

Mergesort

- Ordena inicialmente sub-vetores de tamanho 1 ou 2 e recursivamente dobra esse tamanho até ordenar o vetor total de tamanho N
- Baseia-se no merge de dois vetores ordenados



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Merge de dois vetores ordenados

- Dados dois vetores $V1$ e $V2$, já ordenados, o **merge** cria um outro vetor V ordenado com os elementos de $V1$ e $V2$

```
local i, j, k = 1, 1, 1
for k=1, #v1+#v2 do
    if j>#v2 then v[k]=v1[i]; i=i+1
    else if i>#v1 then v[k]=v2[j]; j=j+1
    else if v1[i]<=v2[j] then v[k]=v1[i]; i=i+1
    else v[k]=v2[j]; j=j+1 end
end
```



Merge de dois vectores

$V1 =$

$i \downarrow$ 1	3	7	18	20
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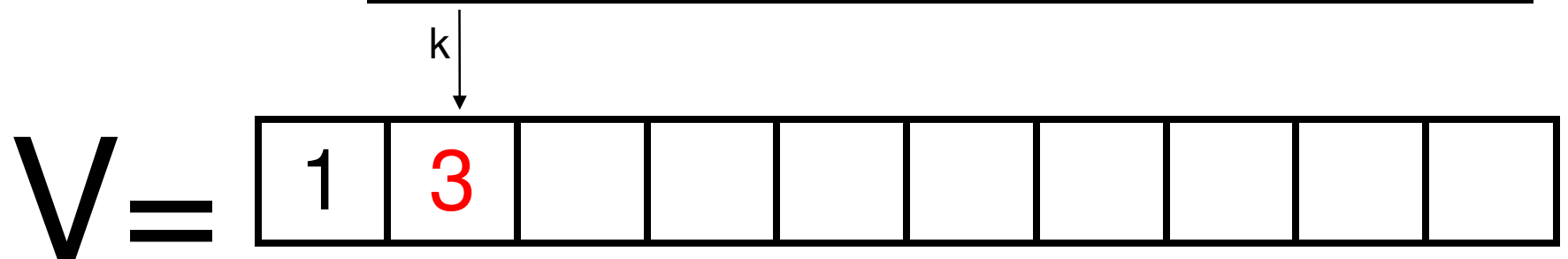
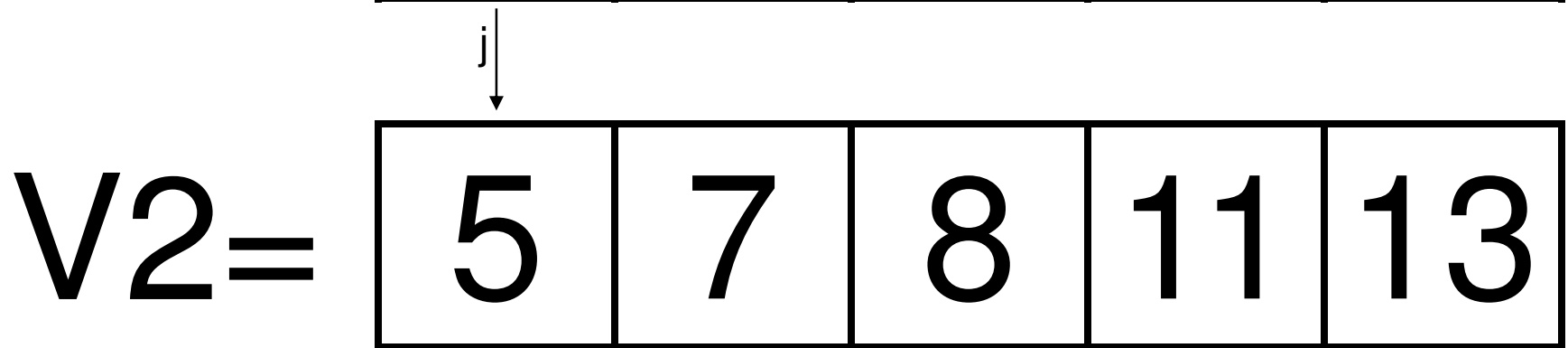
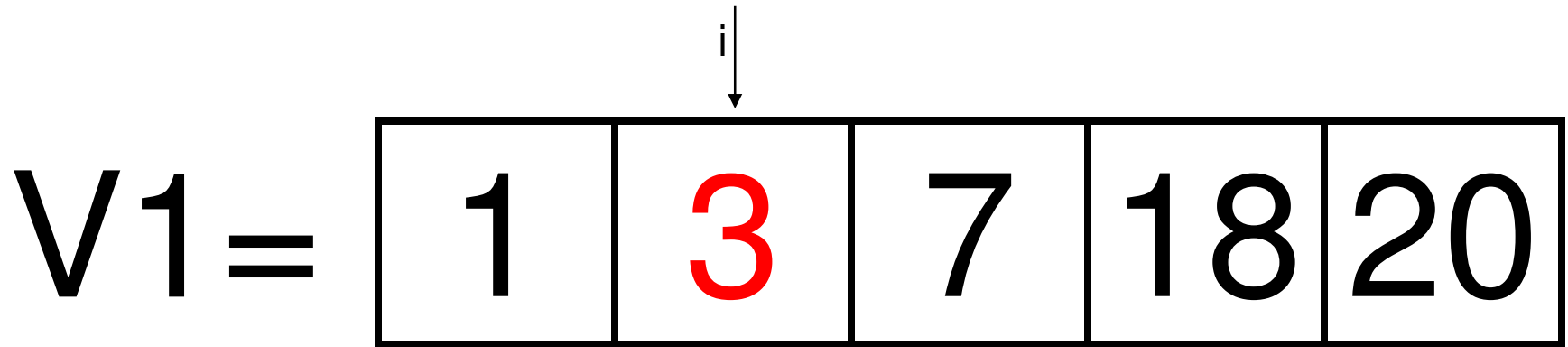
$V2 =$

$j \downarrow$ 5	7	8	11	13
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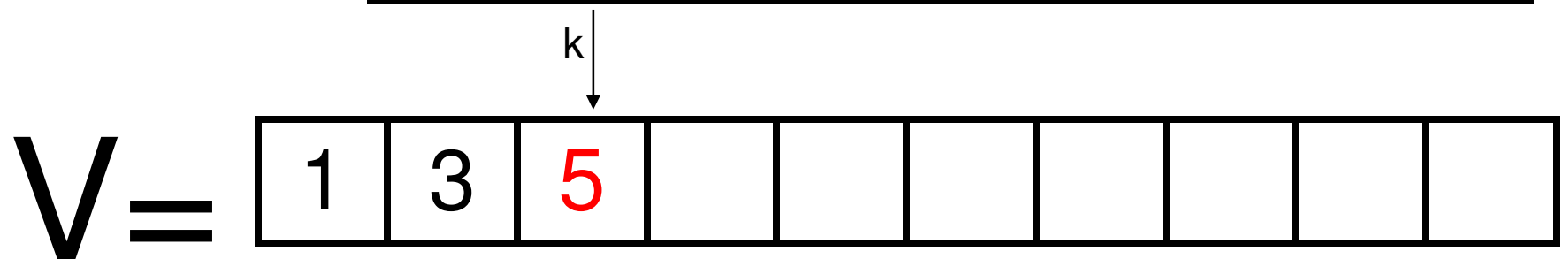
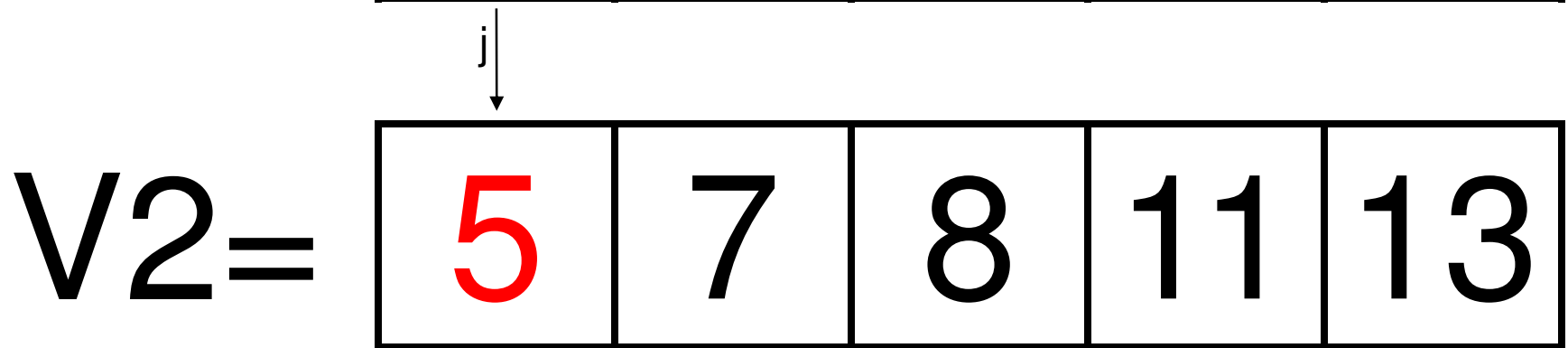
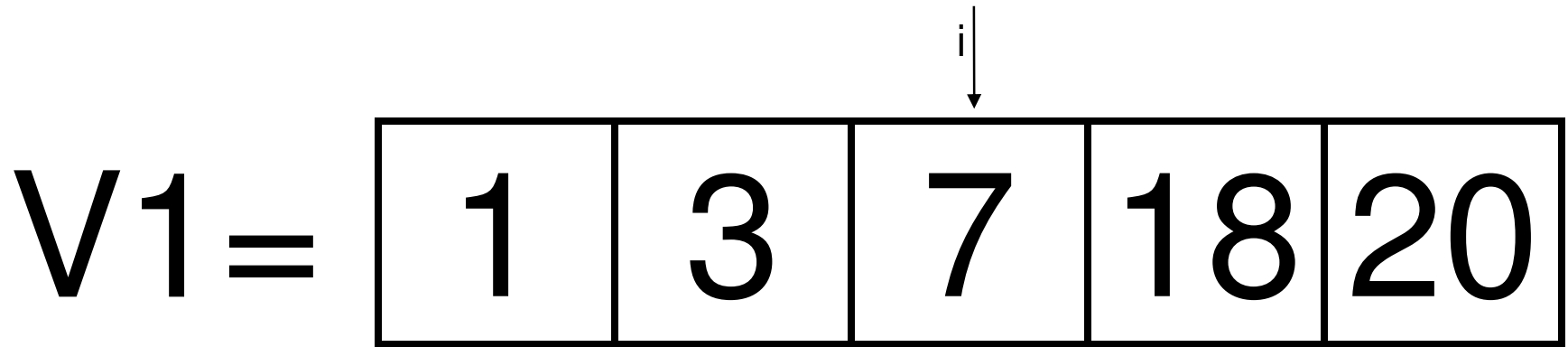
$V =$

$k \downarrow$ 1									
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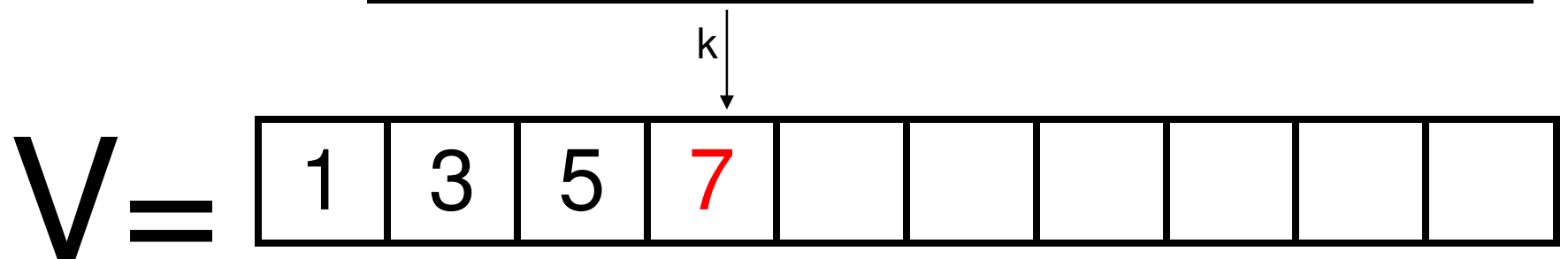
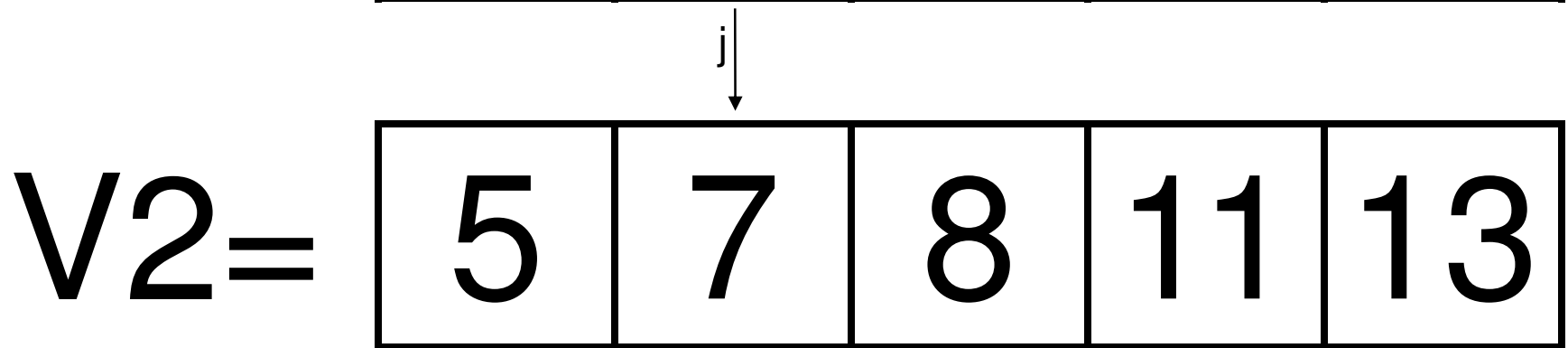
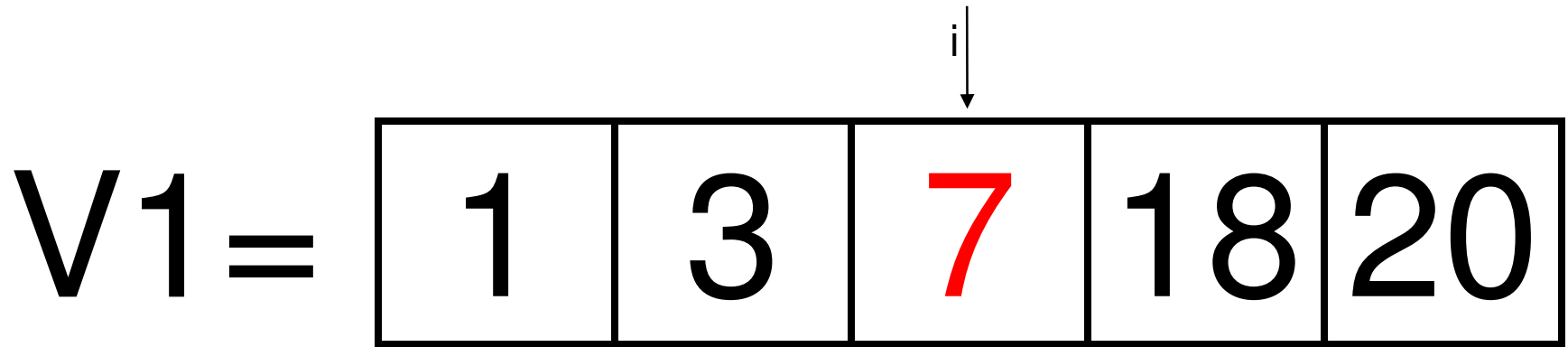
Merge de dois vectores



Merge de dois vectores



Merge de dois vectores



Merge de dois vectores

V1 =

1	3	7	18	20
---	---	---	----	----

V2 =

5	7	8	11	13
---	---	---	----	----

V =

1	3	5	7	7					
---	---	---	---	---	--	--	--	--	--

Merge de dois vectores

V1 =

1	3	7	18	20
---	---	---	----	----

V2 =

5	7	8	11	13
---	---	---	----	----

V =

1	3	5	7	7	8				
---	---	---	---	---	---	--	--	--	--

Merge de dois vectores

V1 =

1	3	7	18	20
---	---	---	----	----

V2 =

5	7	8	11	13
---	---	---	----	----

V =

1	3	5	7	7	8	11			
---	---	---	---	---	---	----	--	--	--

Merge de dois vectores

V1 =

1	3	7	18	20
---	---	---	----	----

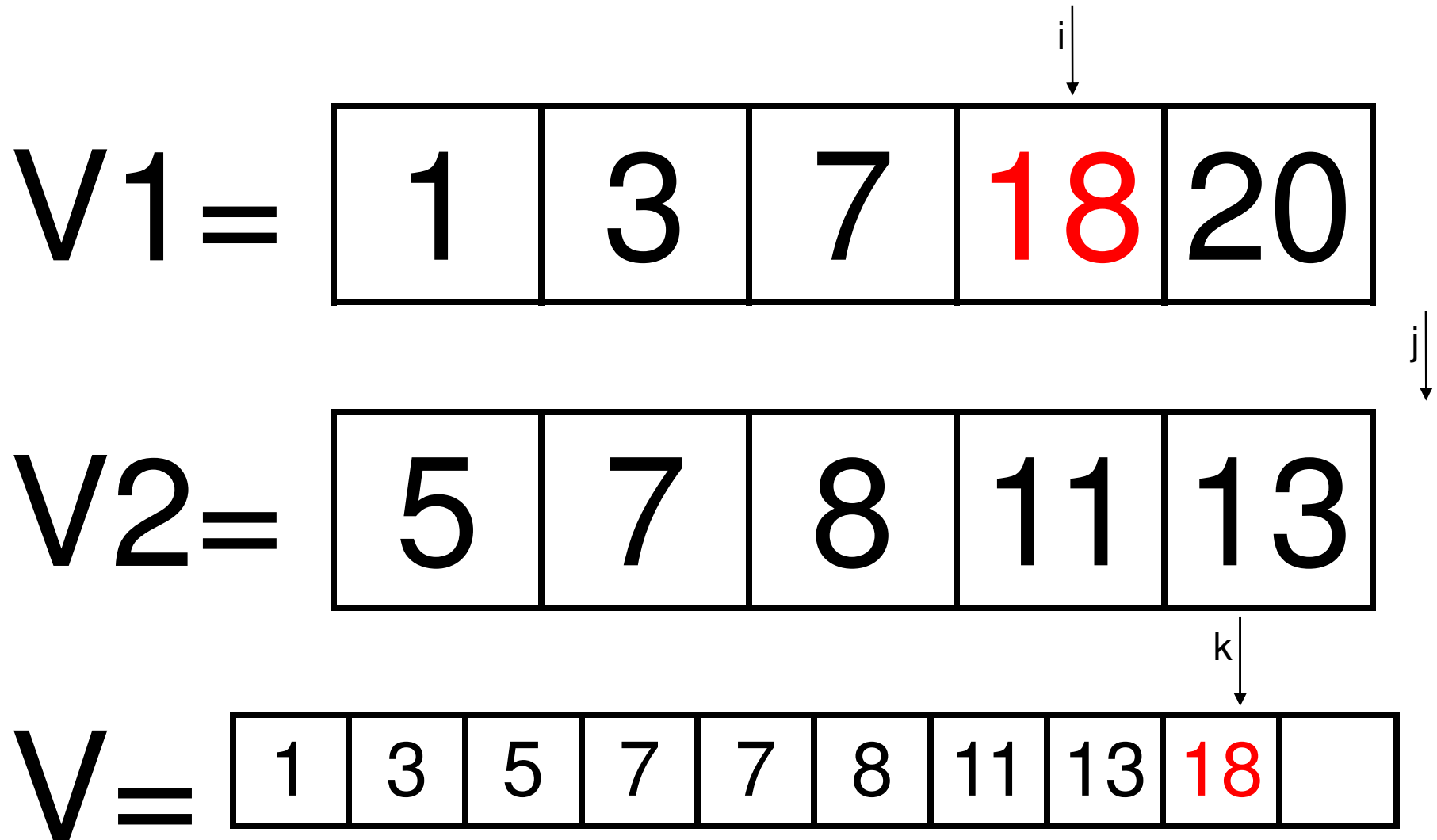
V2 =

5	7	8	11	13
---	---	---	----	----

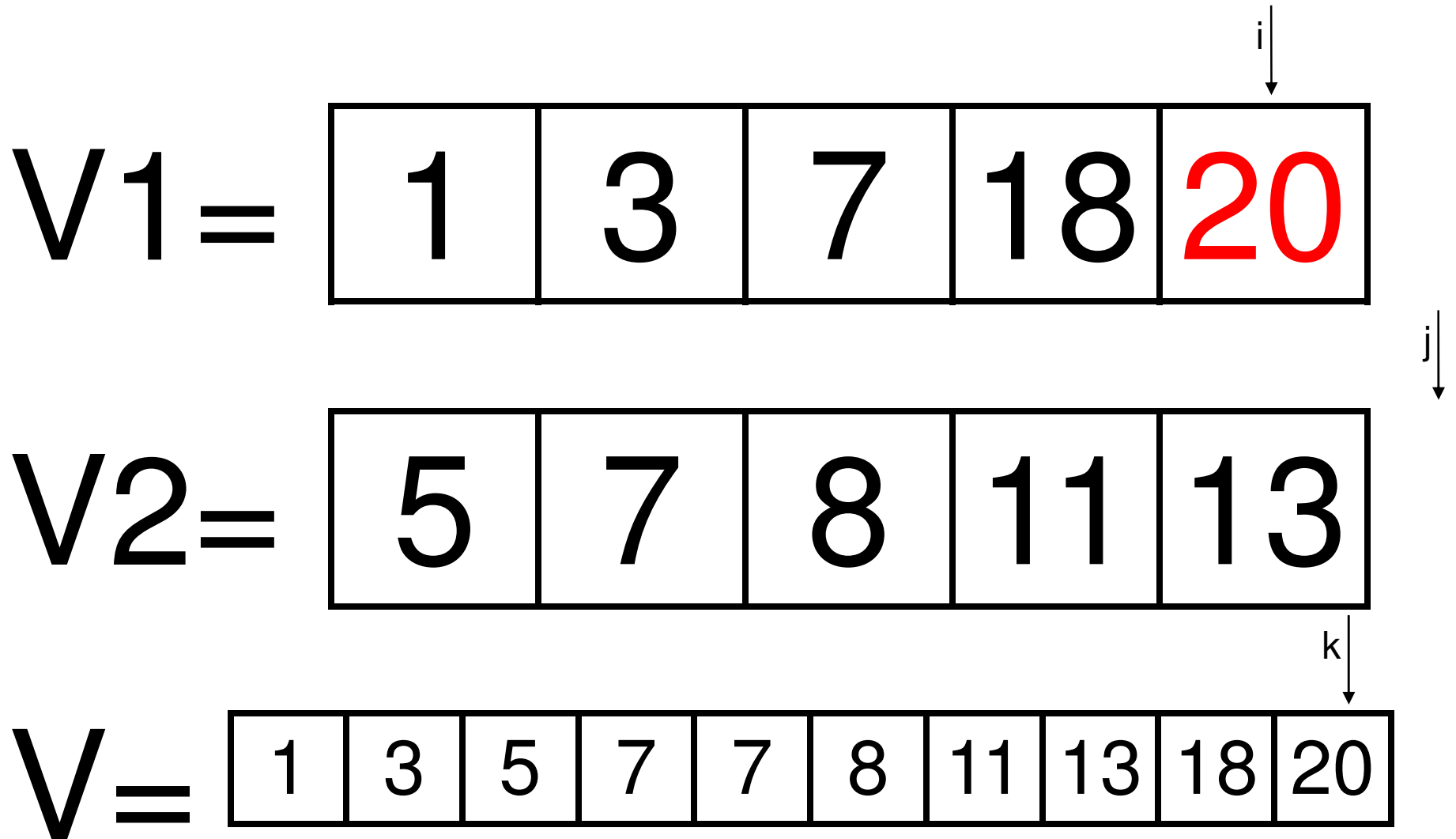
V =

1	3	5	7	7	8	11	13		
---	---	---	---	---	---	----	----	--	--

Merge de dois vectores



Merge de dois vectores



Merge de dois vectores

V1 =

1	3	7	18	20
---	---	---	----	----

i ↓

V2 =

5	7	8	11	13
---	---	---	----	----

j ↓

V =

1	3	5	7	7	8	11	13	18	20
---	---	---	---	---	---	----	----	----	----

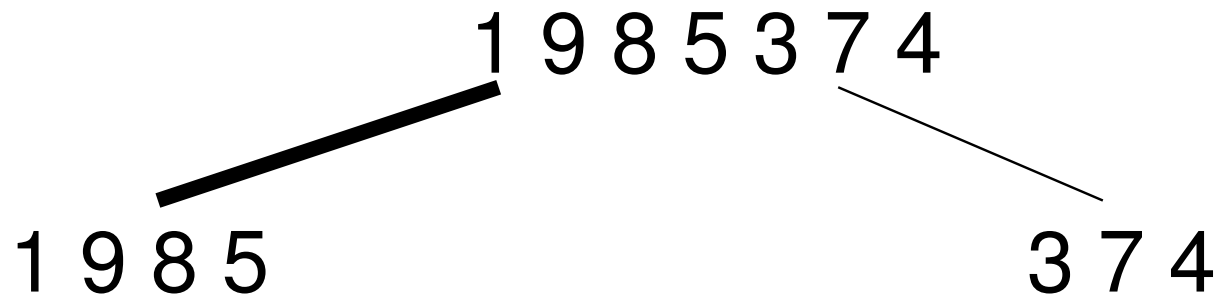
k ↓

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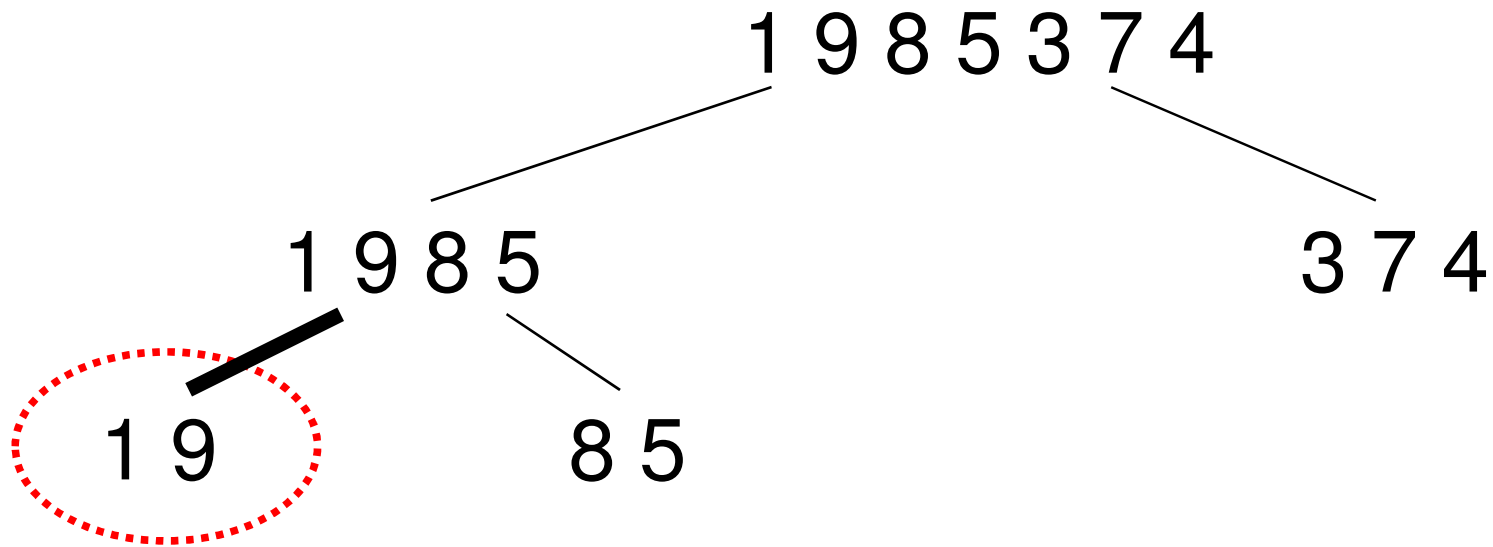
1 9 8 5 3 7 4



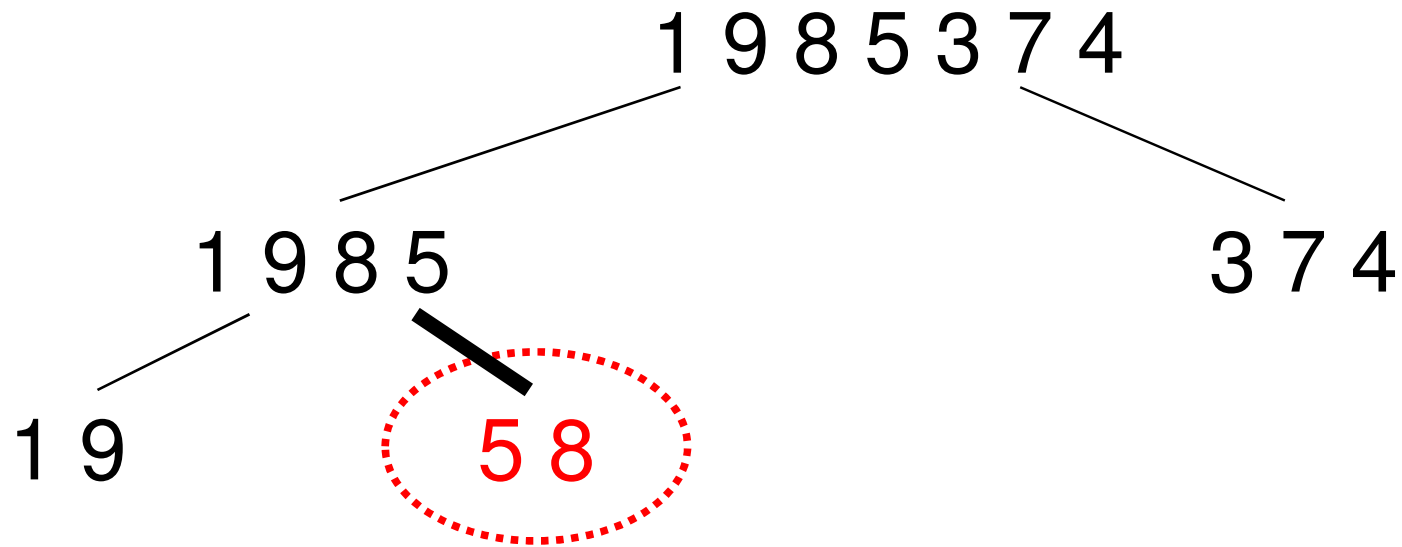
Mergesort



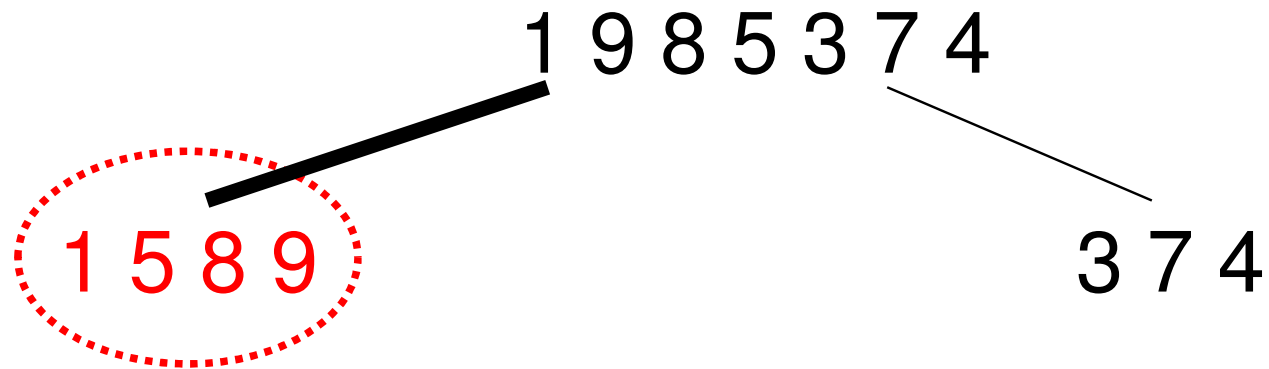
Mergesort



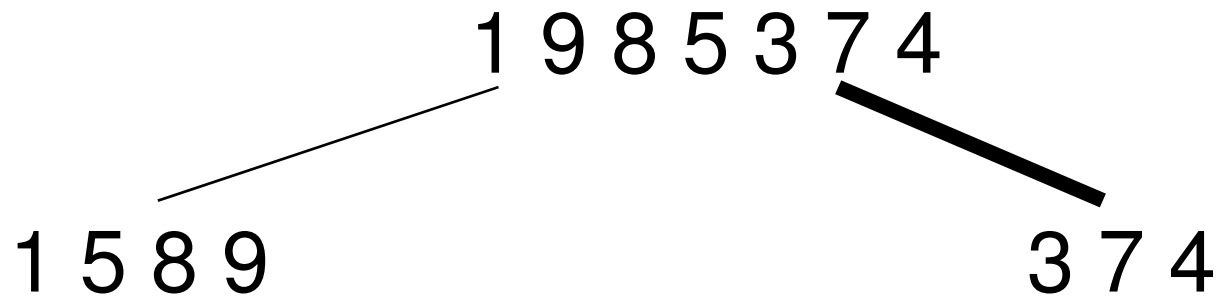
Mergesort



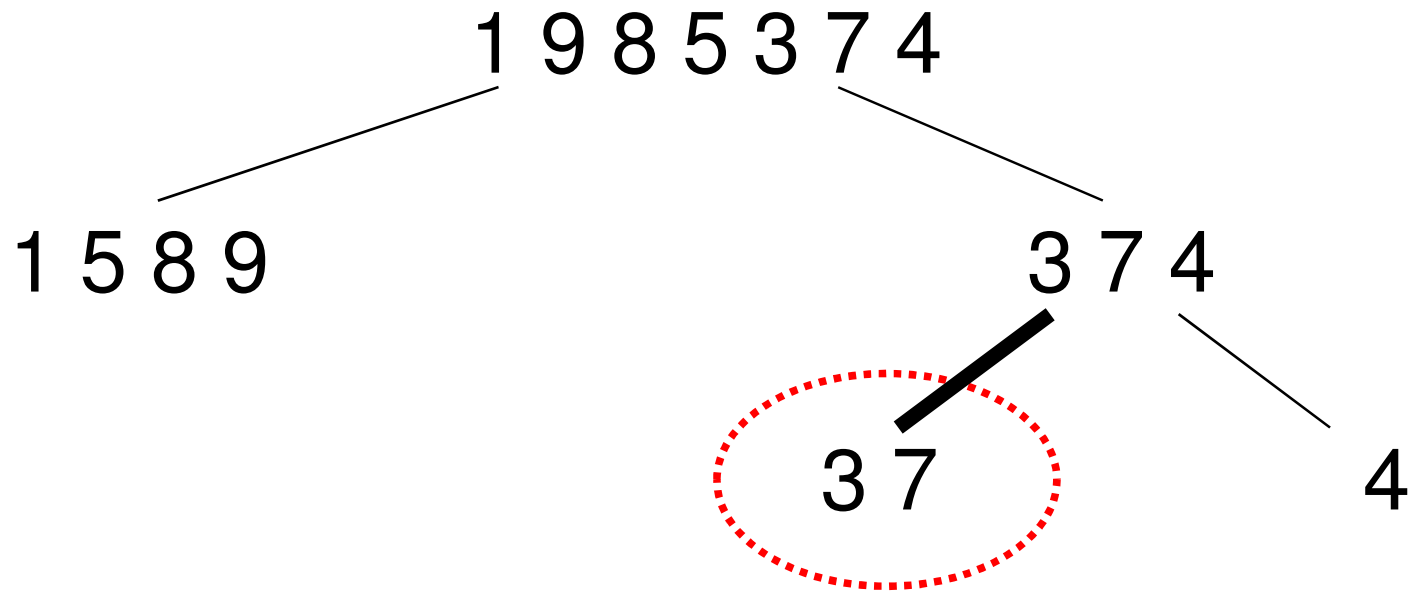
Mergesort



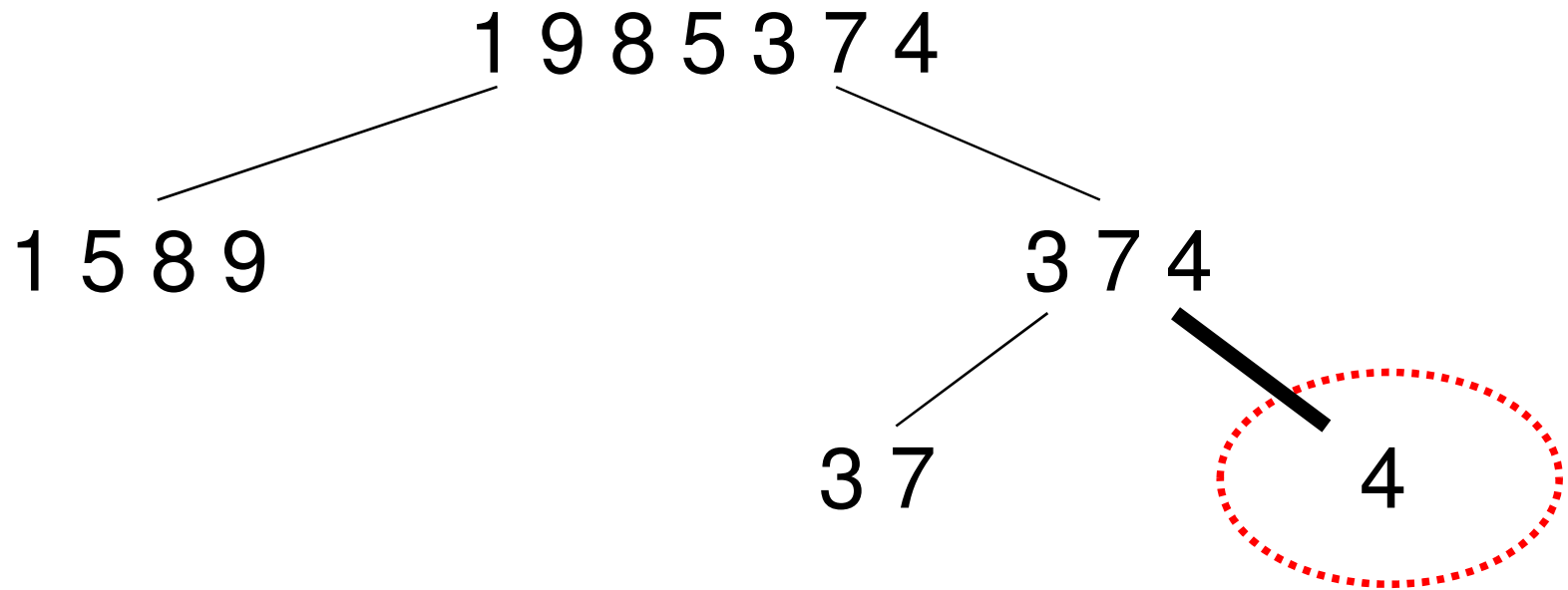
Mergesort



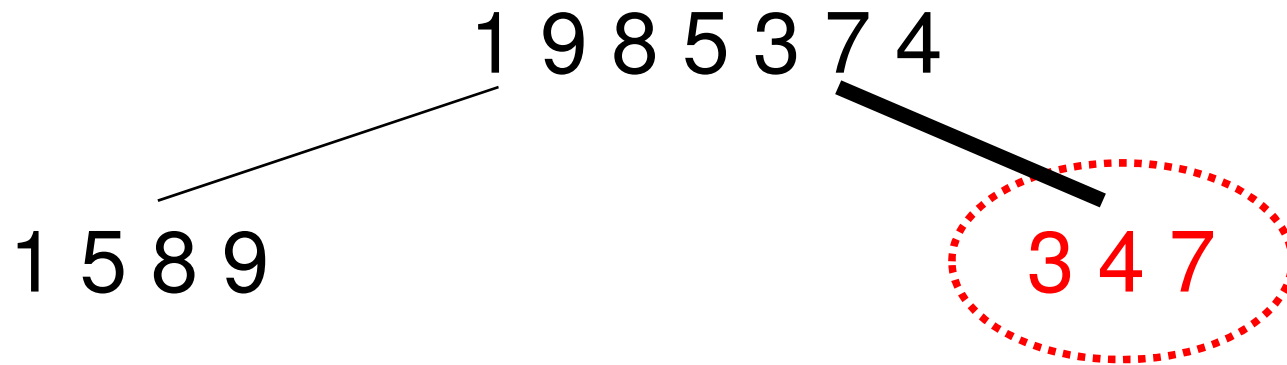
Mergesort



Mergesort



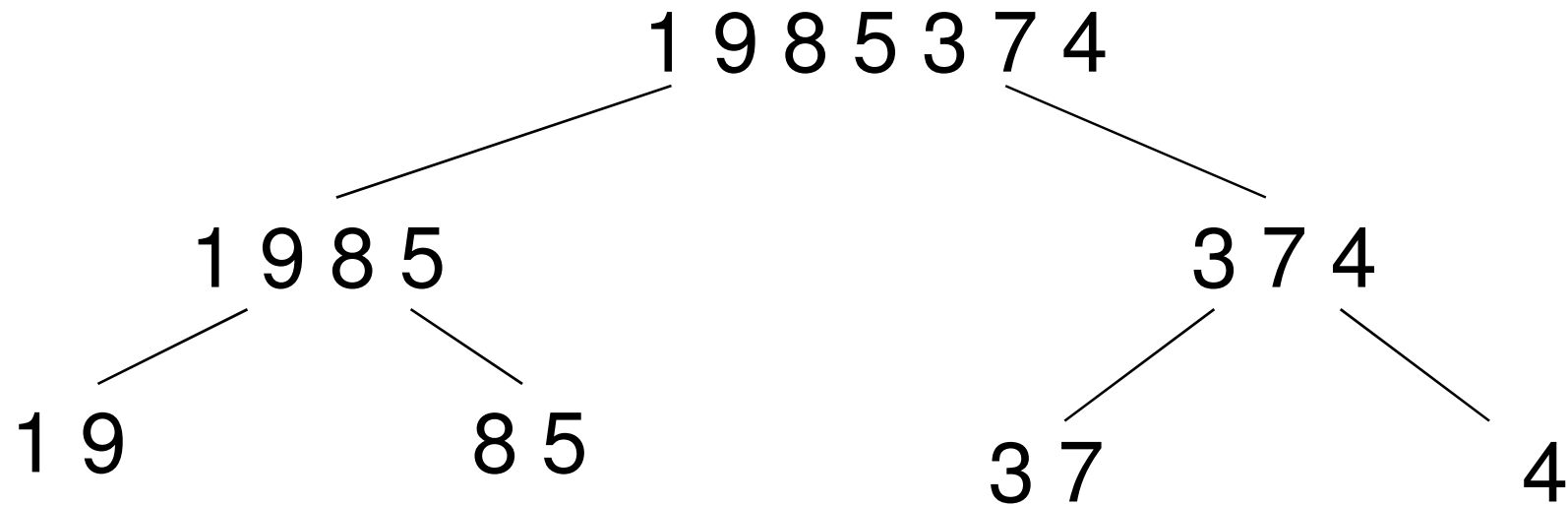
Mergesort



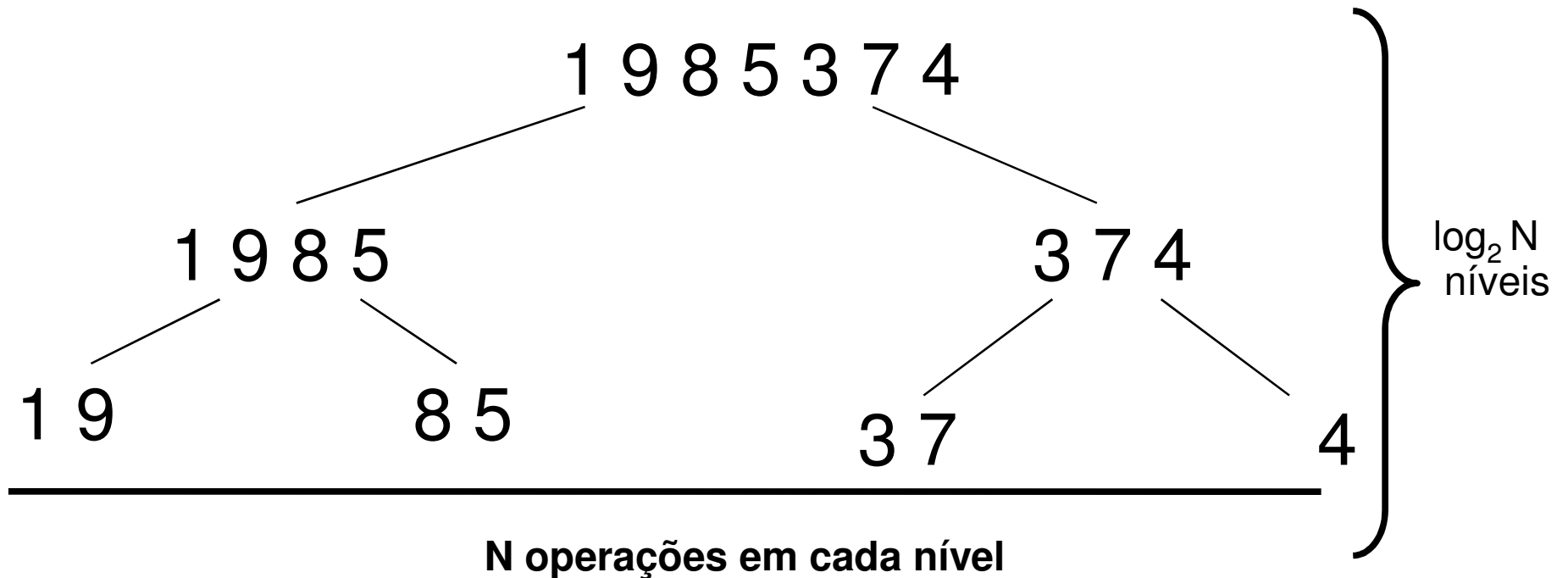
Mergesort

1 3 4 5 7 8 9

Mergesort - operações



Mergesort - operações



Total de operações:
 $N * \log_2 N$