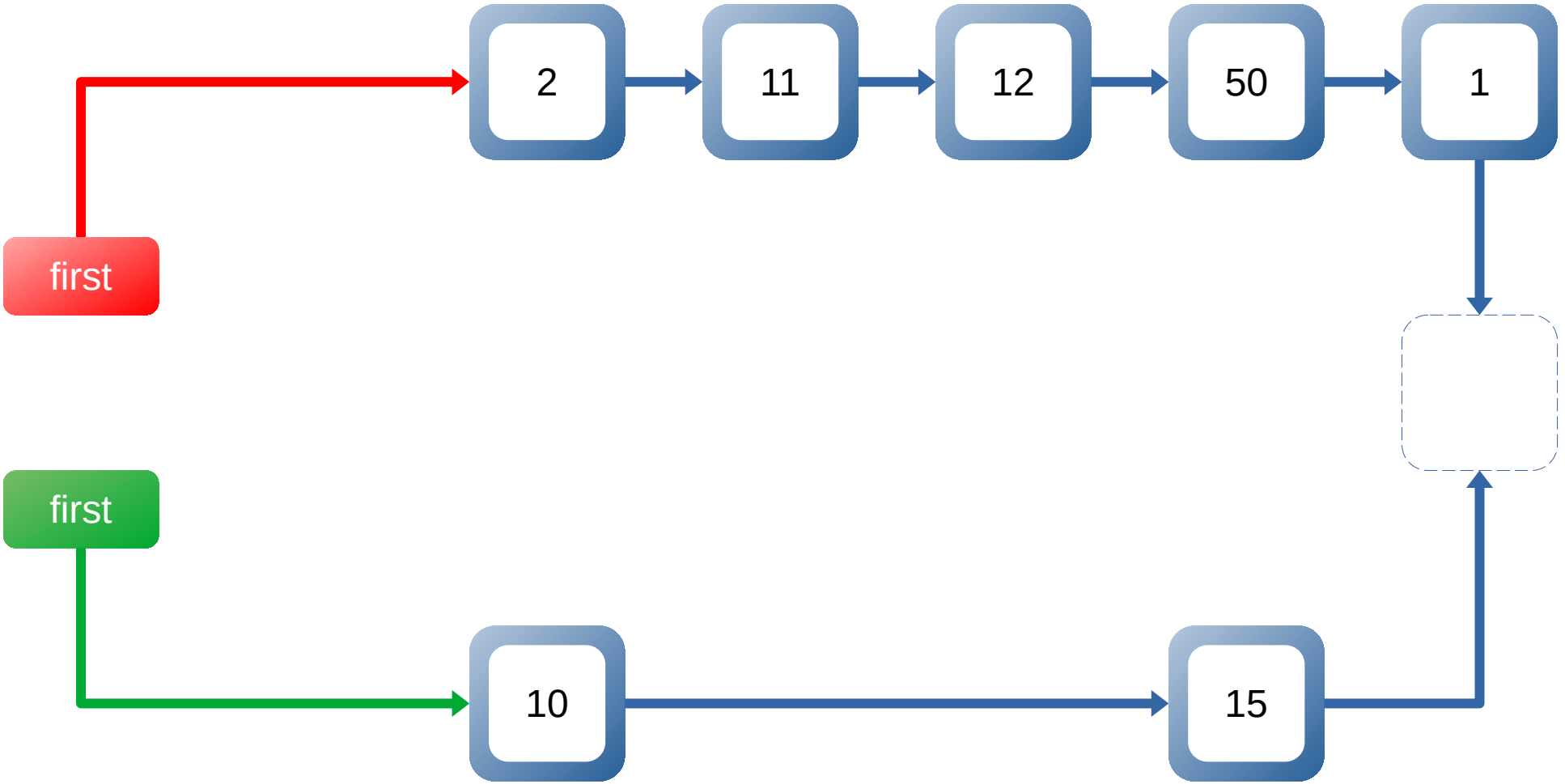


Vladislav Novák

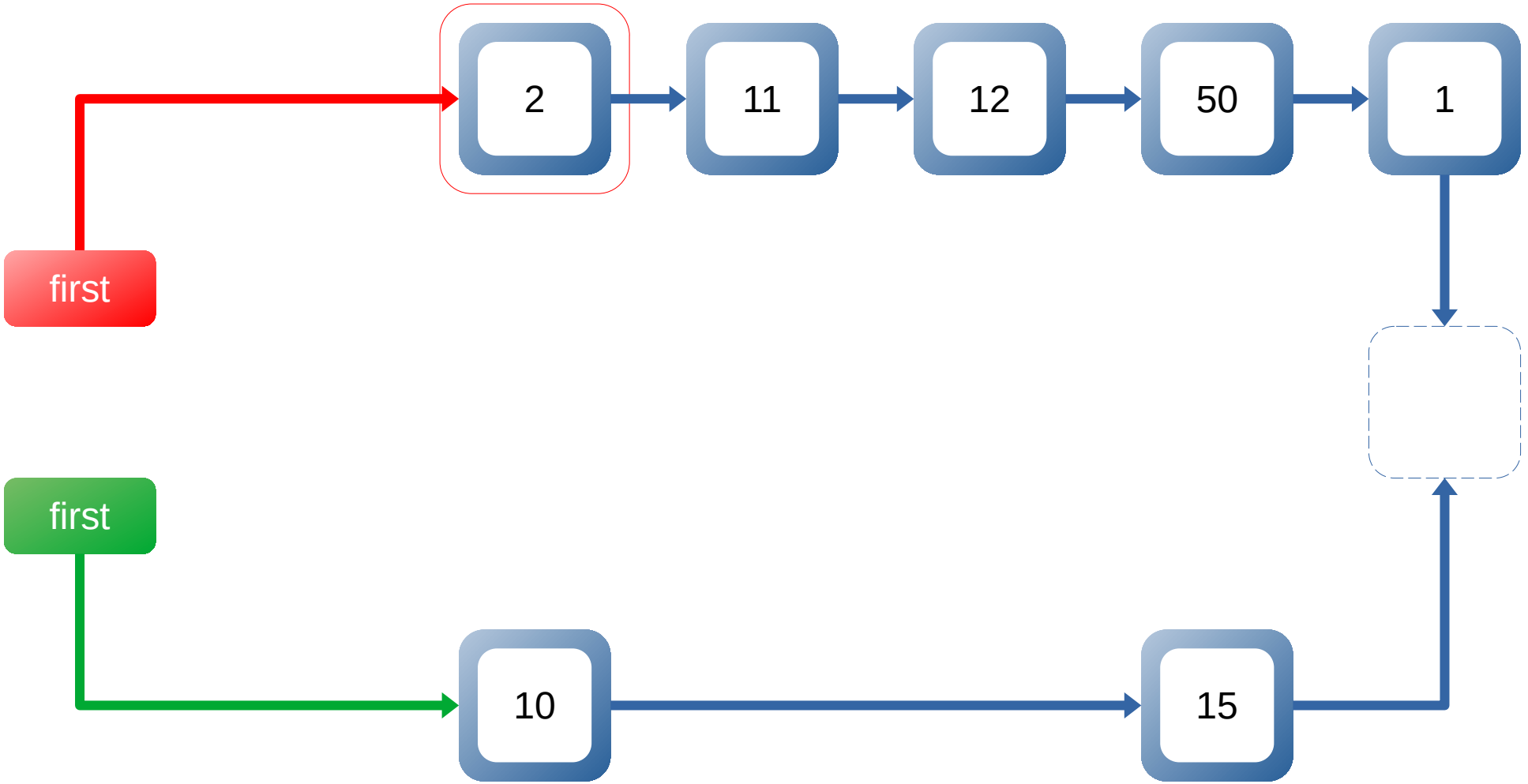
Insertion sort – zreťazený zoznam



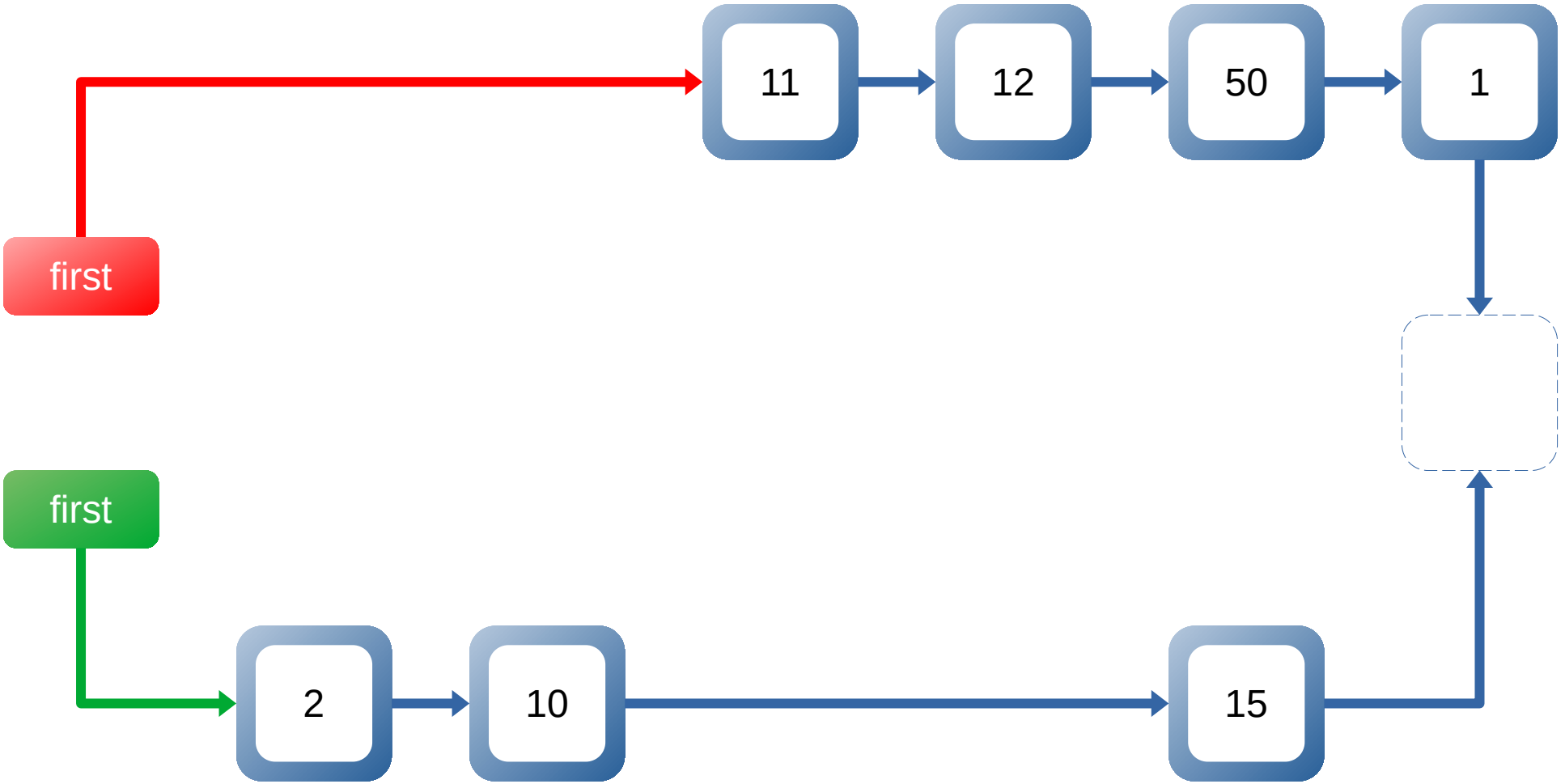
Insertion sort – zreťazený zoznam



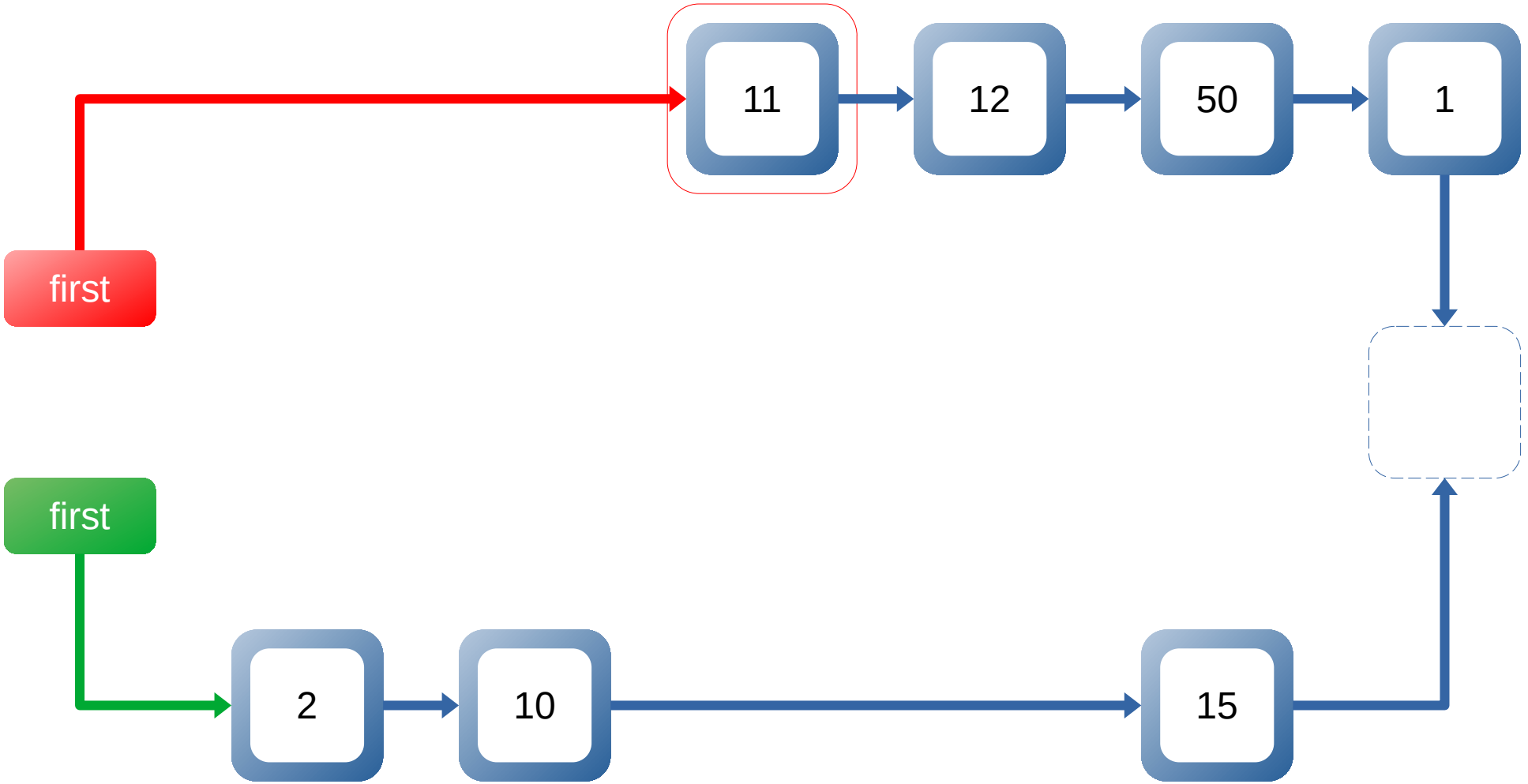
Insertion sort – zreťazený zoznam



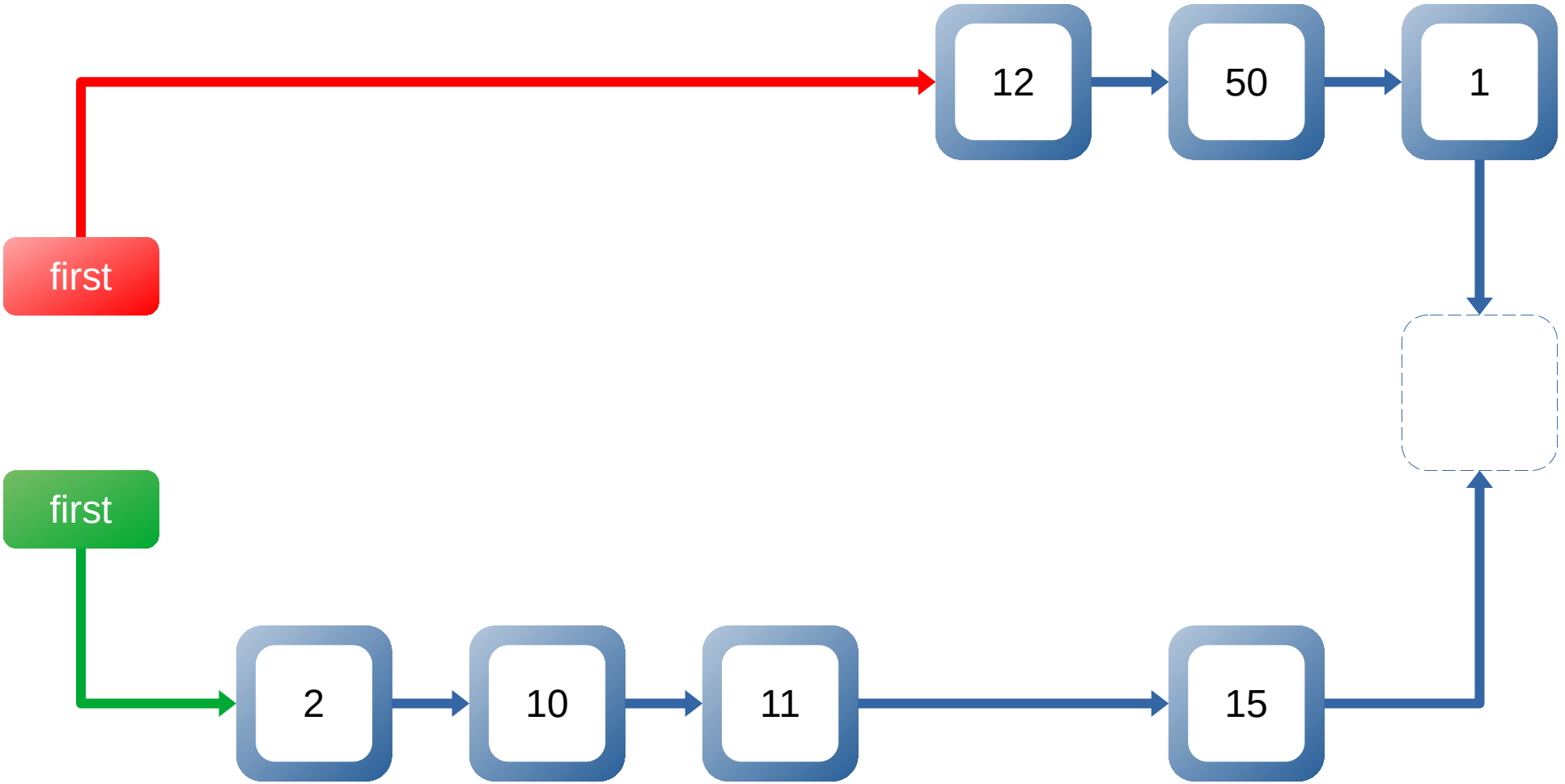
Insertion sort – zreťazený zoznam



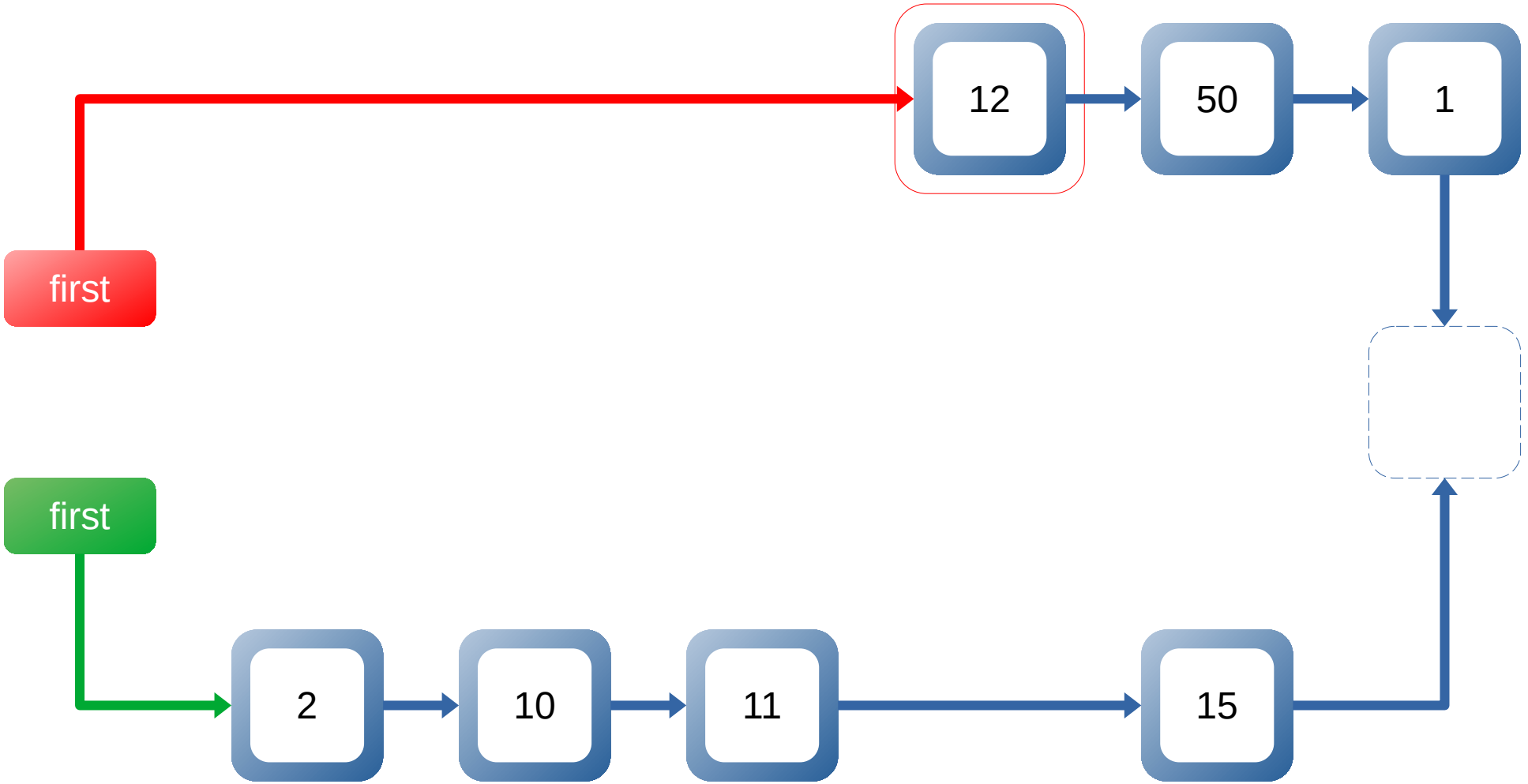
Insertion sort – zreťazený zoznam



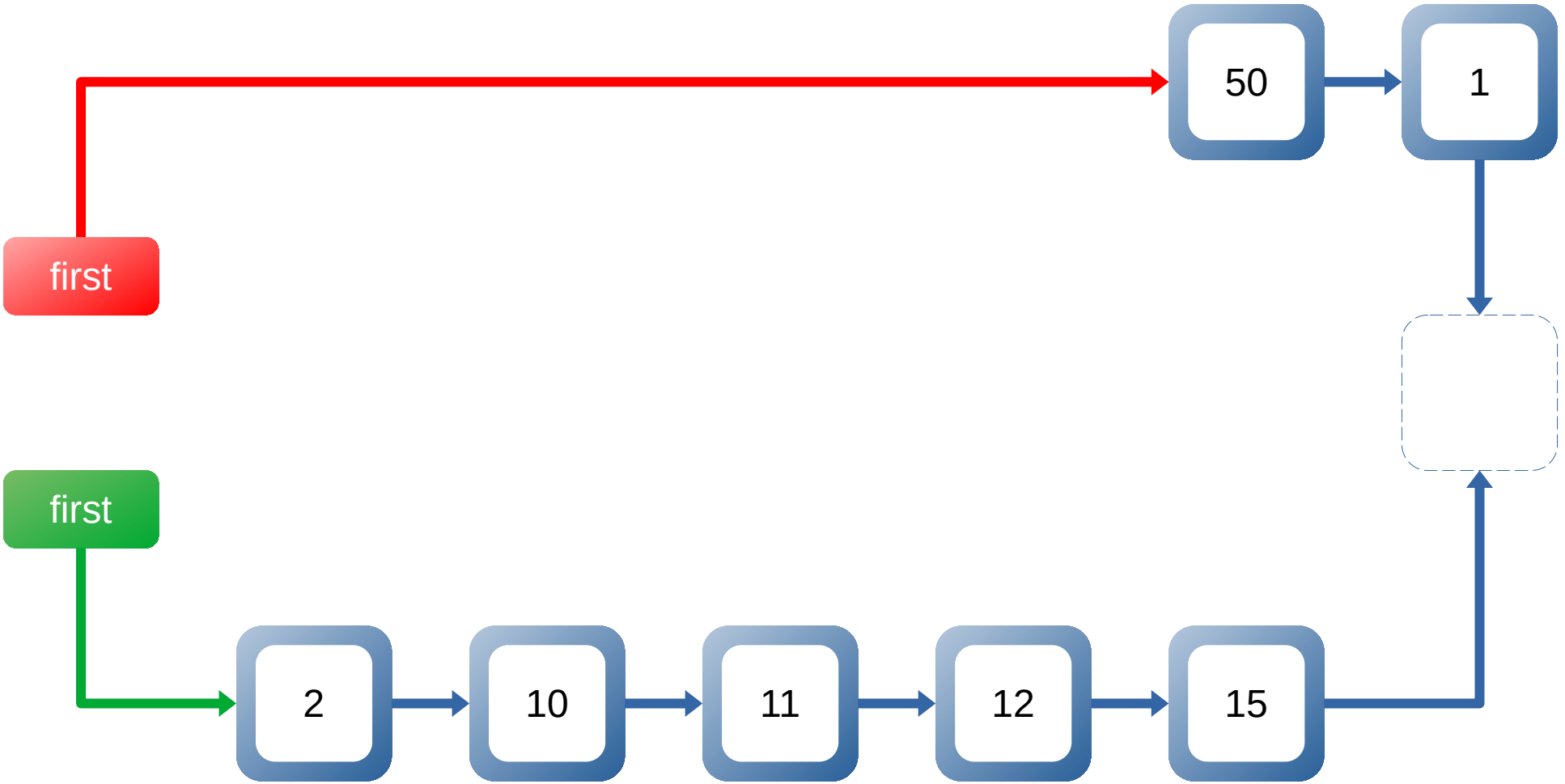
Insertion sort – zreťazený zoznam



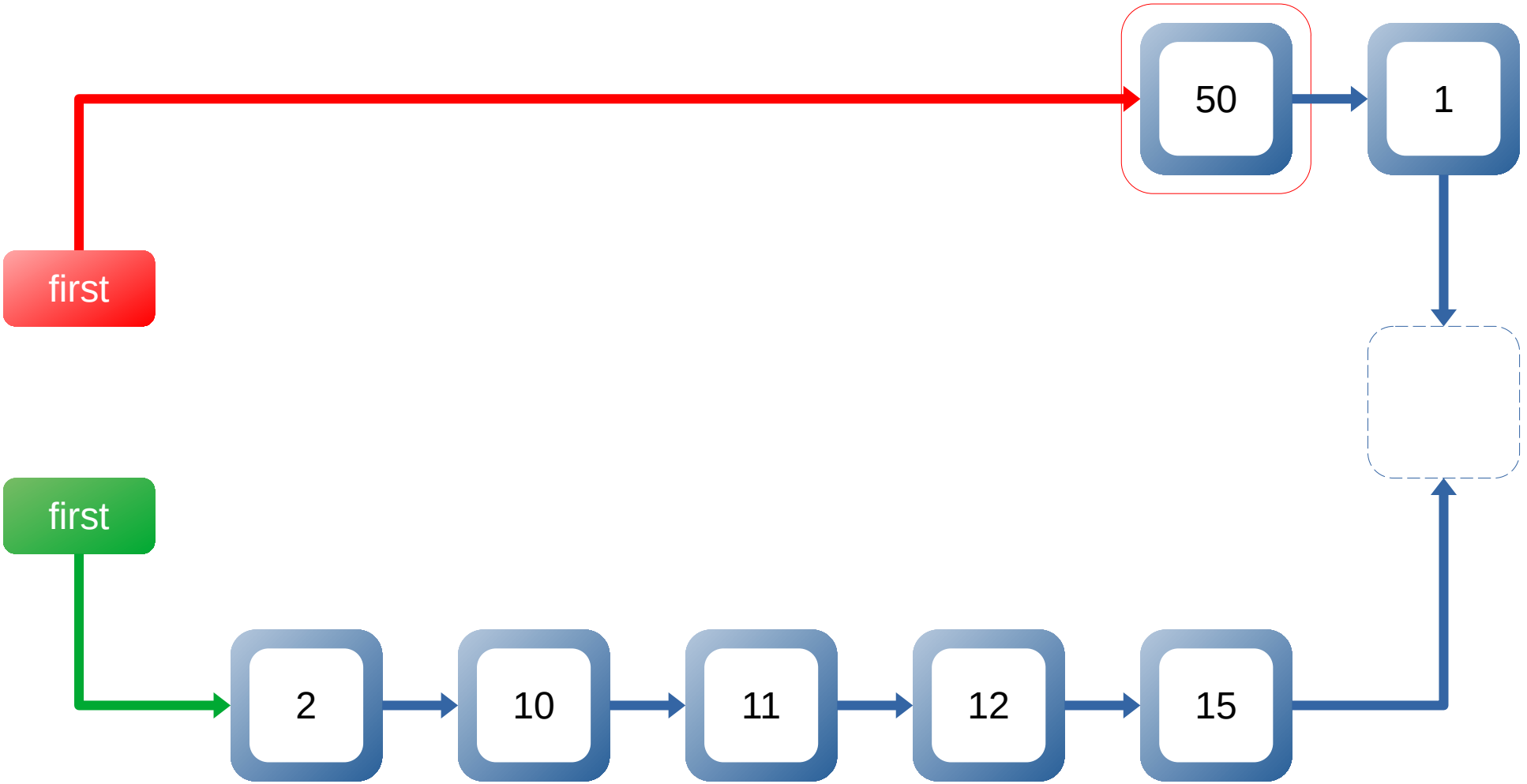
Insertion sort – zreťazený zoznam



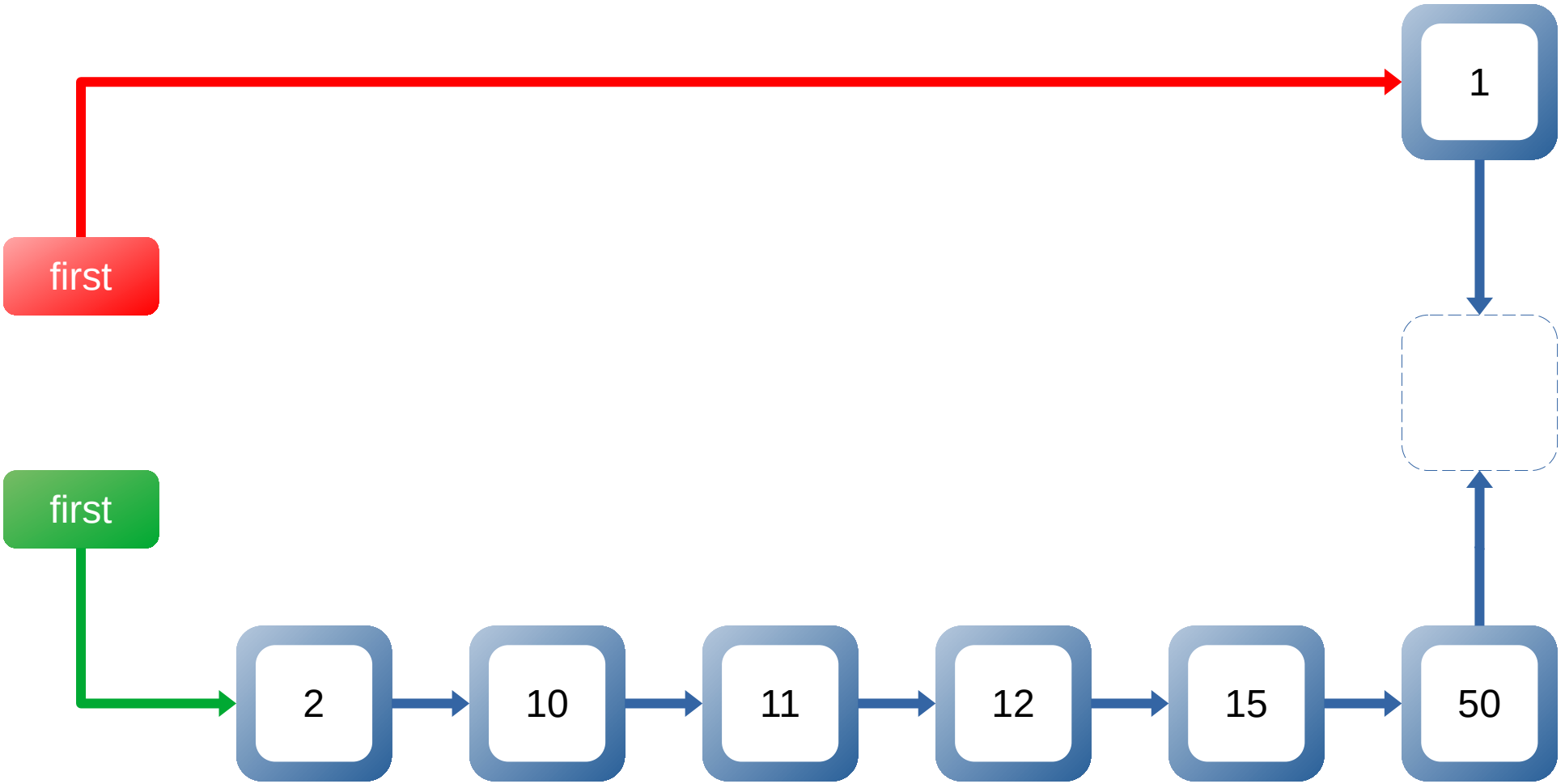
Insertion sort – zreťazený zoznam



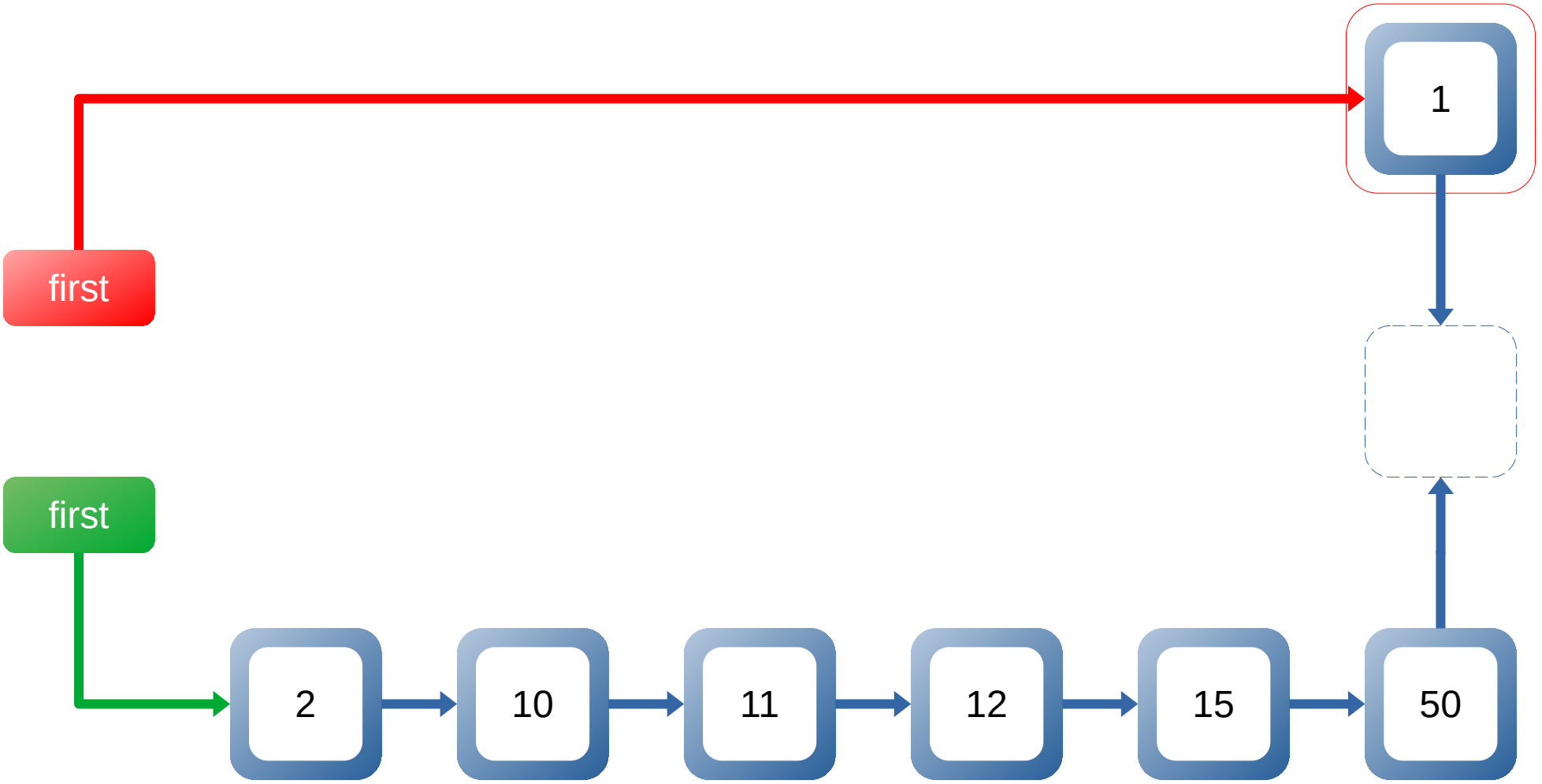
Insertion sort – zreťazený zoznam



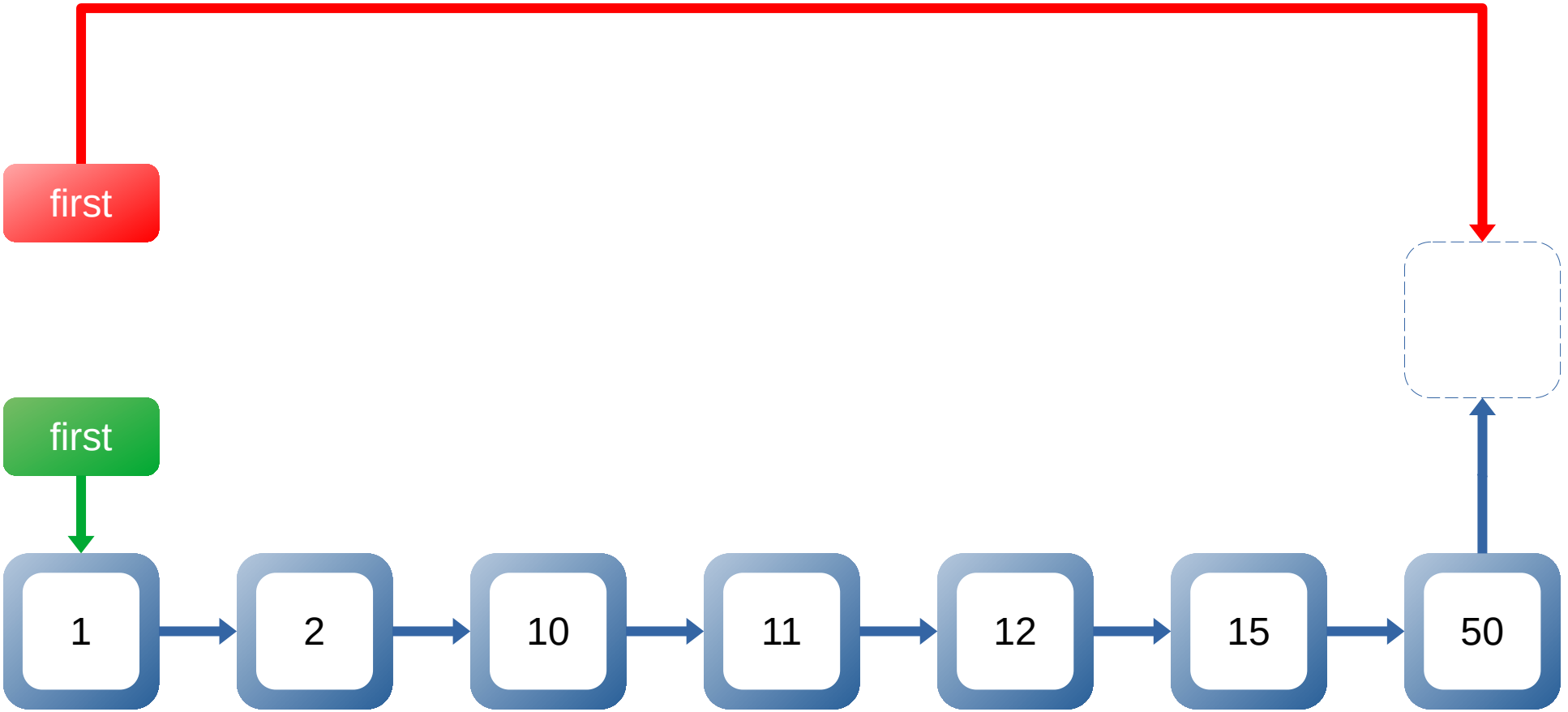
Insertion sort – zreťazený zoznam



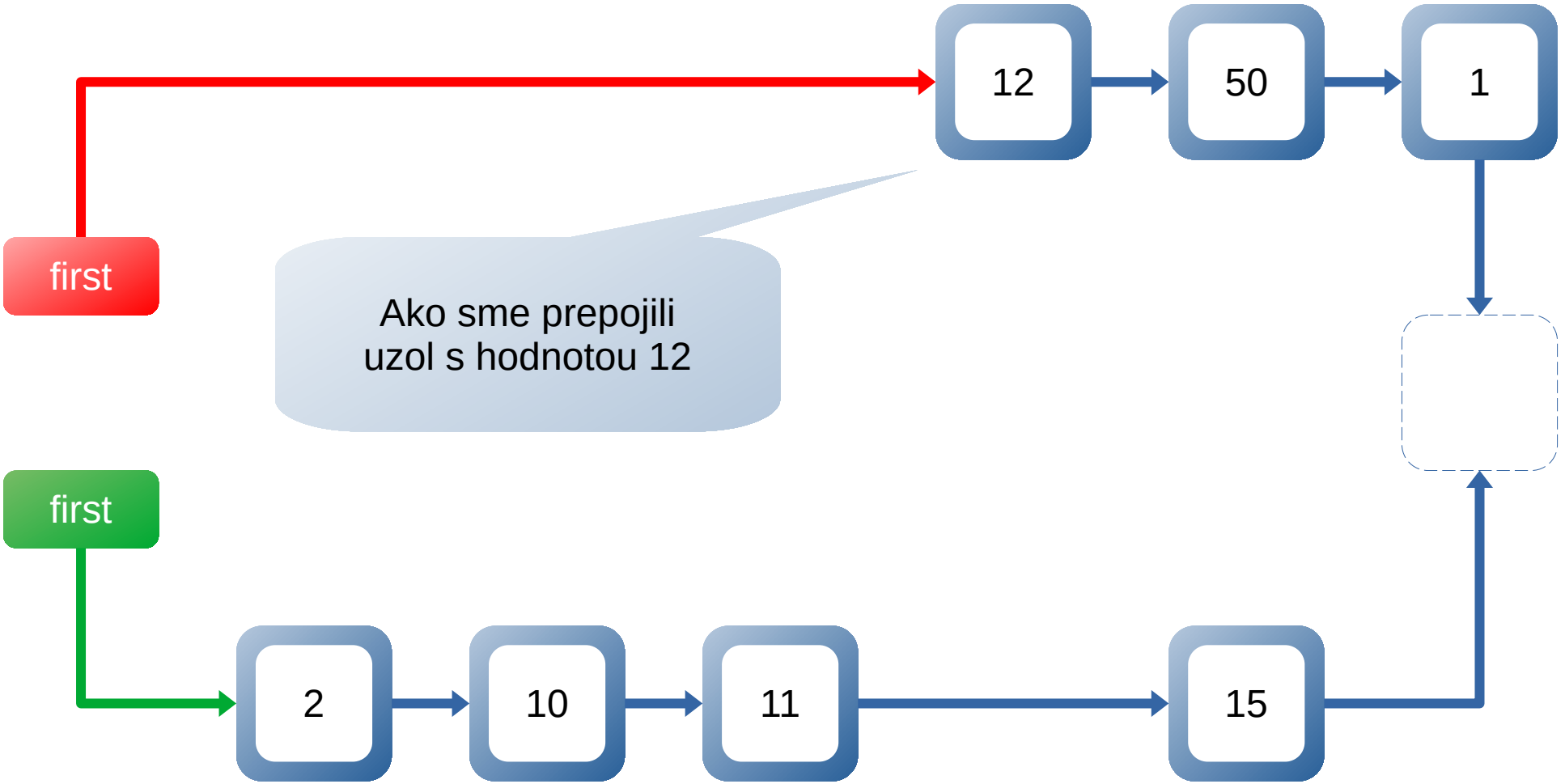
Insertion sort – zreťazený zoznam



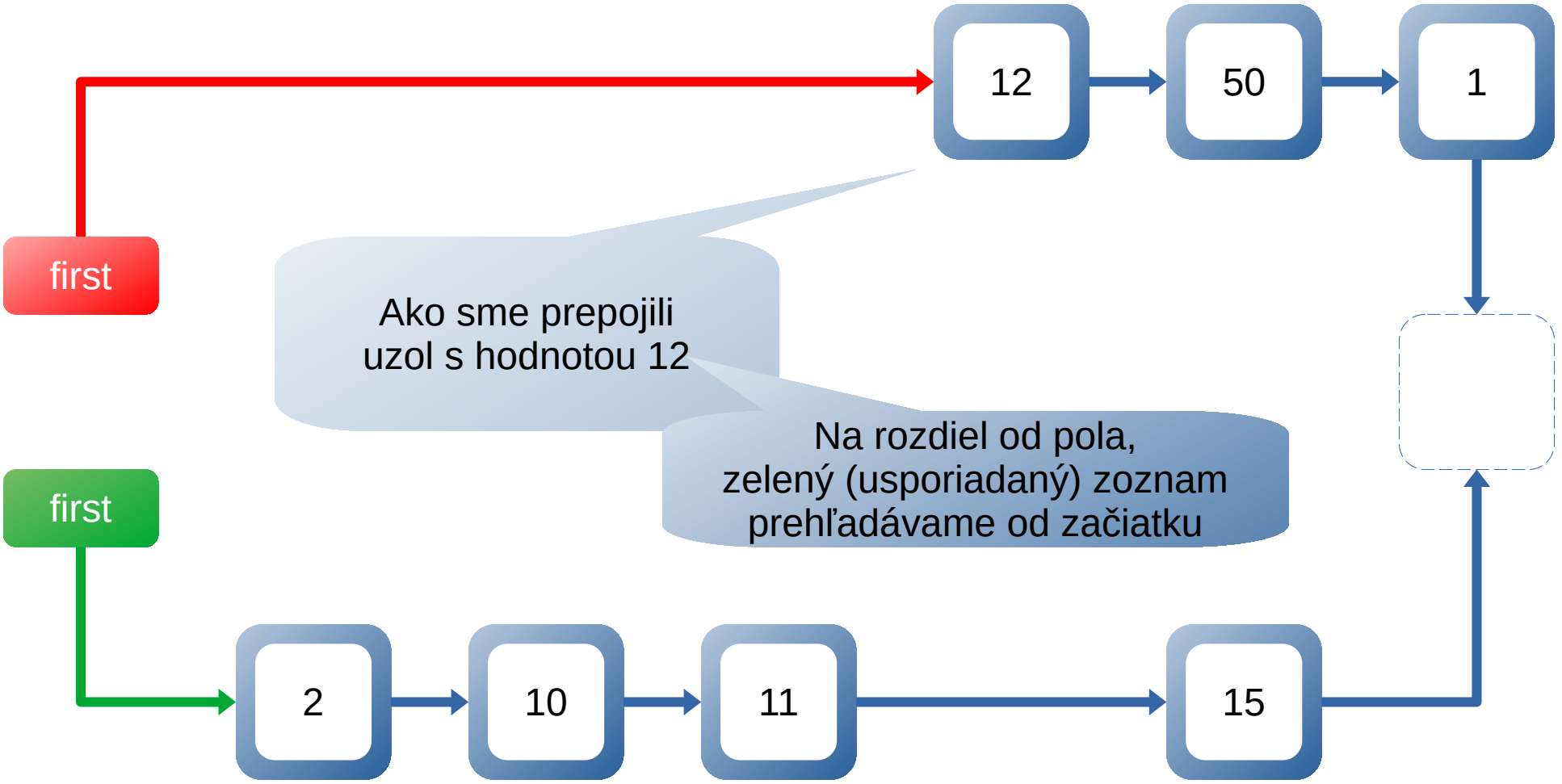
Insertion sort – zreťazený zoznam



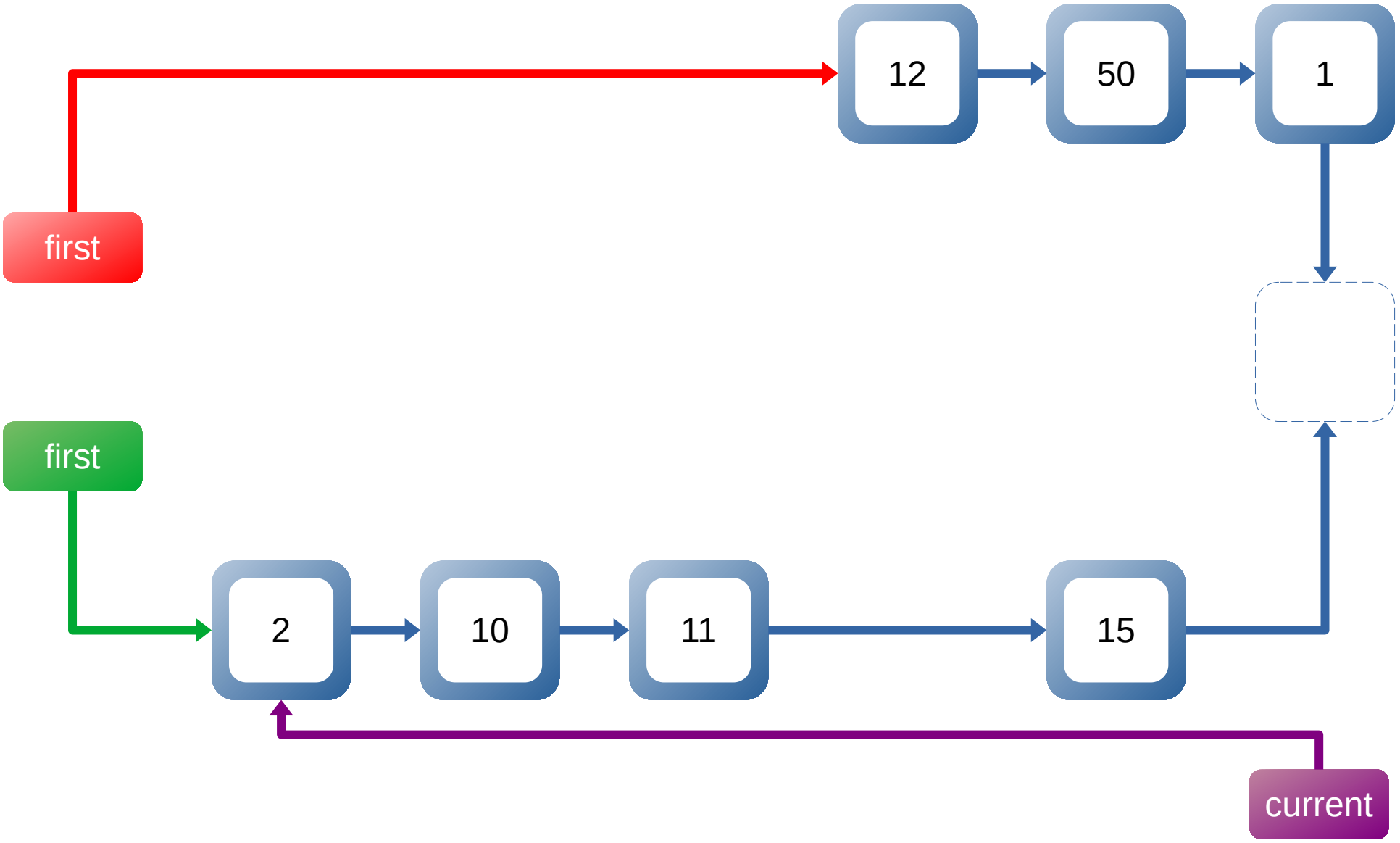
Insertion sort – zreťazený zoznam



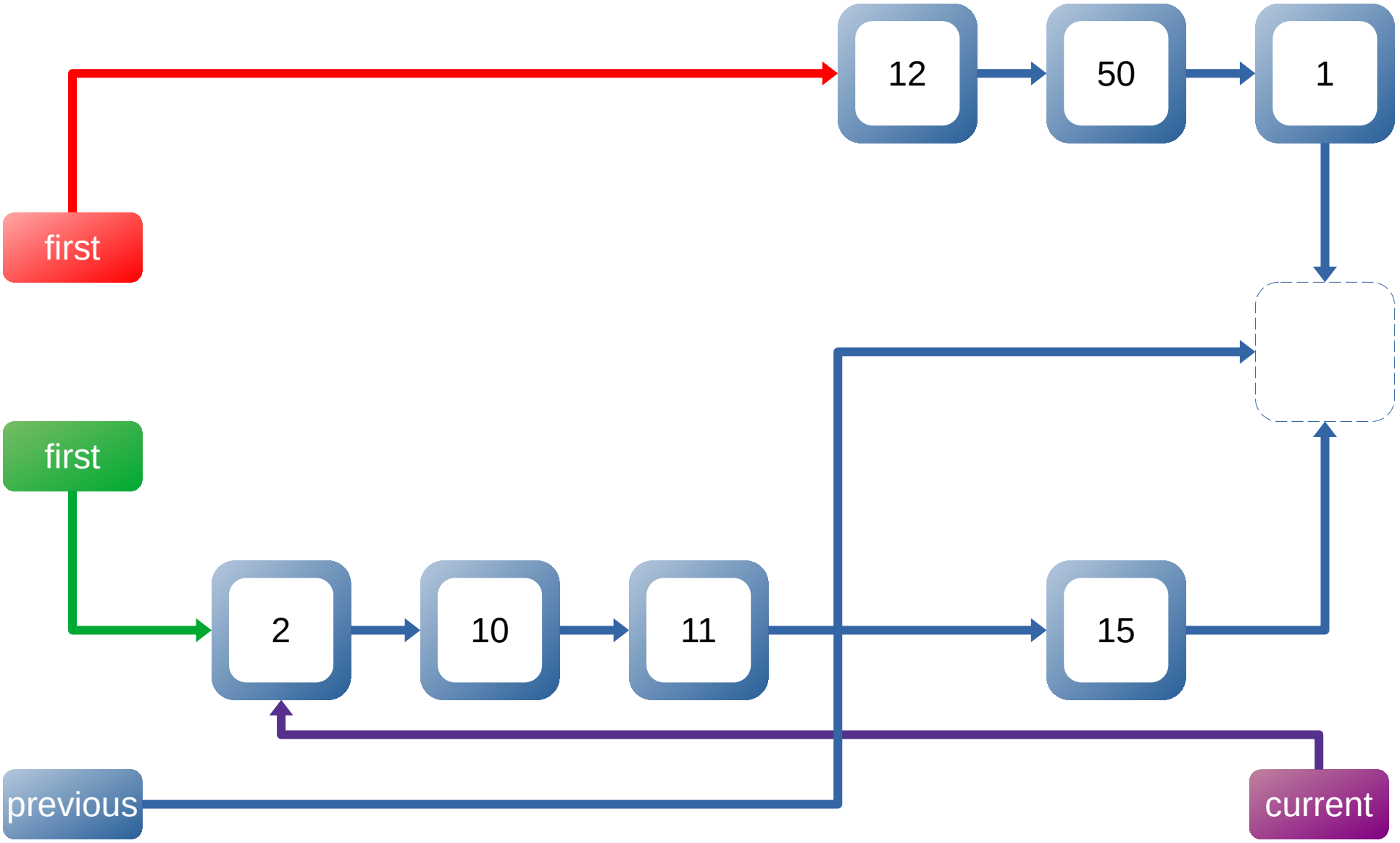
Insertion sort – zreťazený zoznam



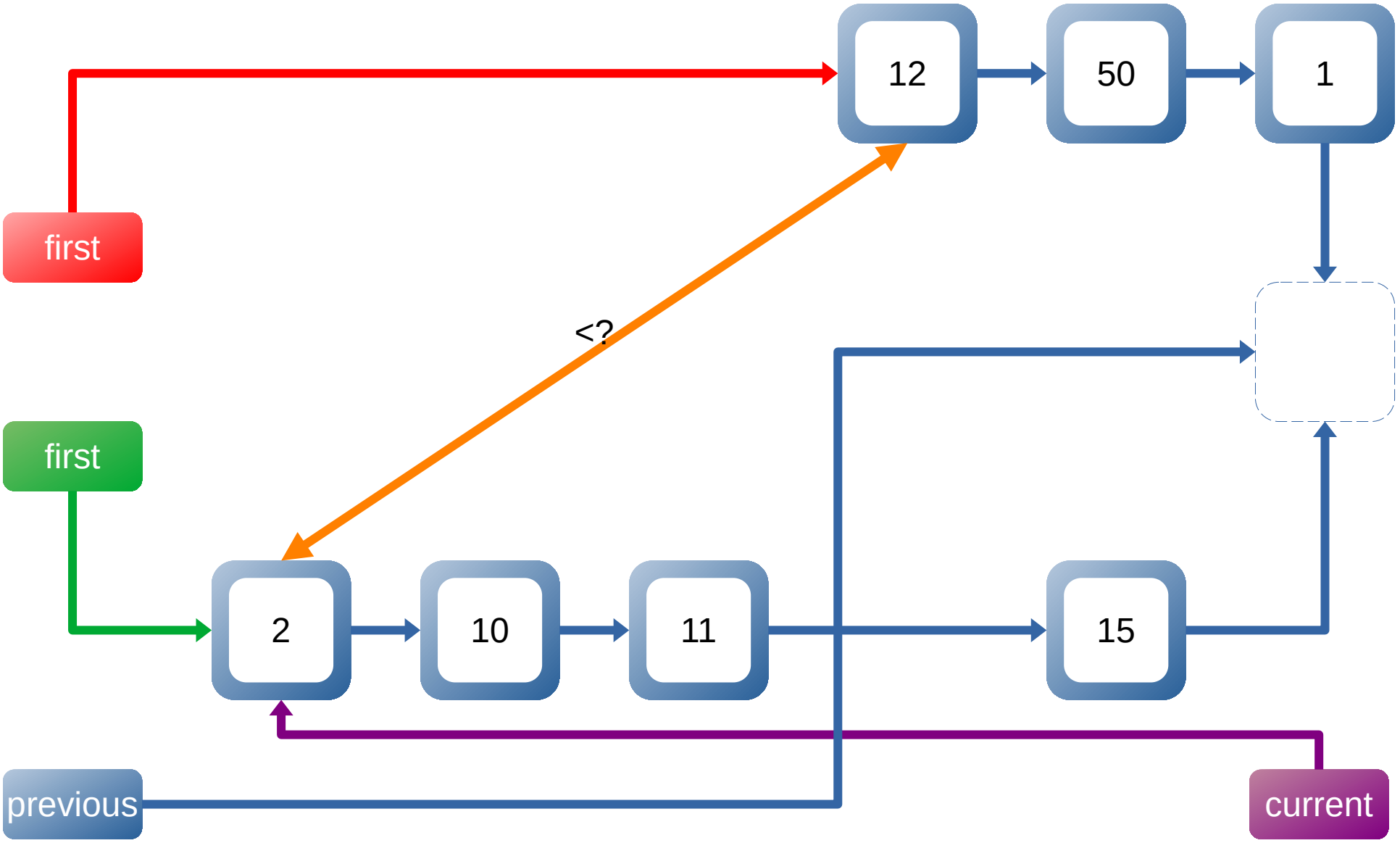
Insertion sort – zreťazený zoznam



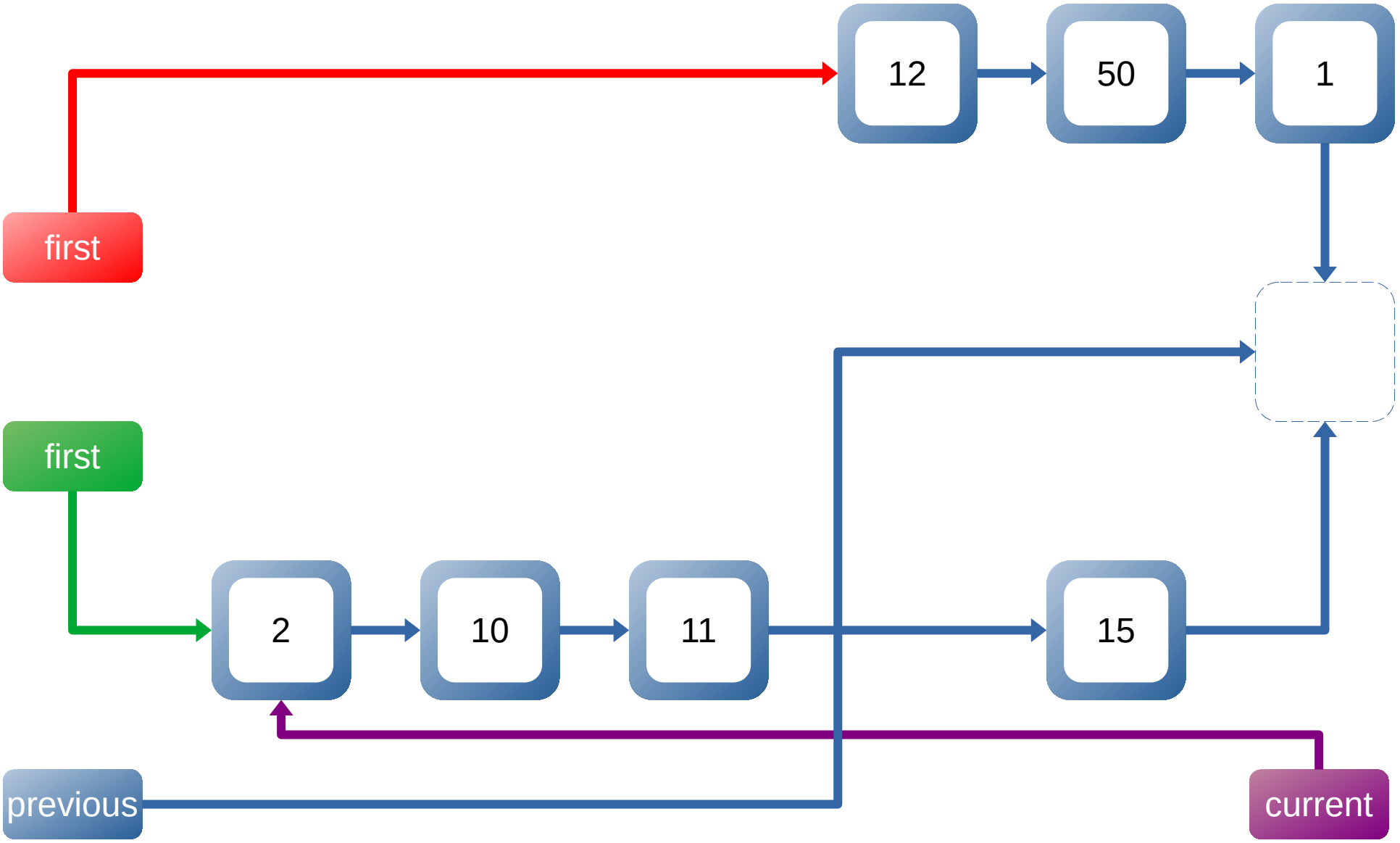
Insertion sort – zreťazený zoznam



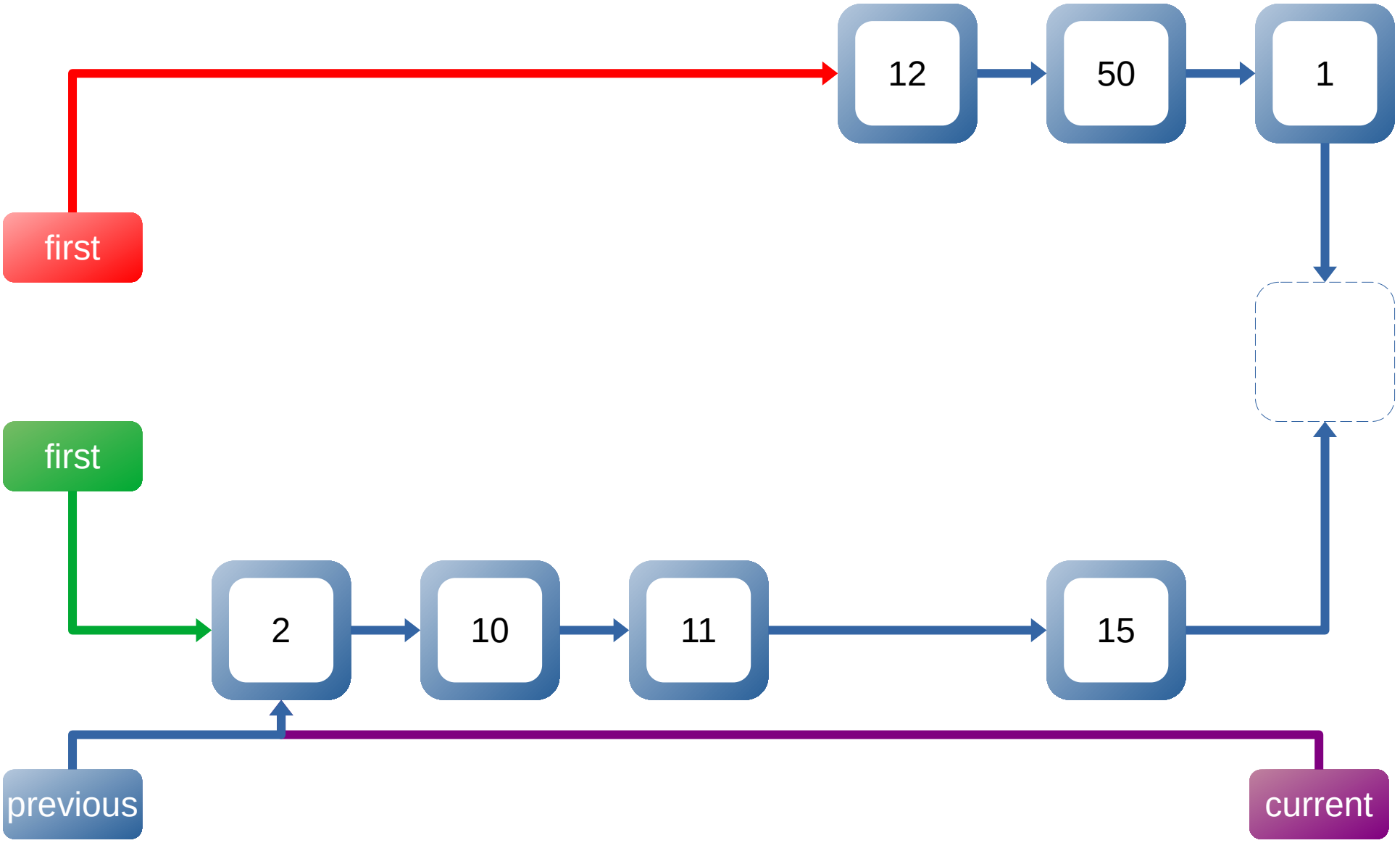
Insertion sort – zreťazený zoznam



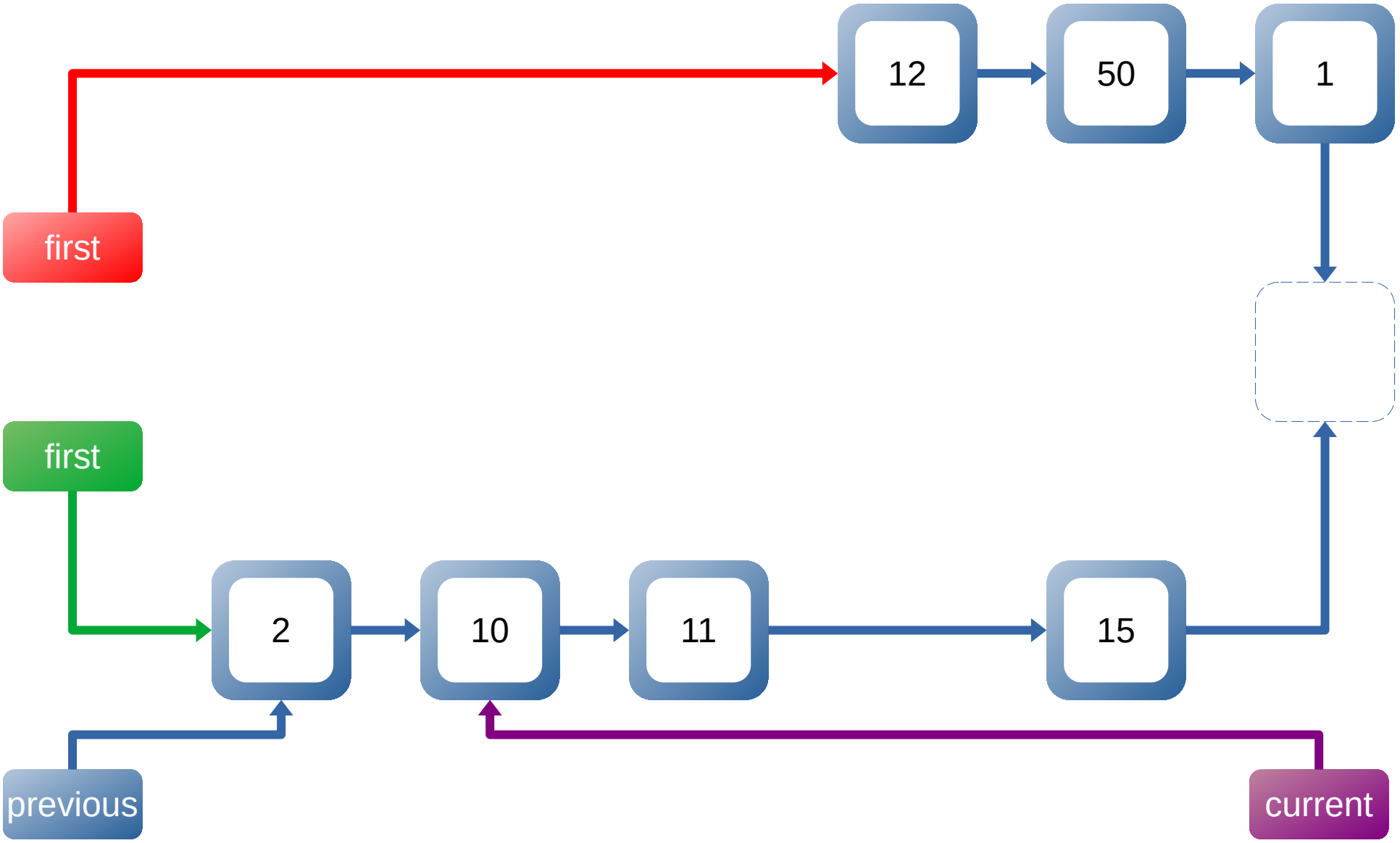
Insertion sort – zreťazený zoznam



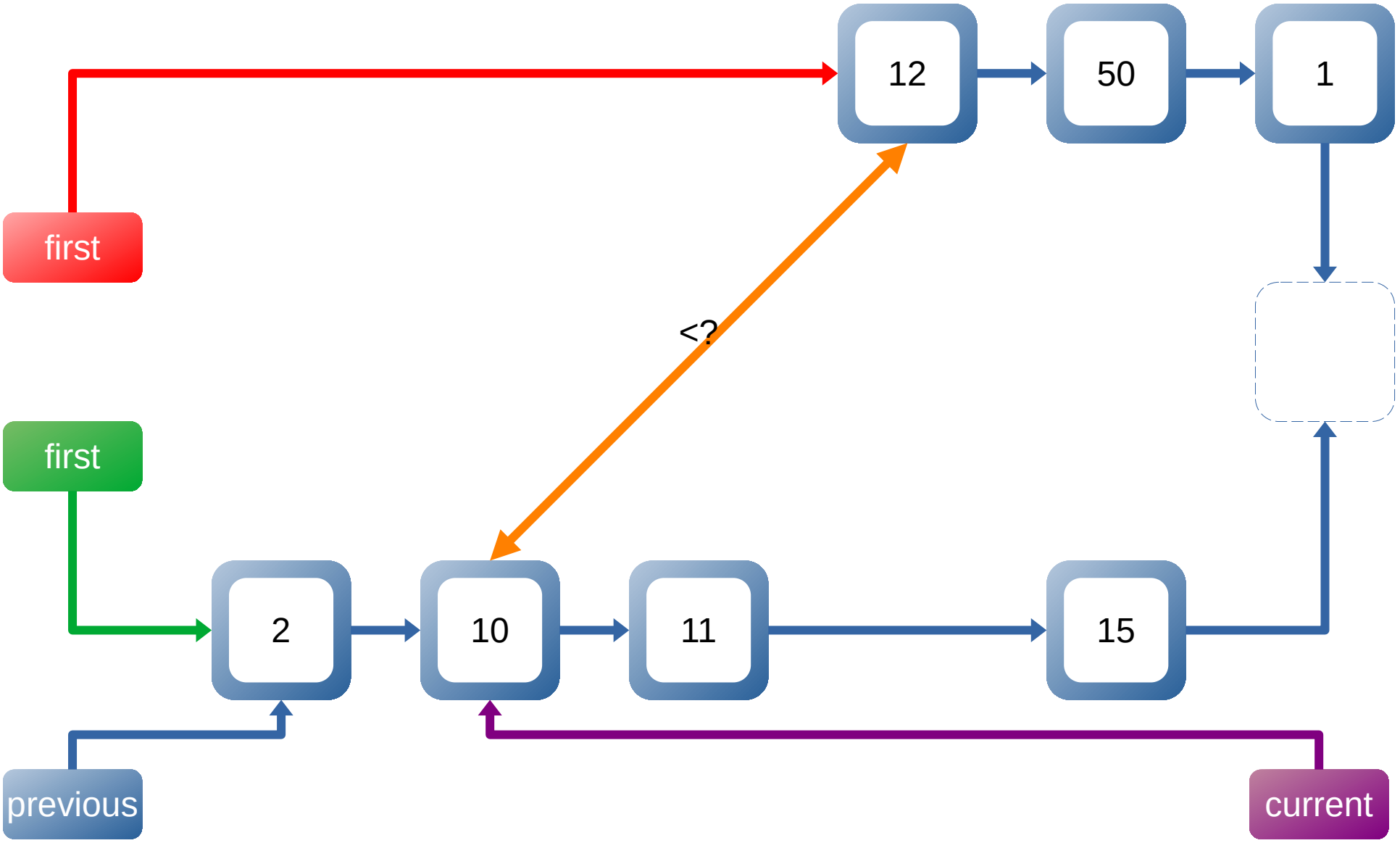
Insertion sort – zreťazený zoznam



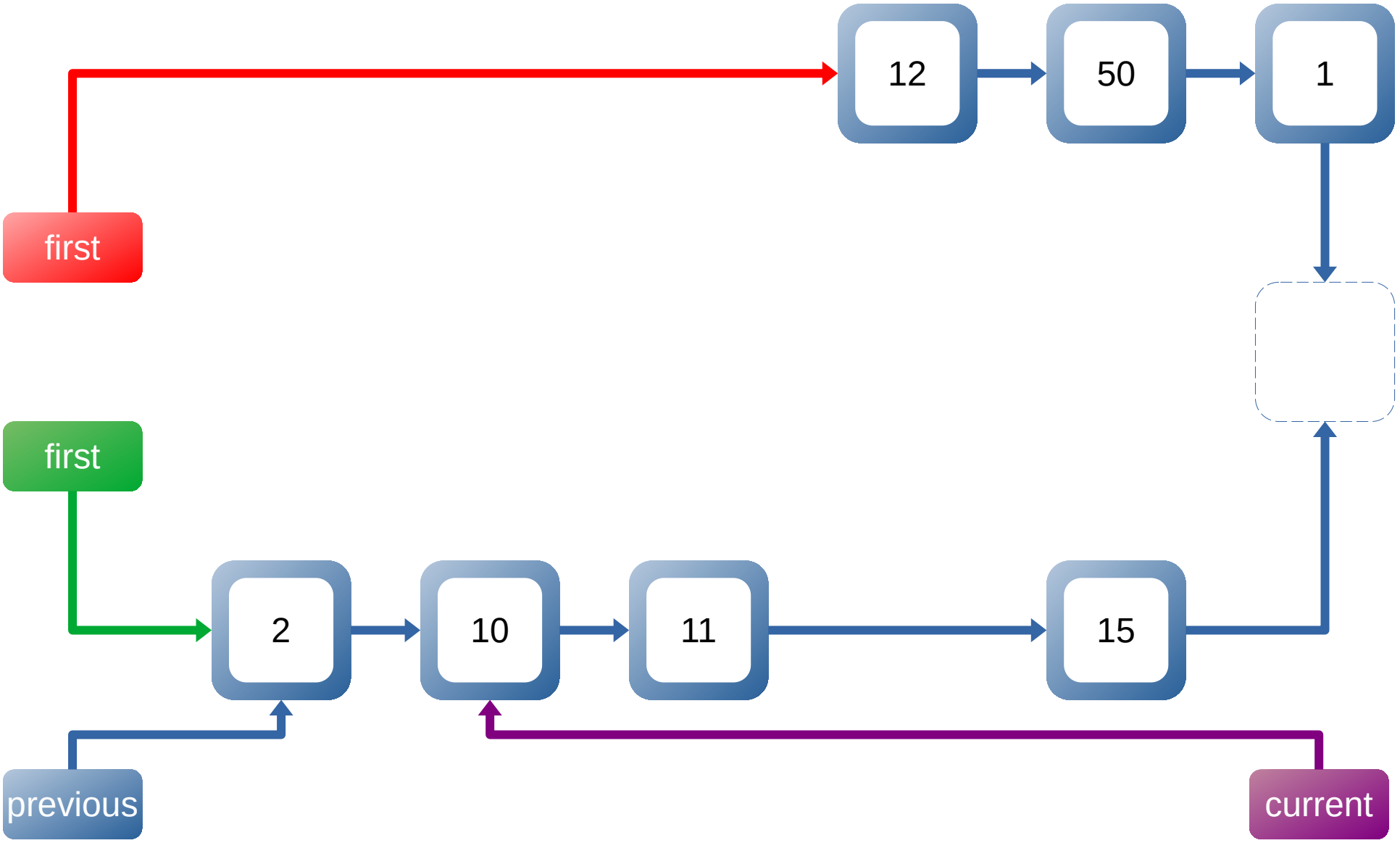
Insertion sort – zreťazený zoznam



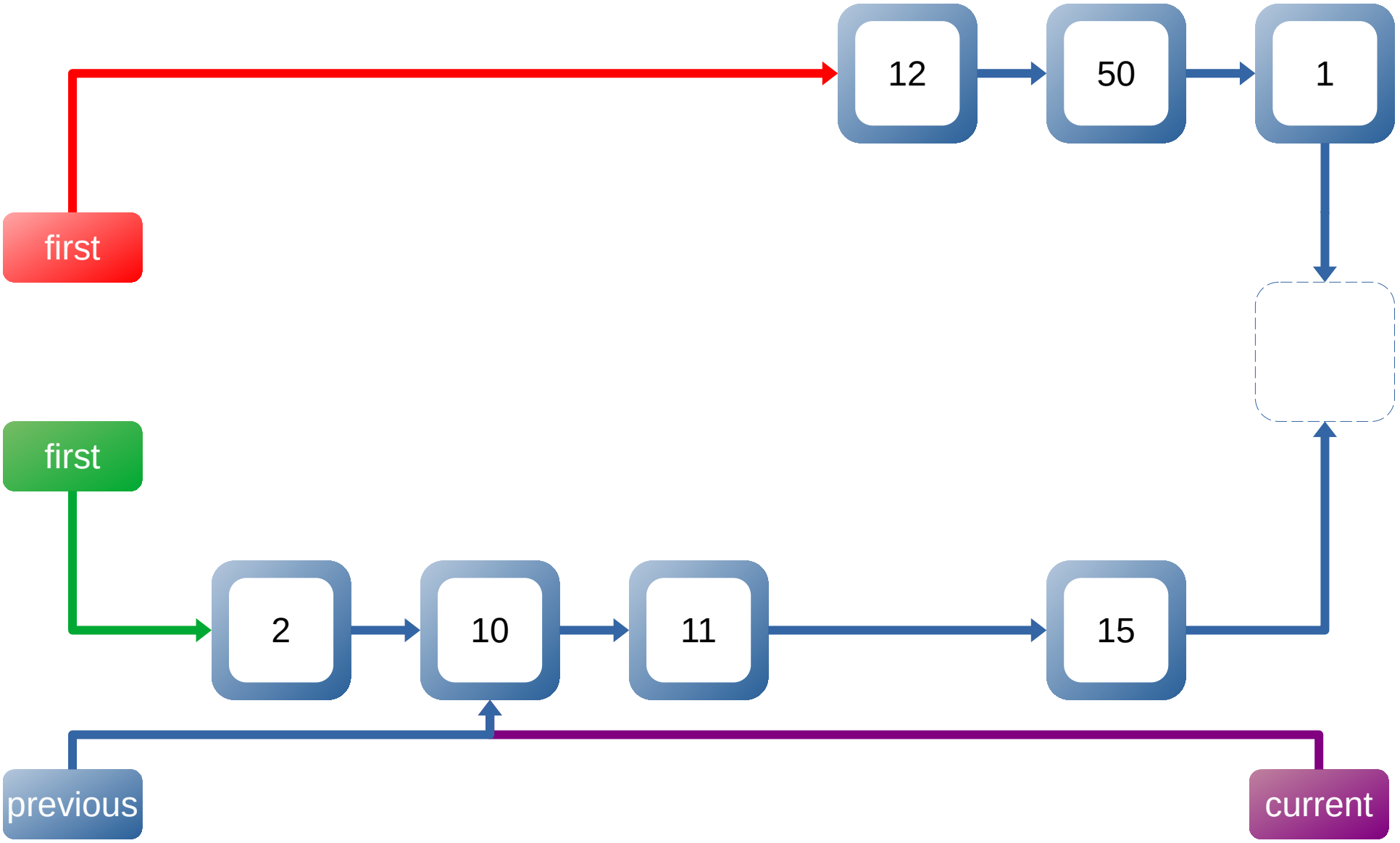
Insertion sort – zreťazený zoznam



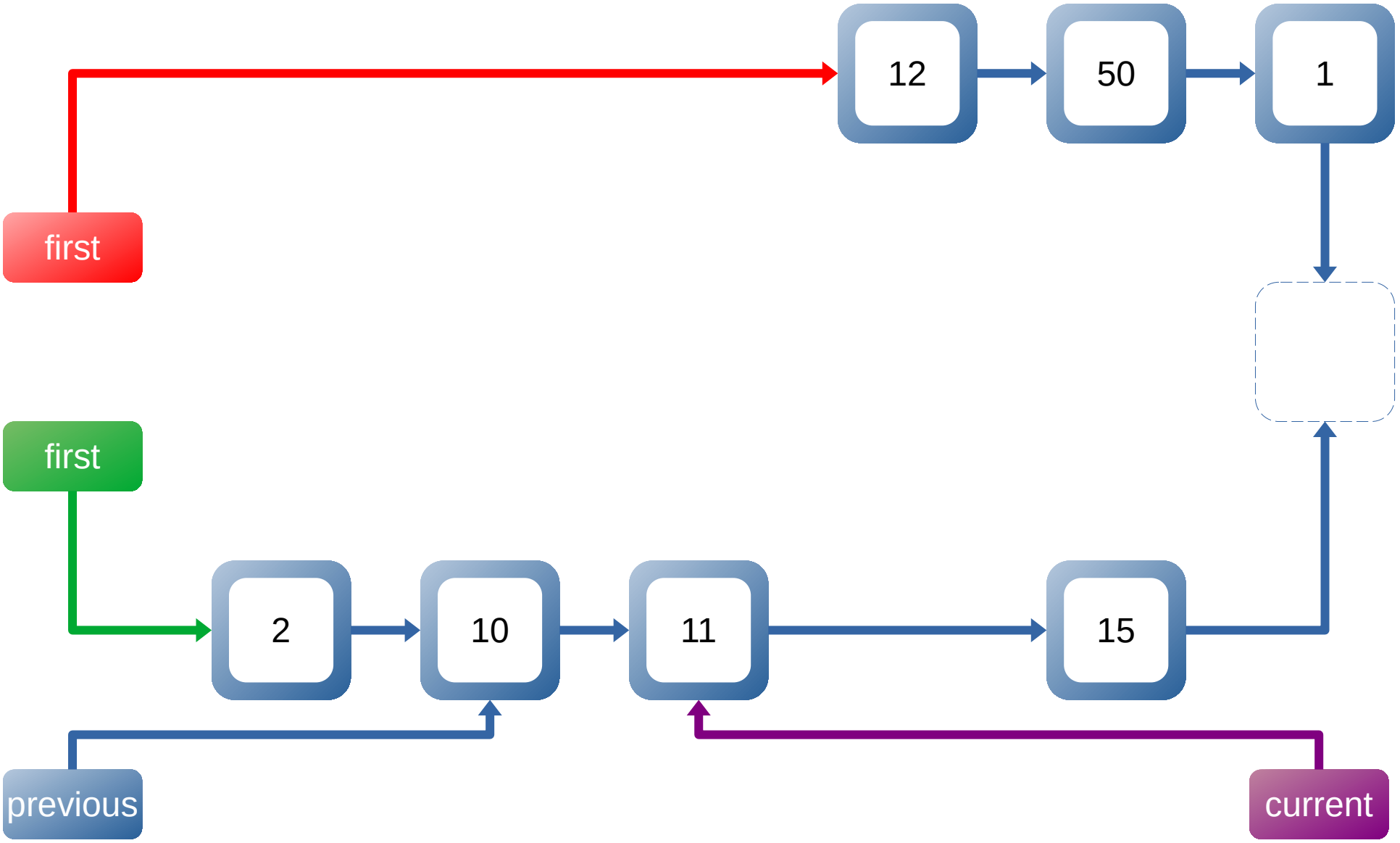
Insertion sort – zreťazený zoznam



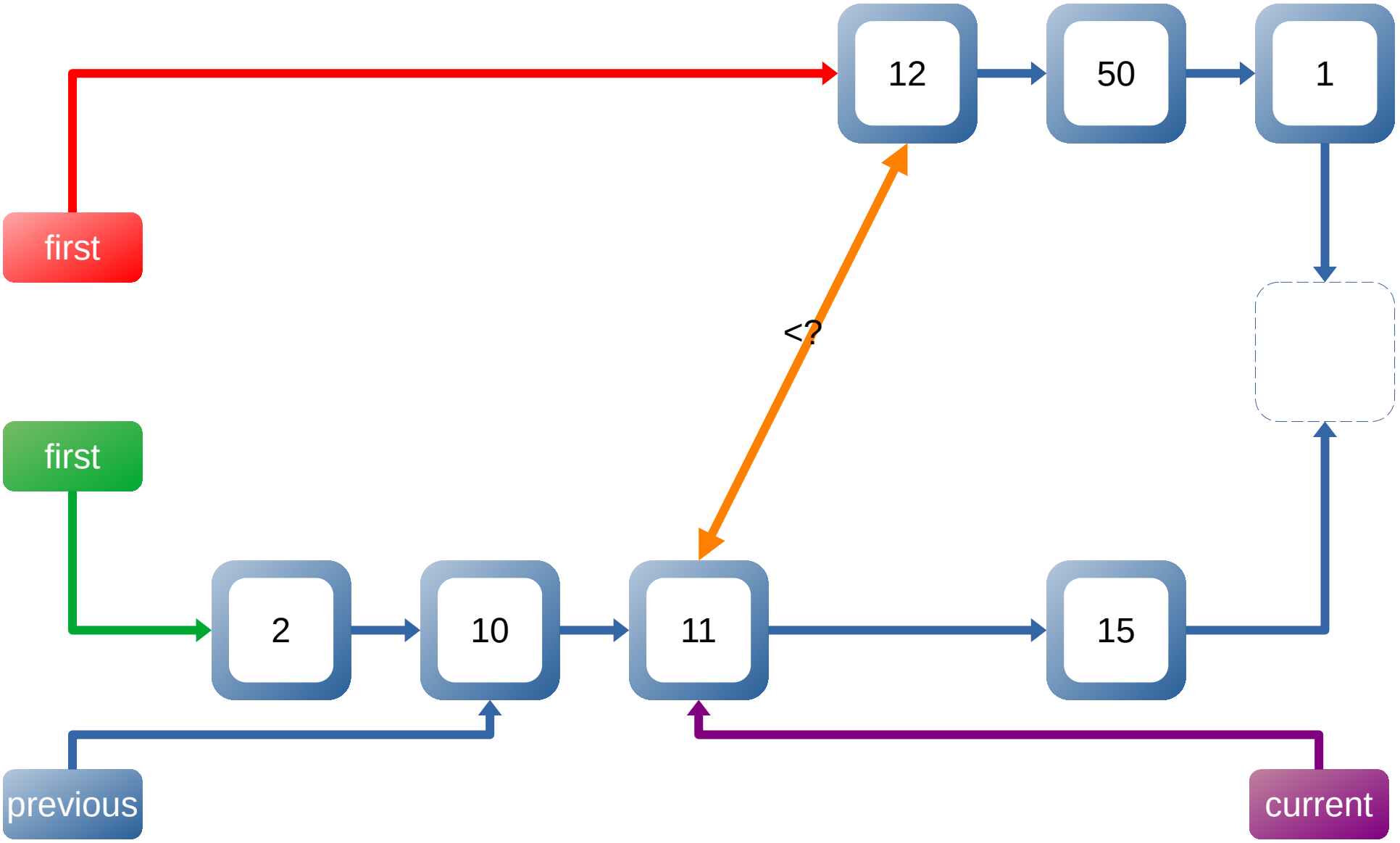
Insertion sort – zreťazený zoznam



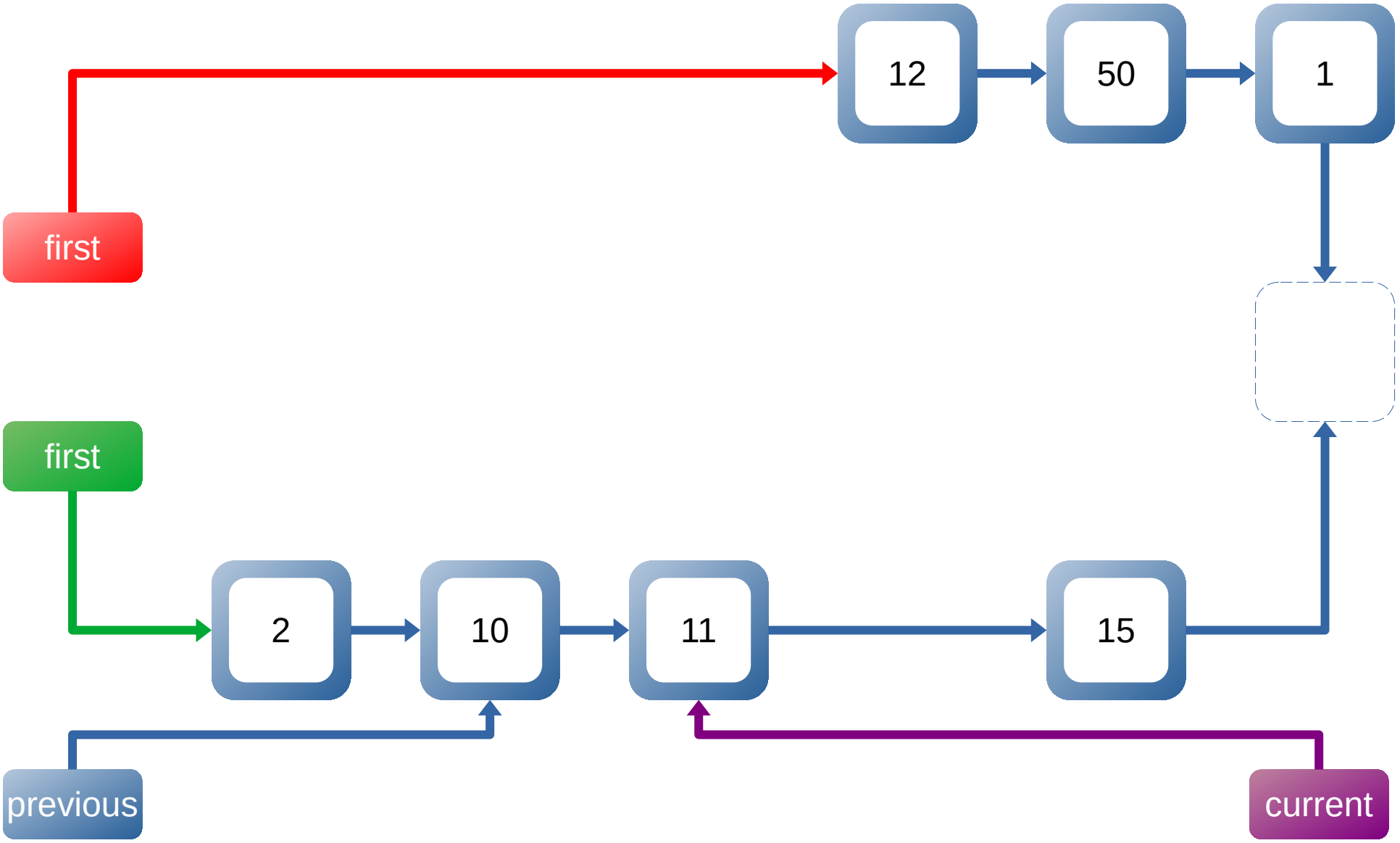
Insertion sort – zreťazený zoznam



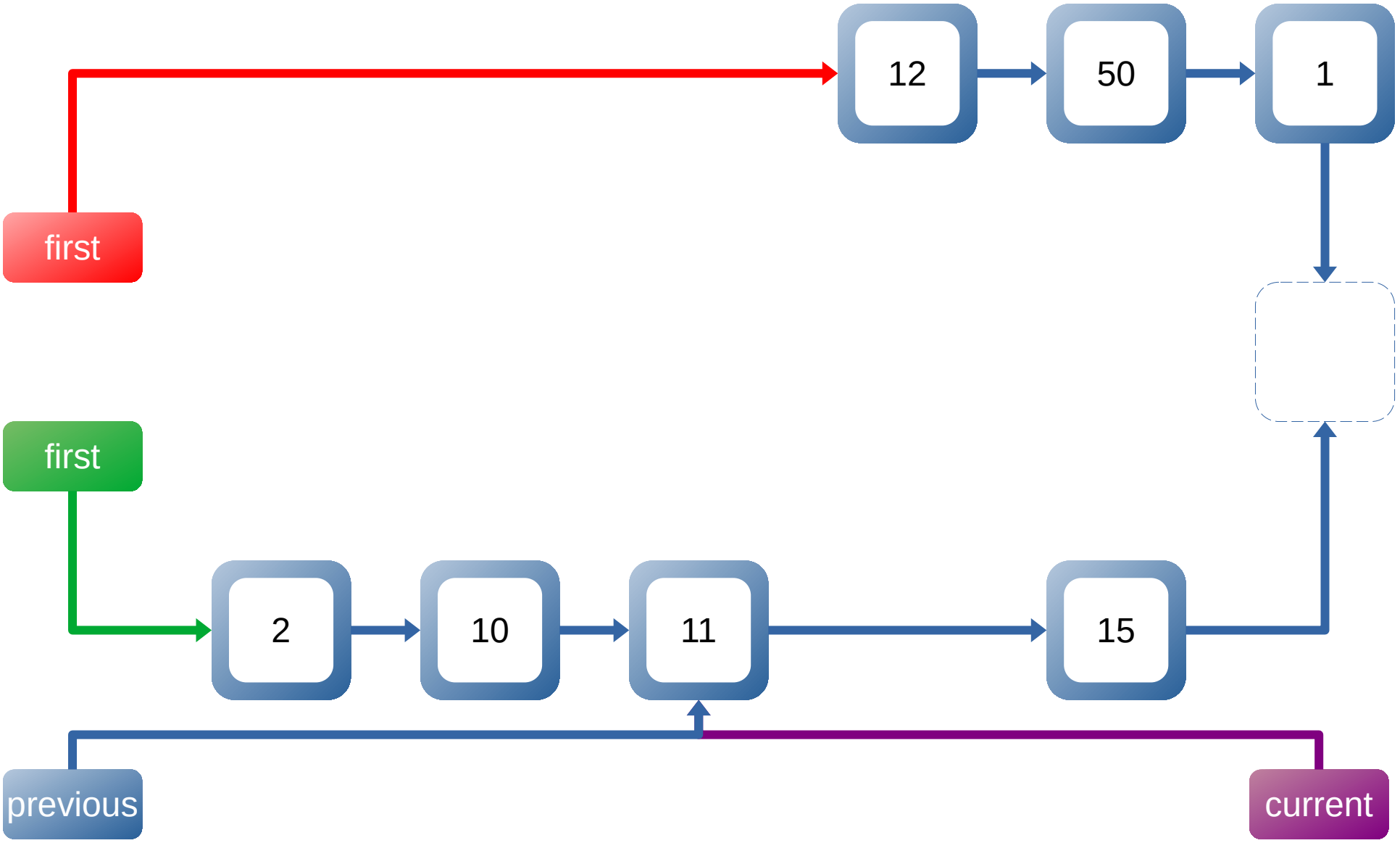
Insertion sort – zreťazený zoznam



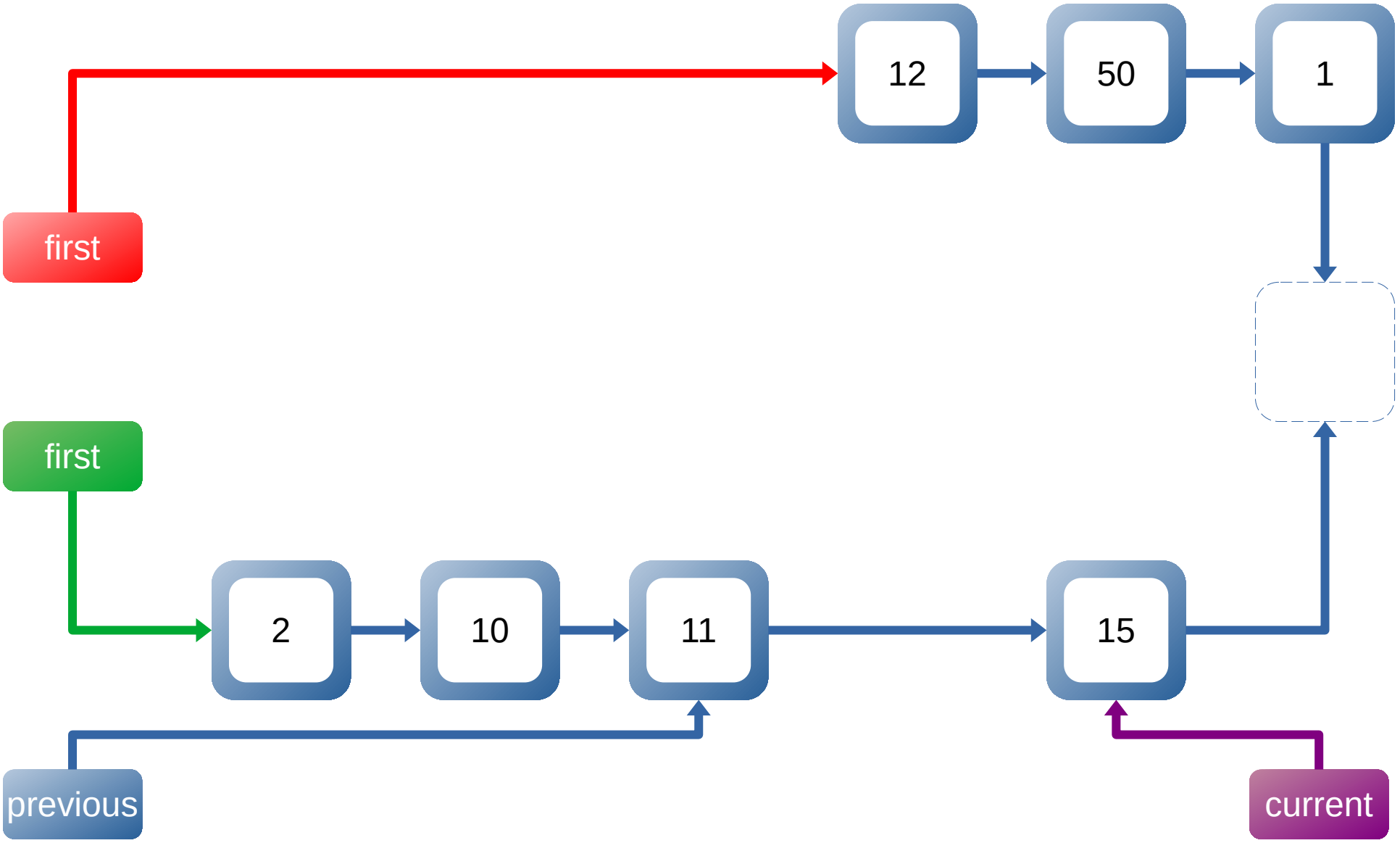
Insertion sort – zreťazený zoznam



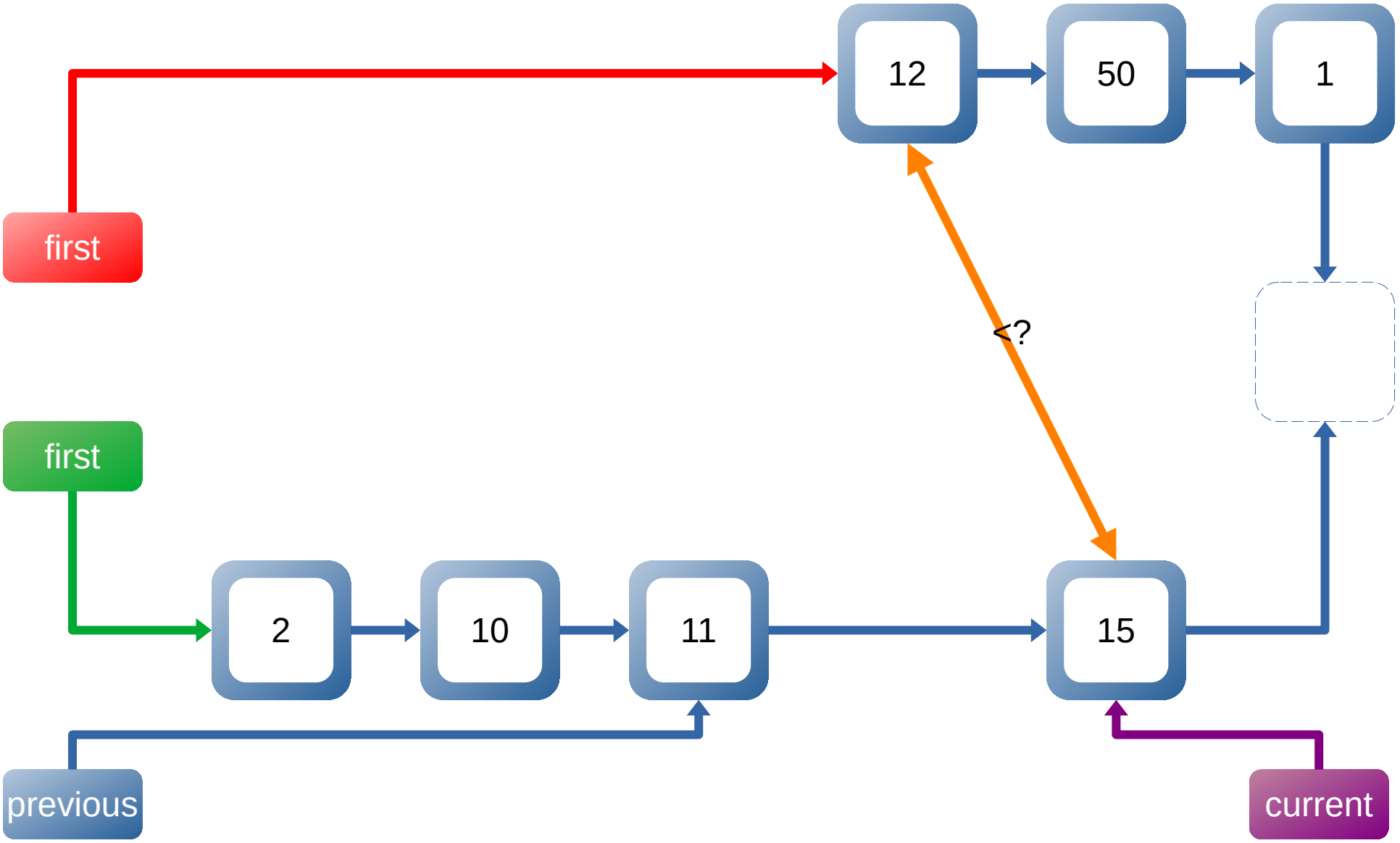
Insertion sort – zreťazený zoznam



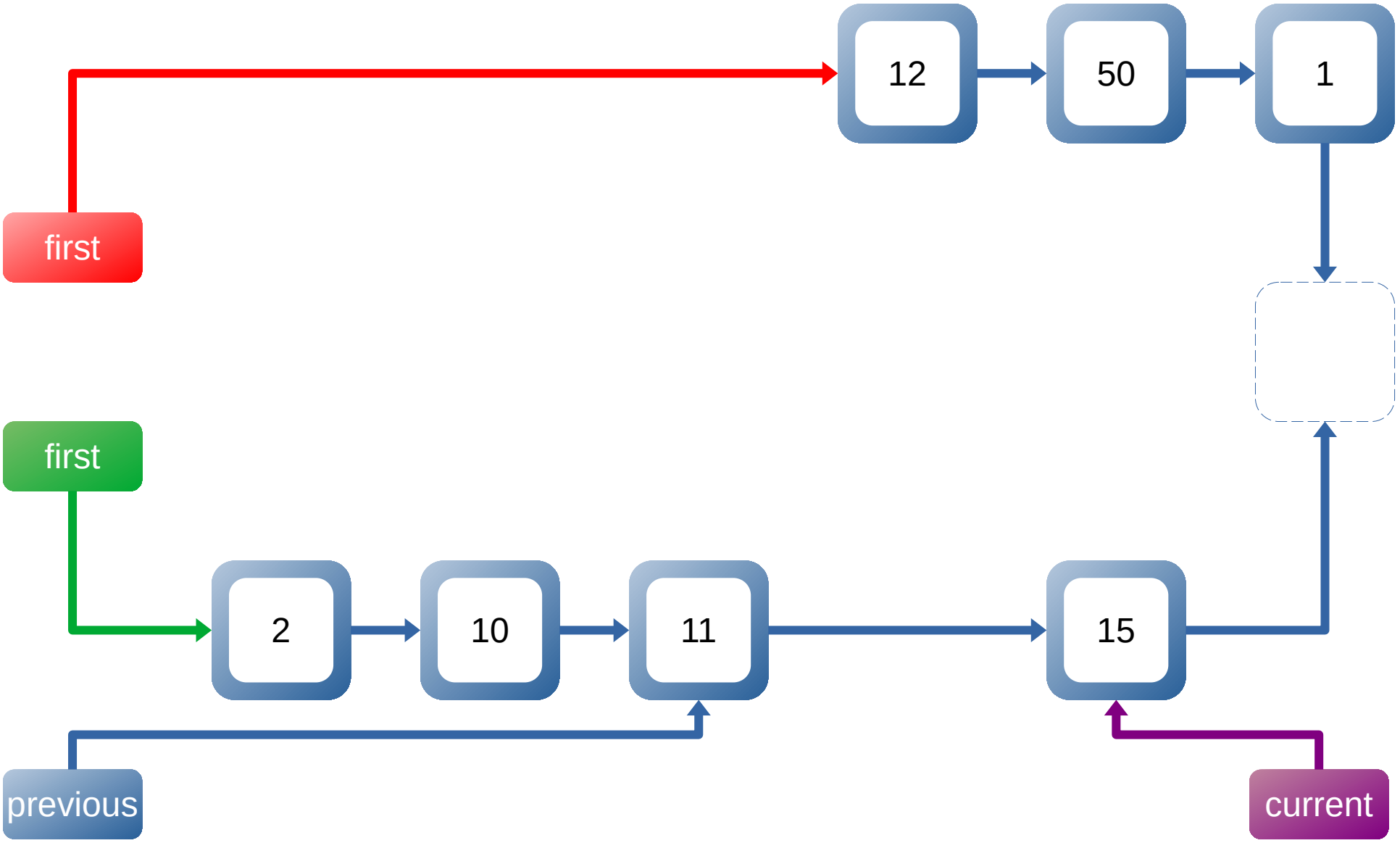
Insertion sort – zreťazený zoznam



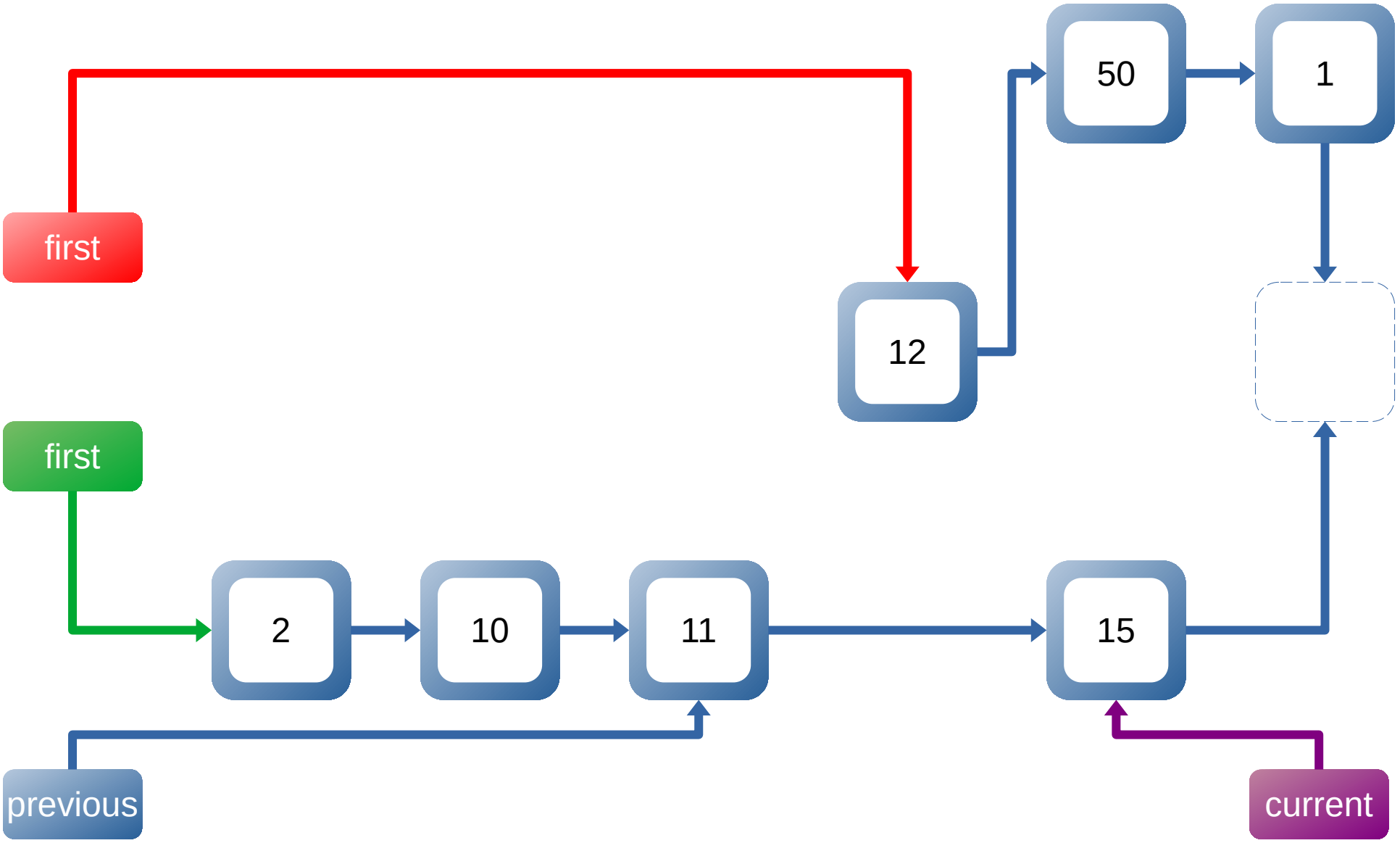
Insertion sort – zreťazený zoznam



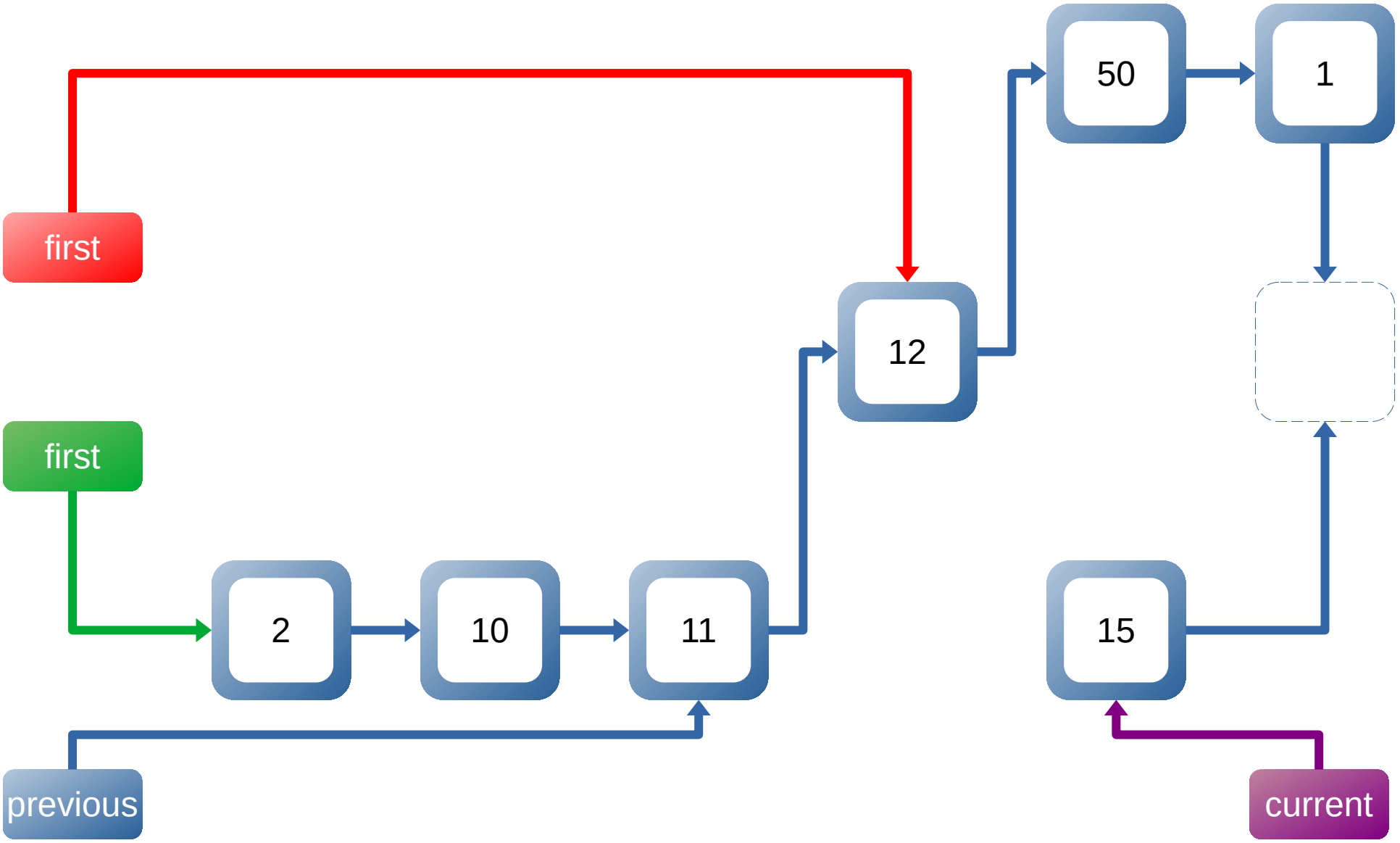
Insertion sort – zreťazený zoznam



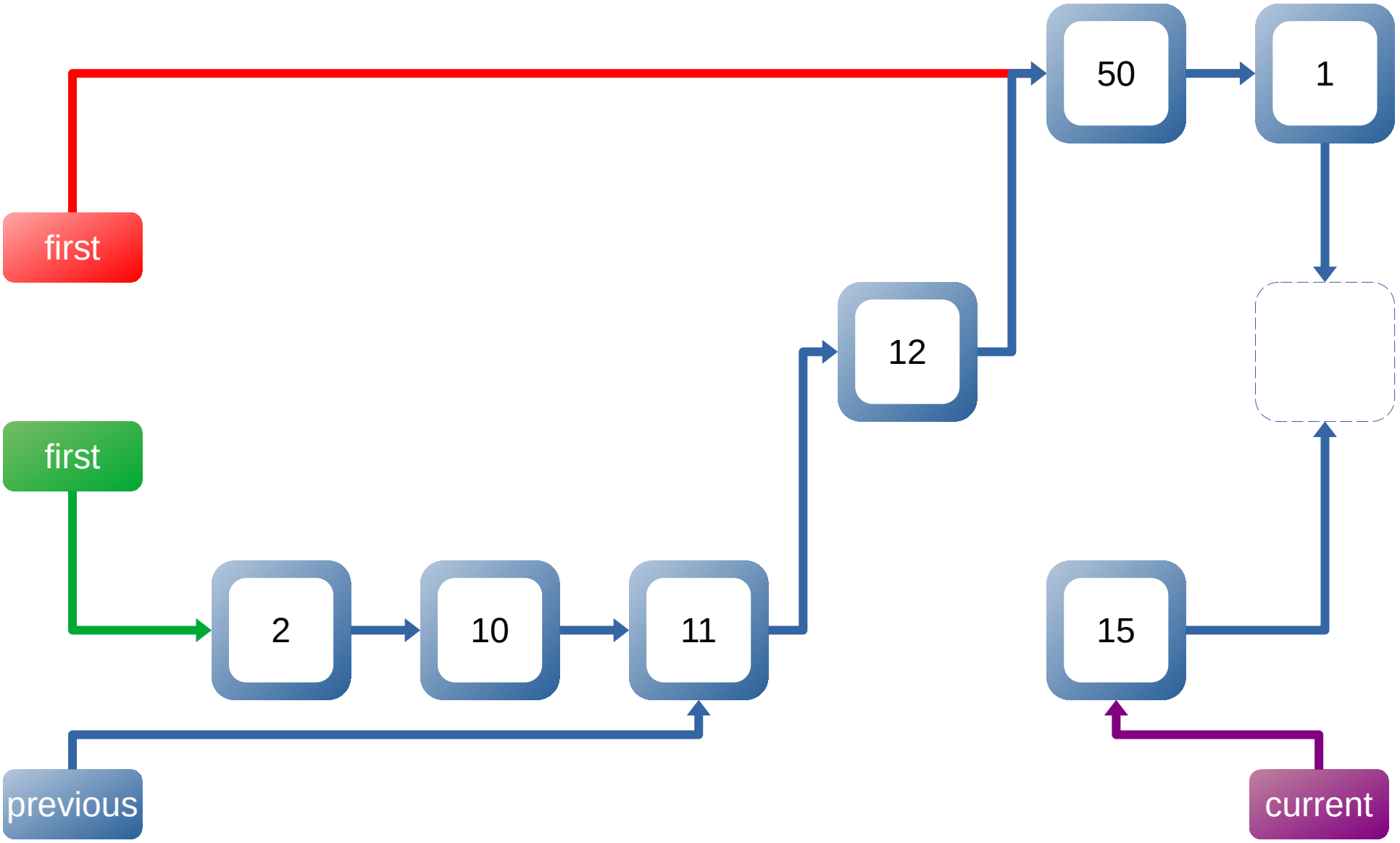
Insertion sort – zreťazený zoznam



Insertion sort – zreťazený zoznam



Insertion sort – zreťazený zoznam



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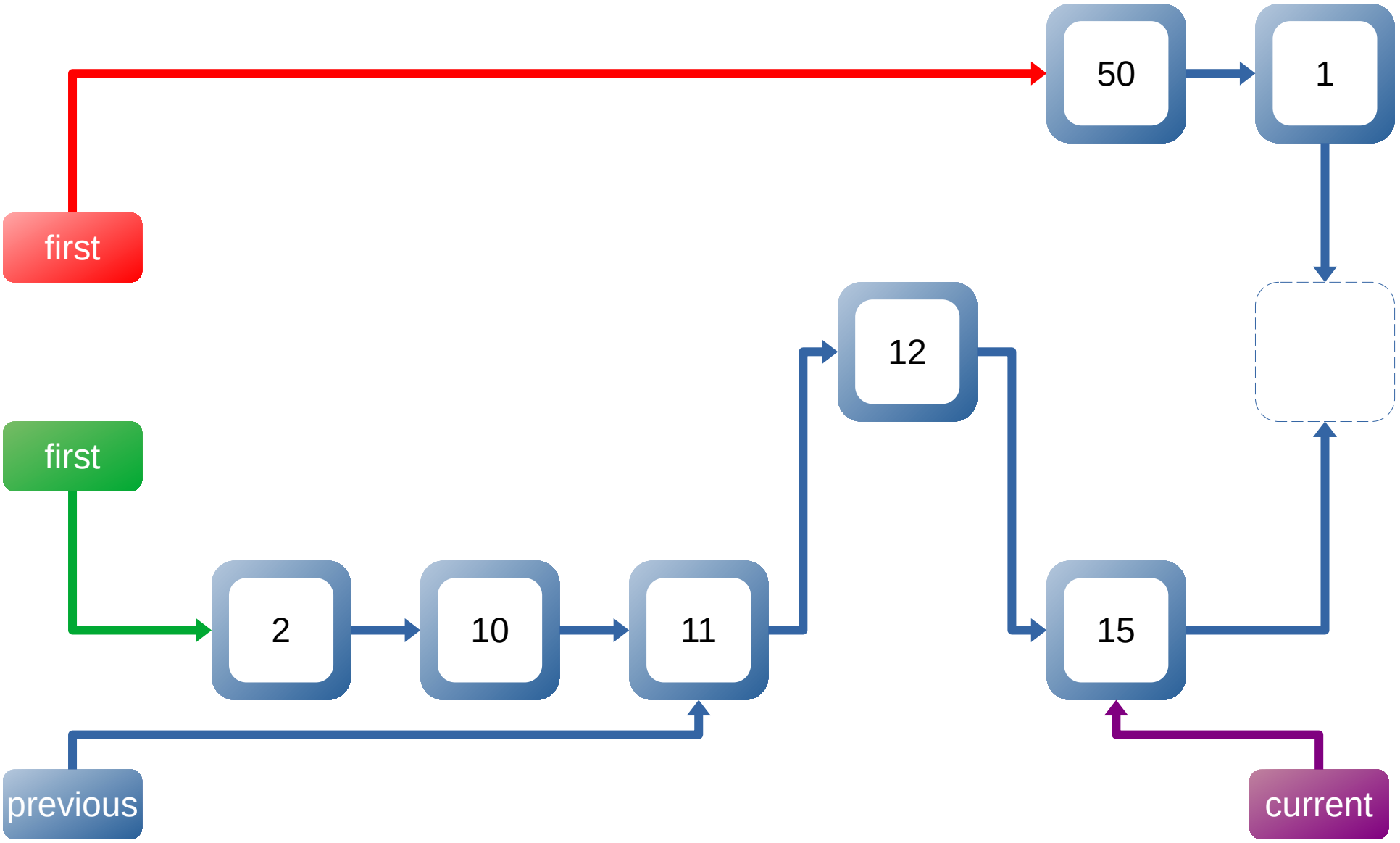

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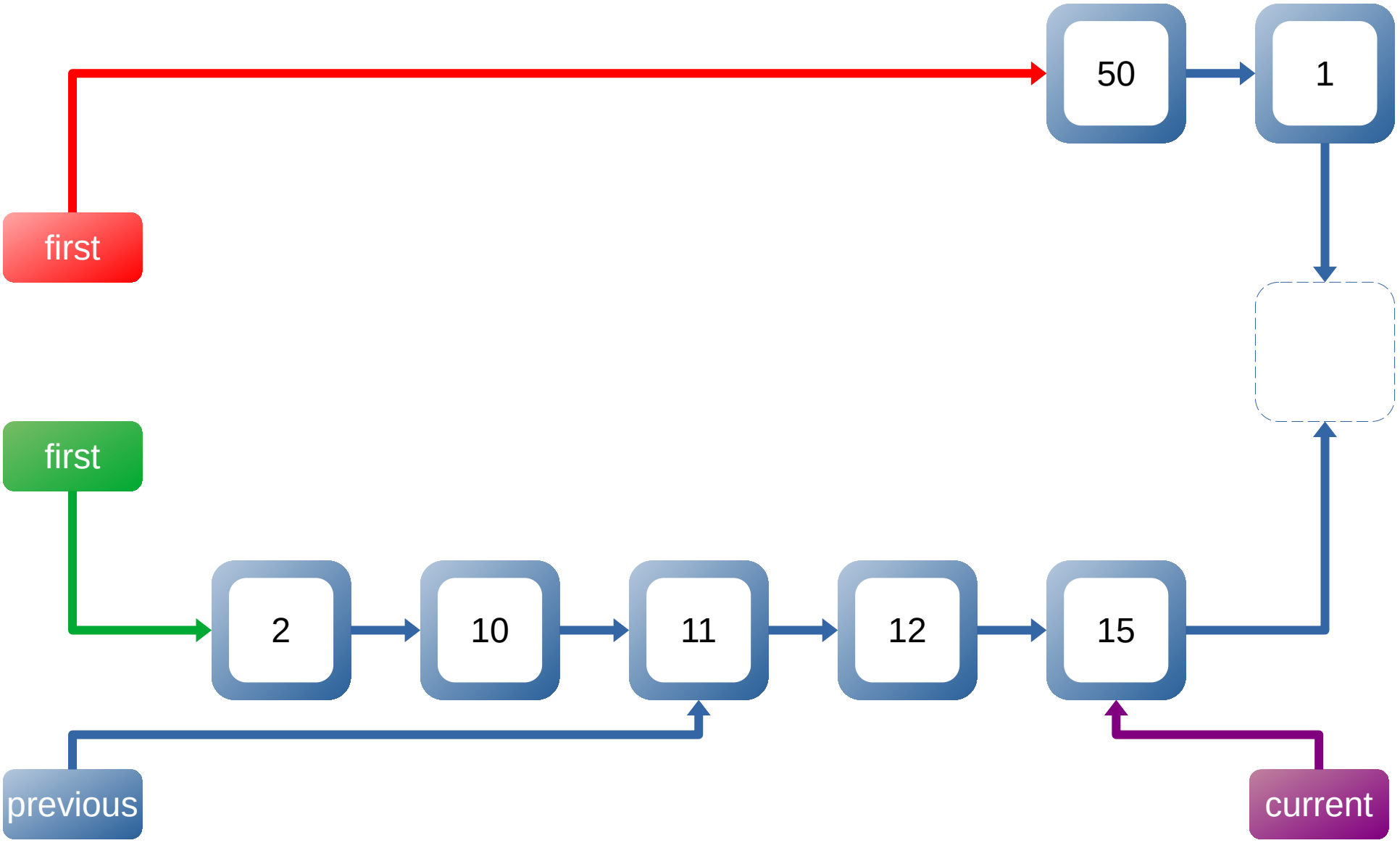

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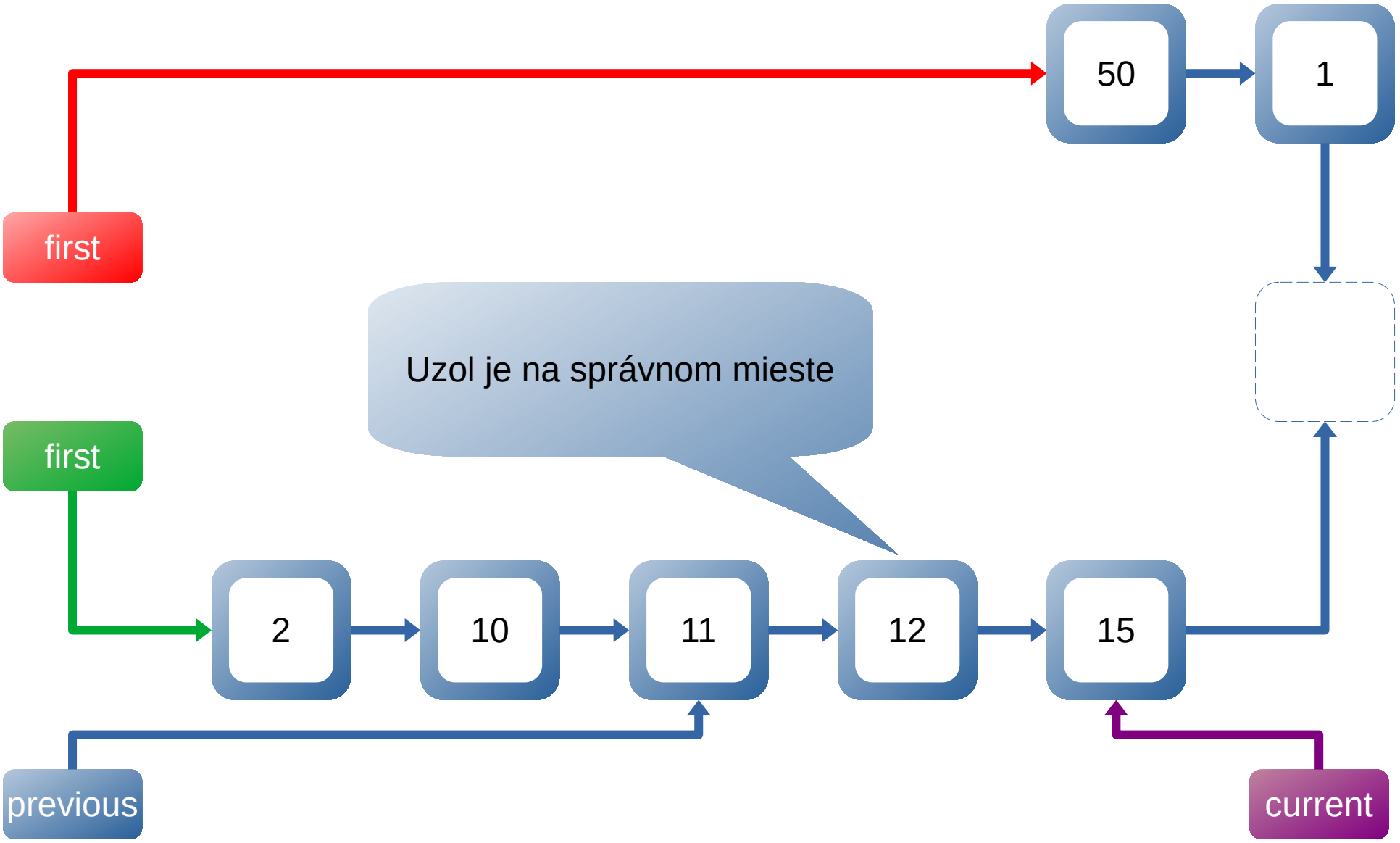
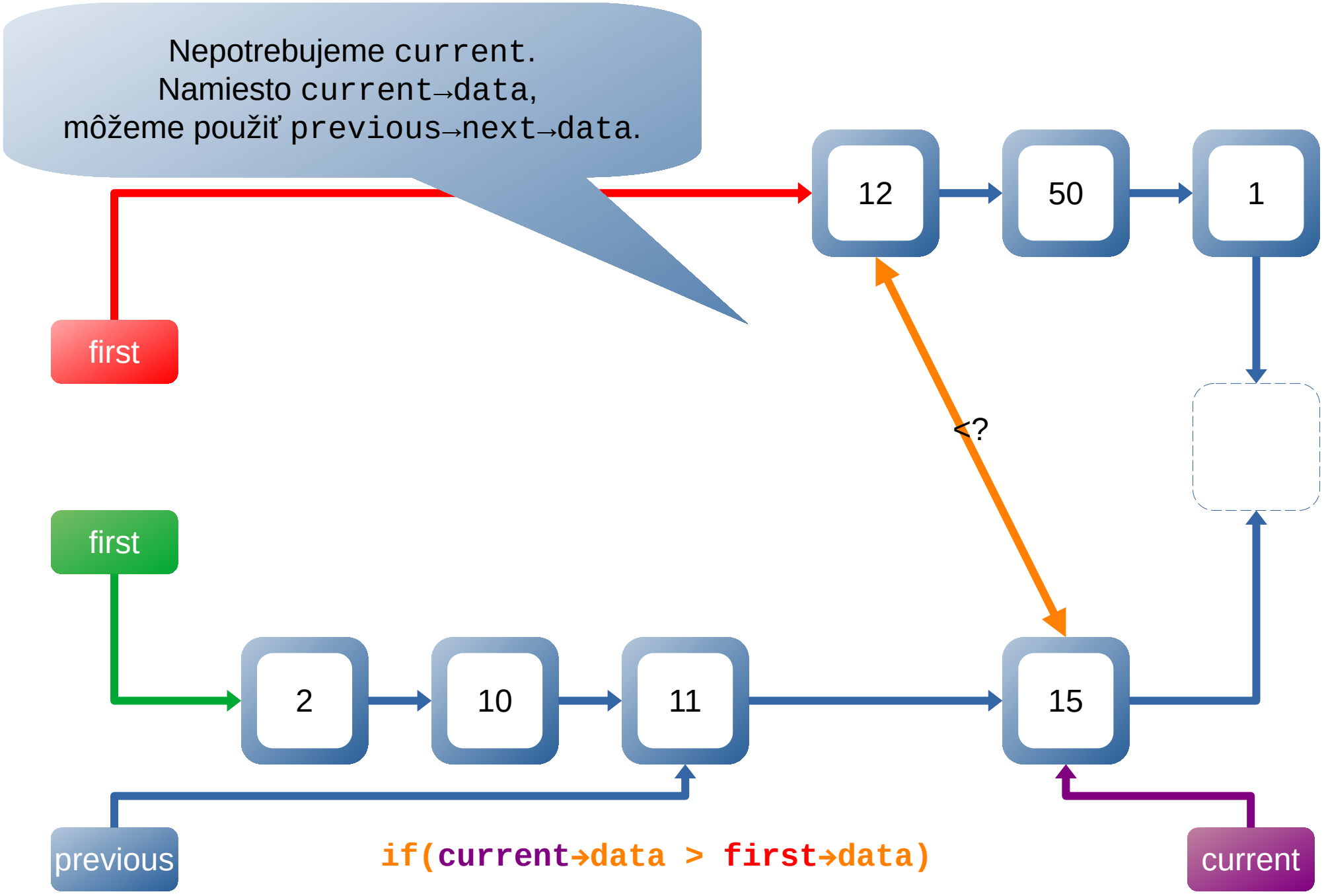


Insertion sort – zreťazený zoznam



Insertion sort – zreťazený zoznam