Hi-Degree Polynomials

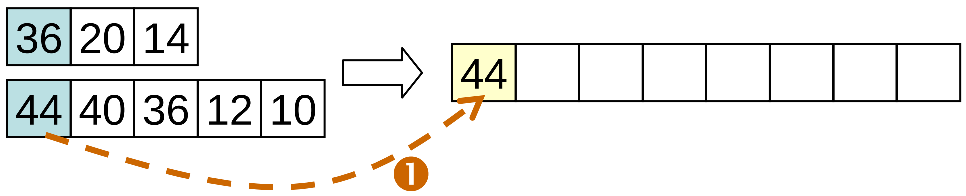
Pei-yih Ting

102/04/30

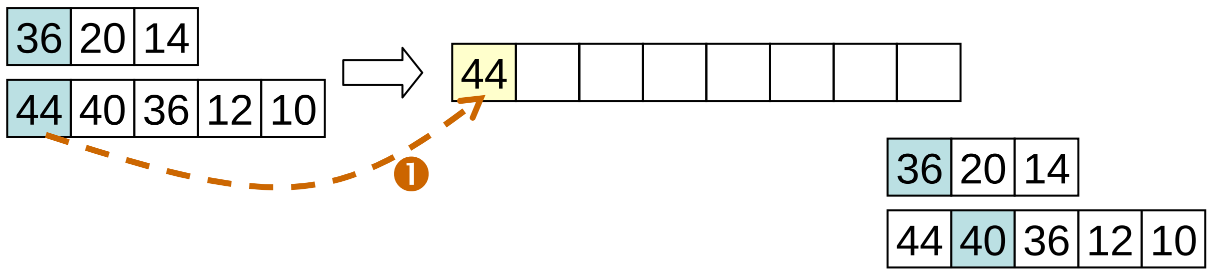
Merging Two Sorted Arrays

36	20	14		
44	40	36	12	10

Merging Two Sorted Arrays



Merging Two Sorted Arrays



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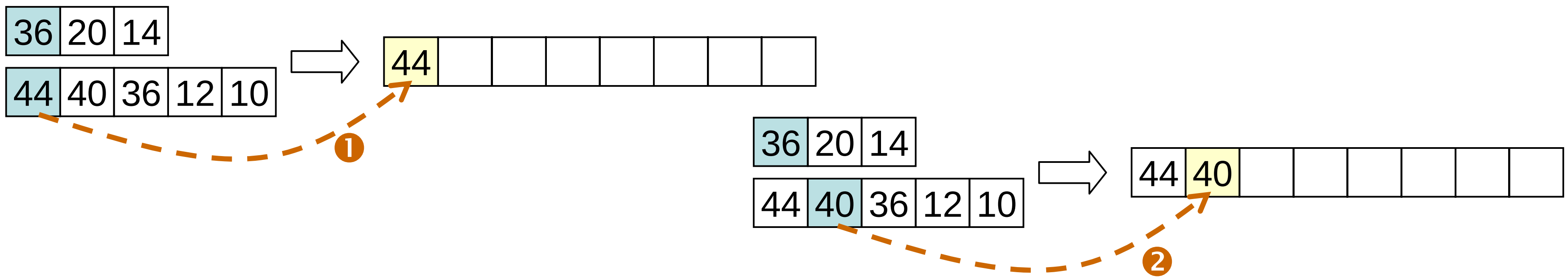

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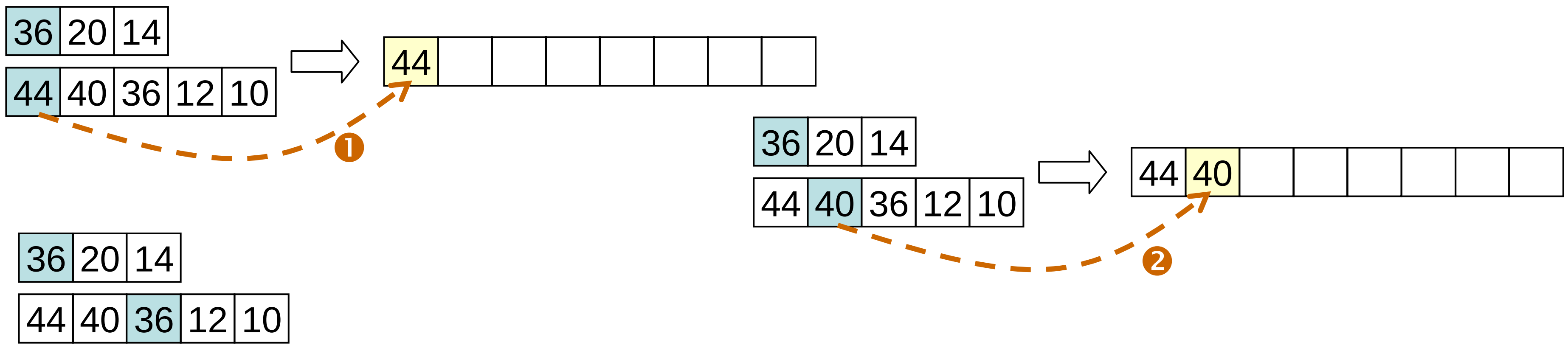

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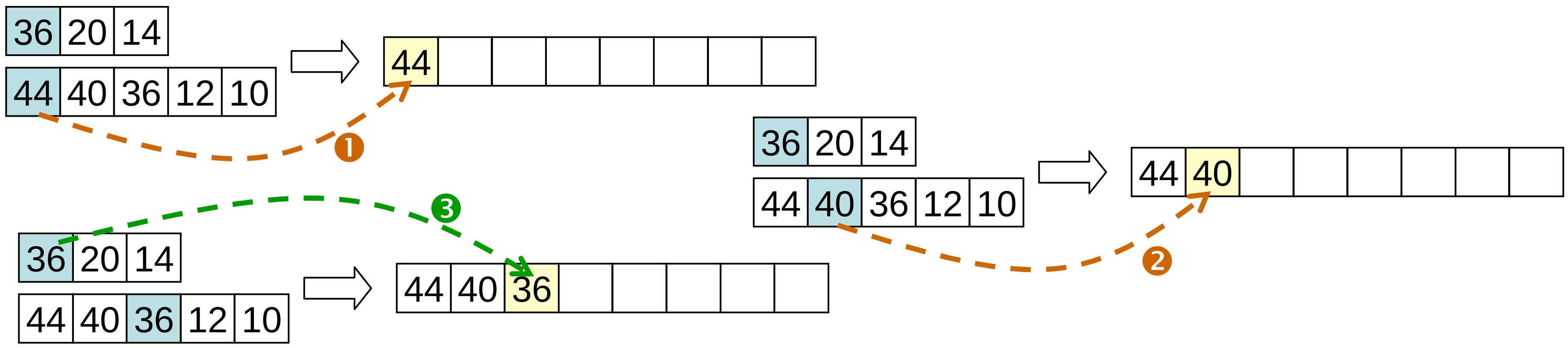

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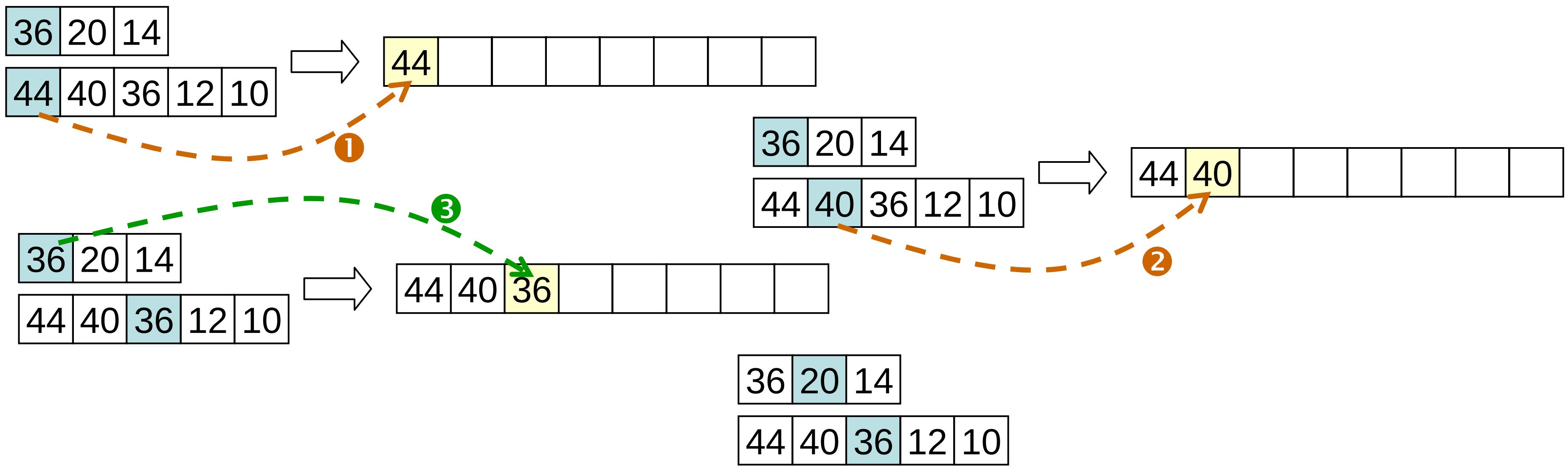

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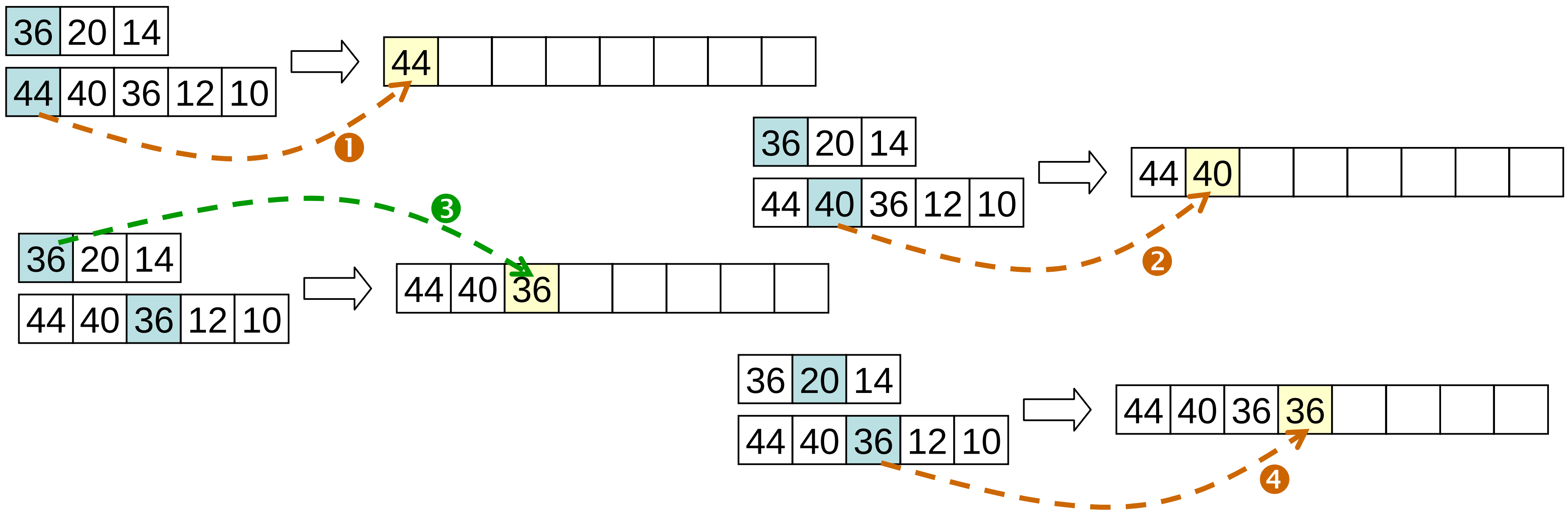

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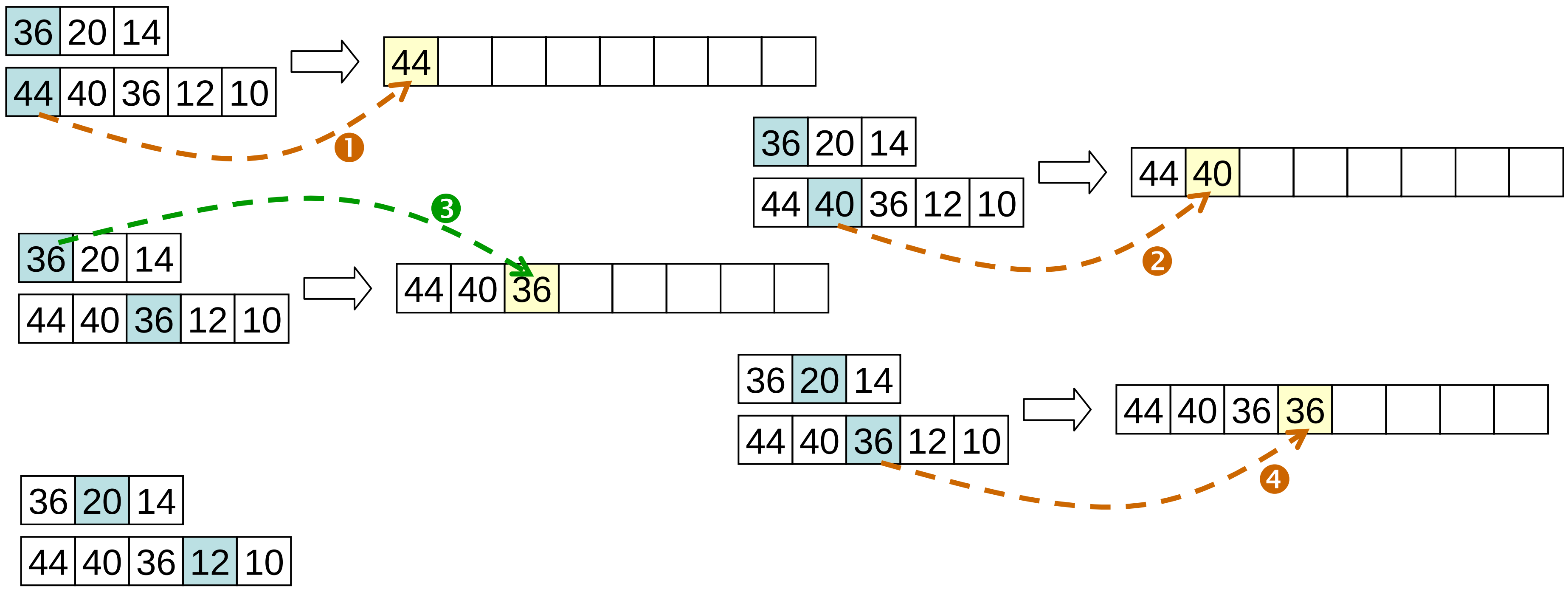
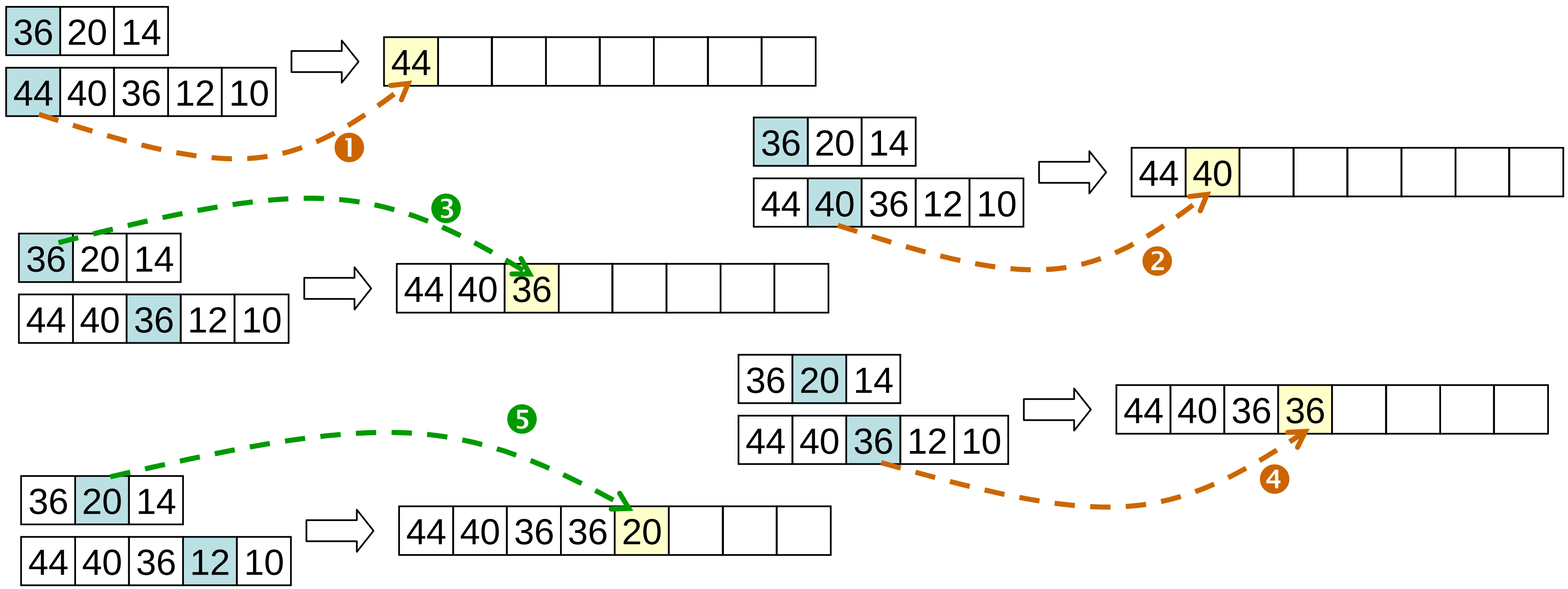
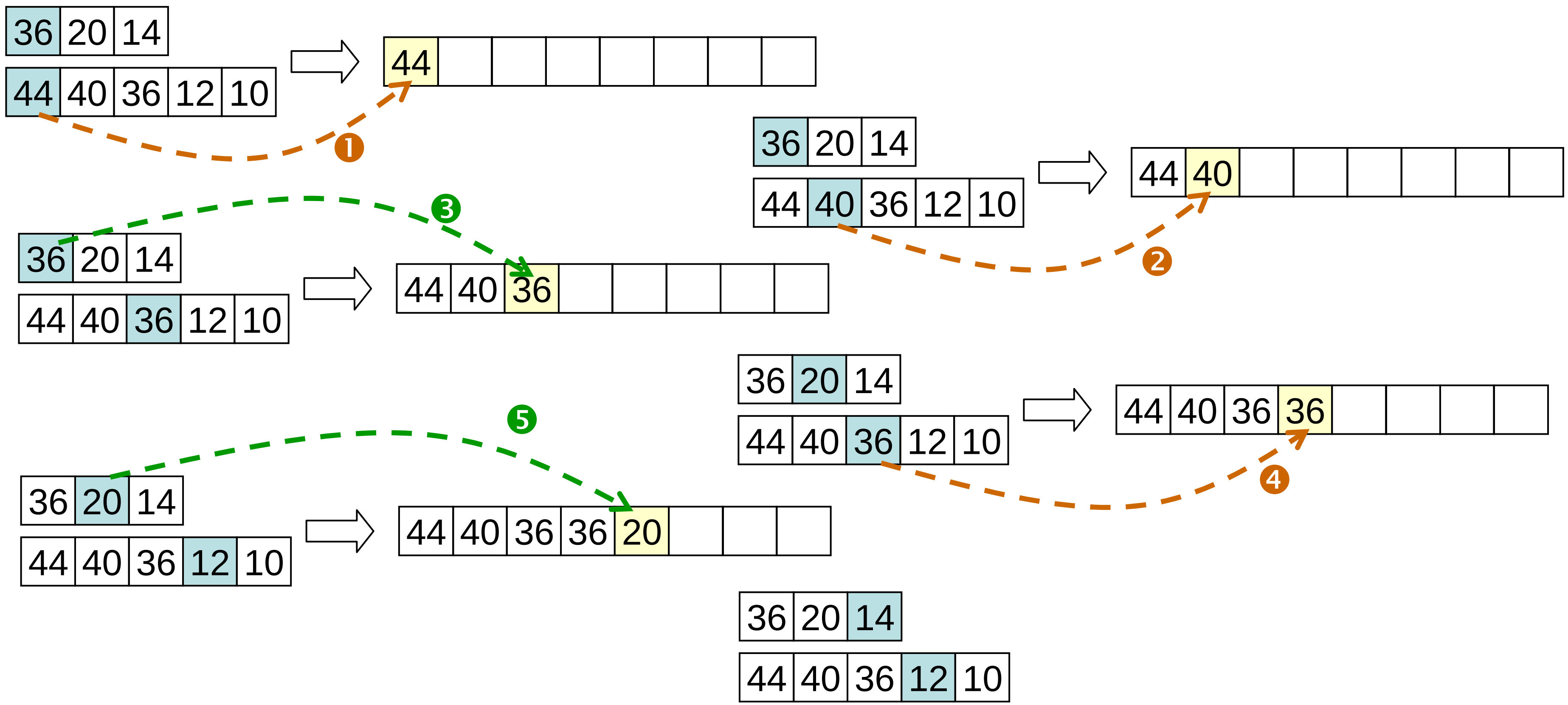


Merging Two Sorted Arrays



Merging Two Sorted Arrays



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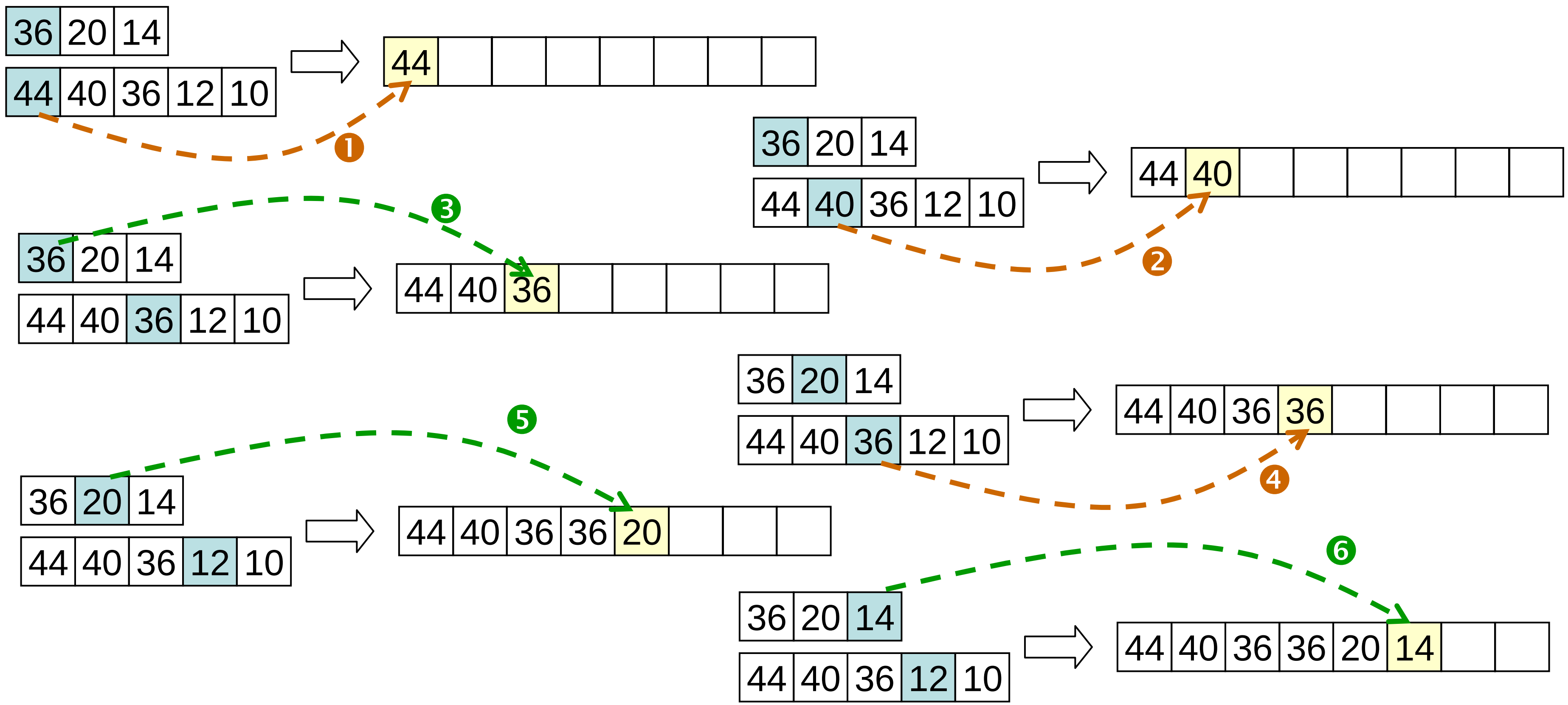

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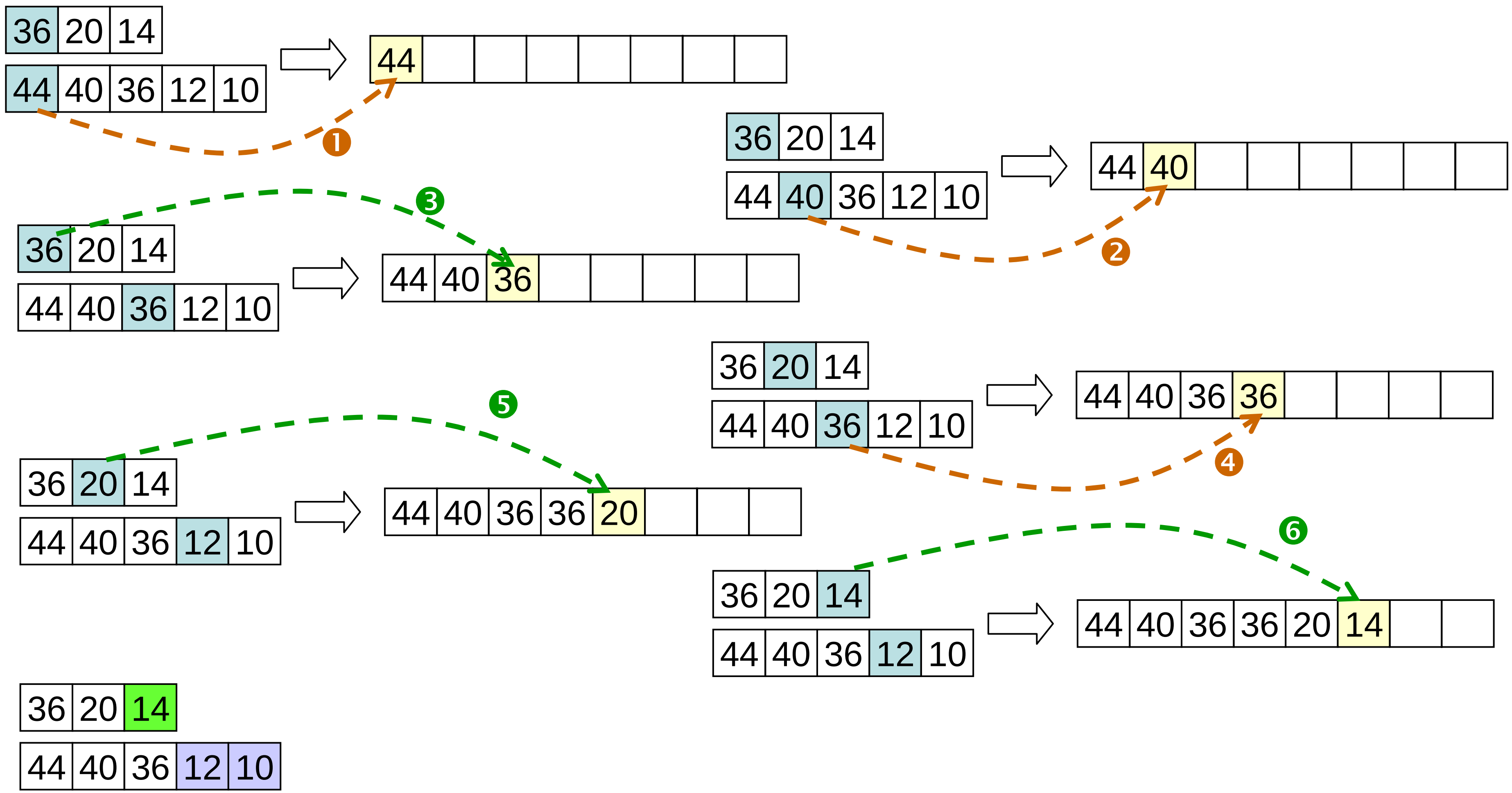

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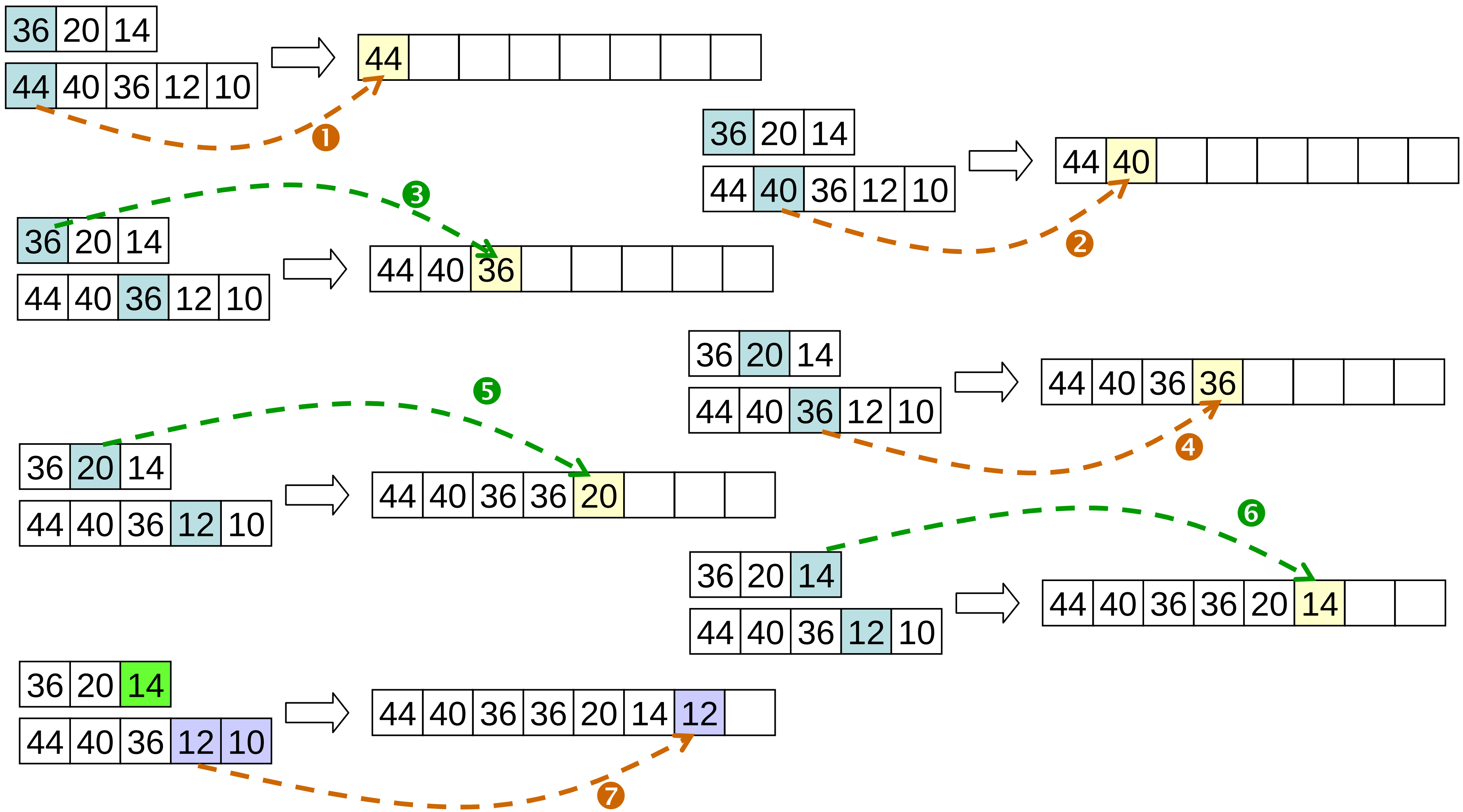

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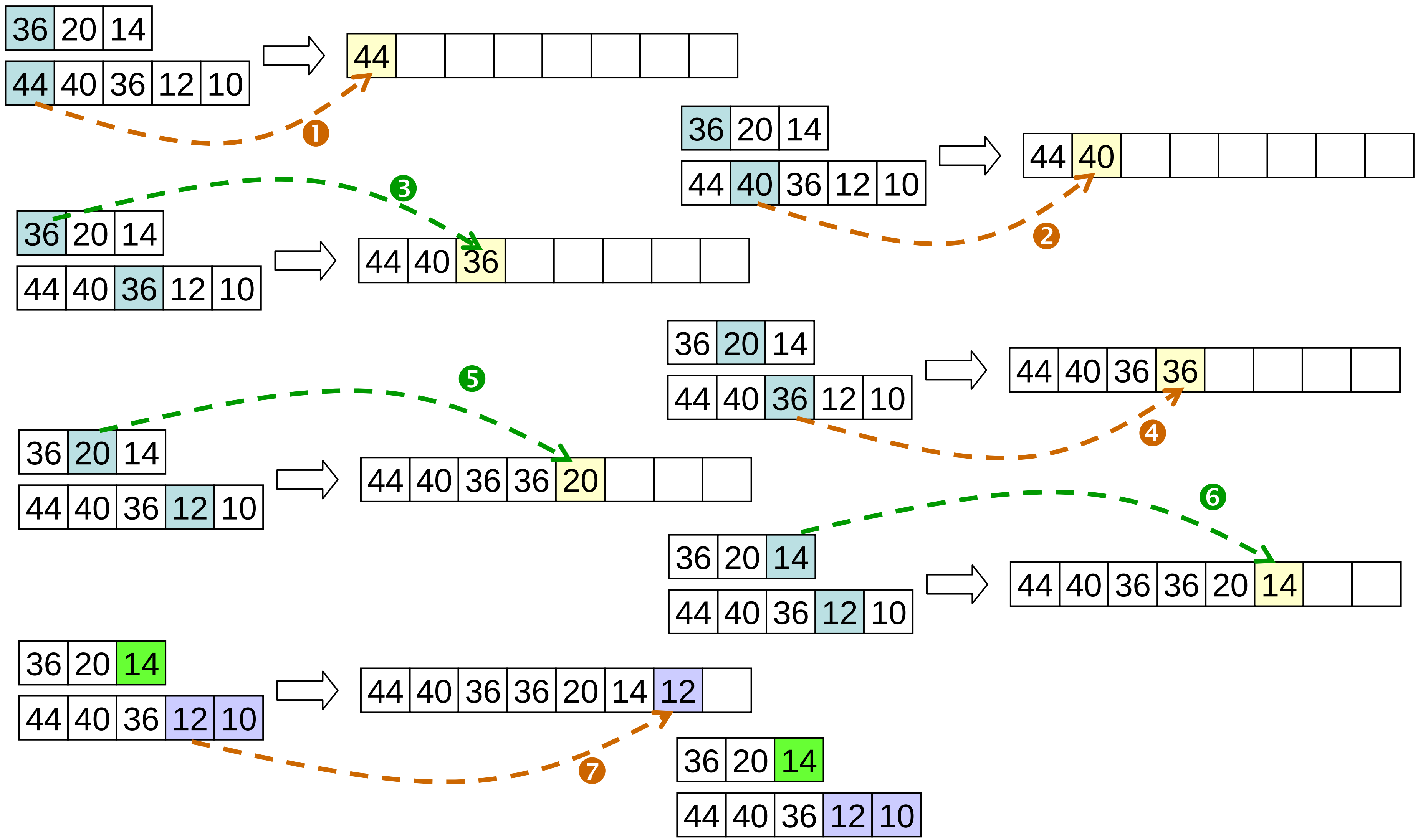

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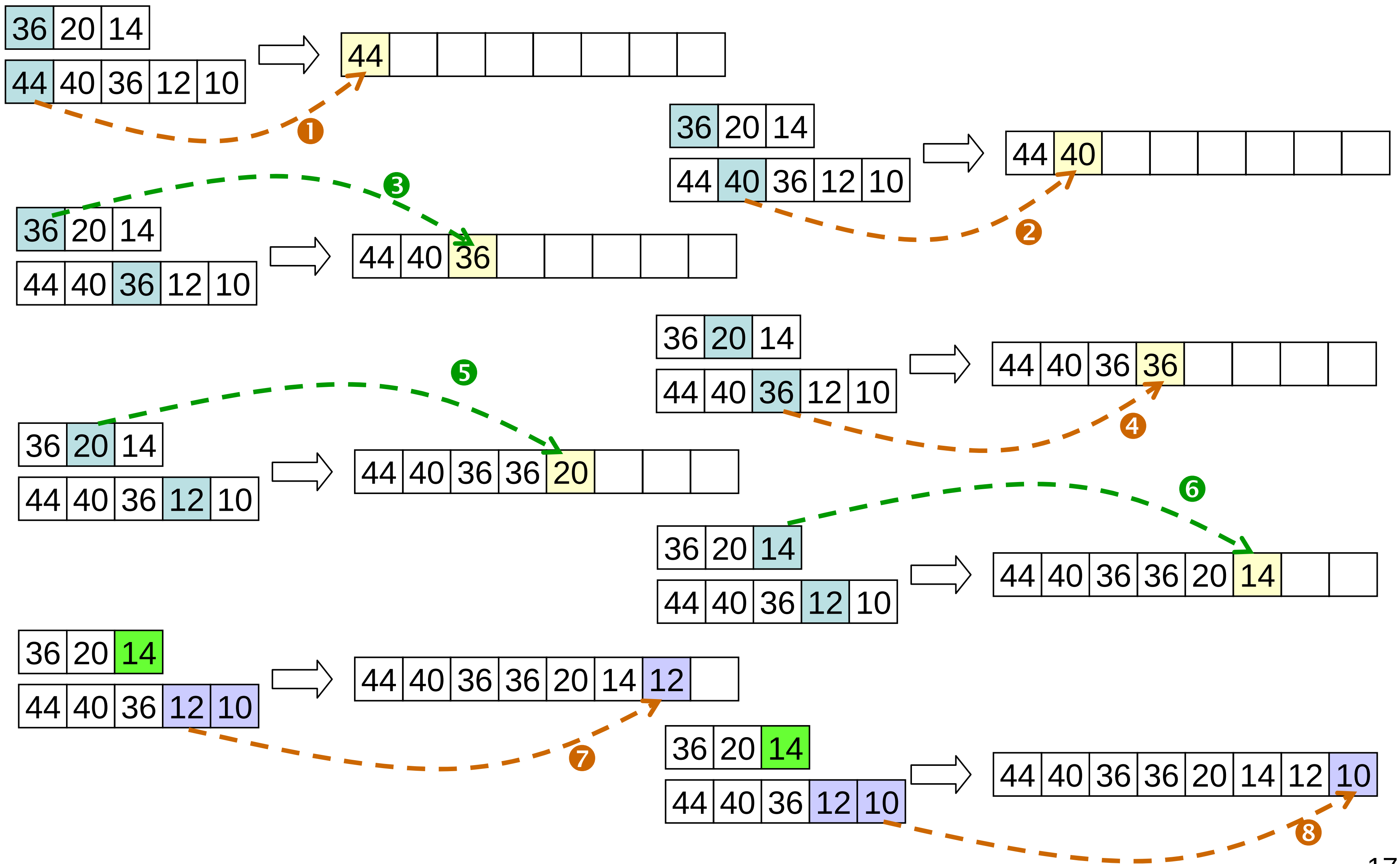

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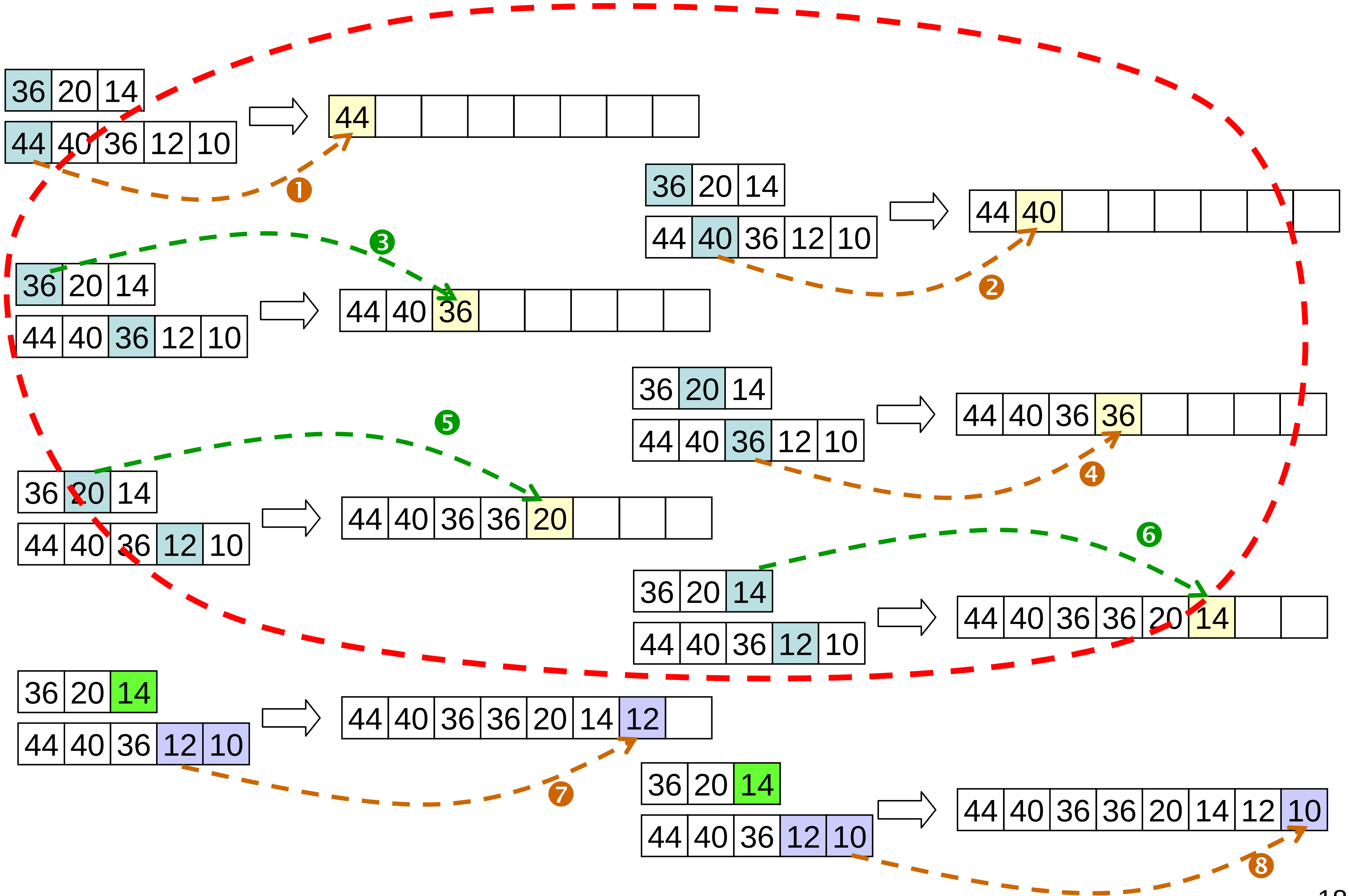

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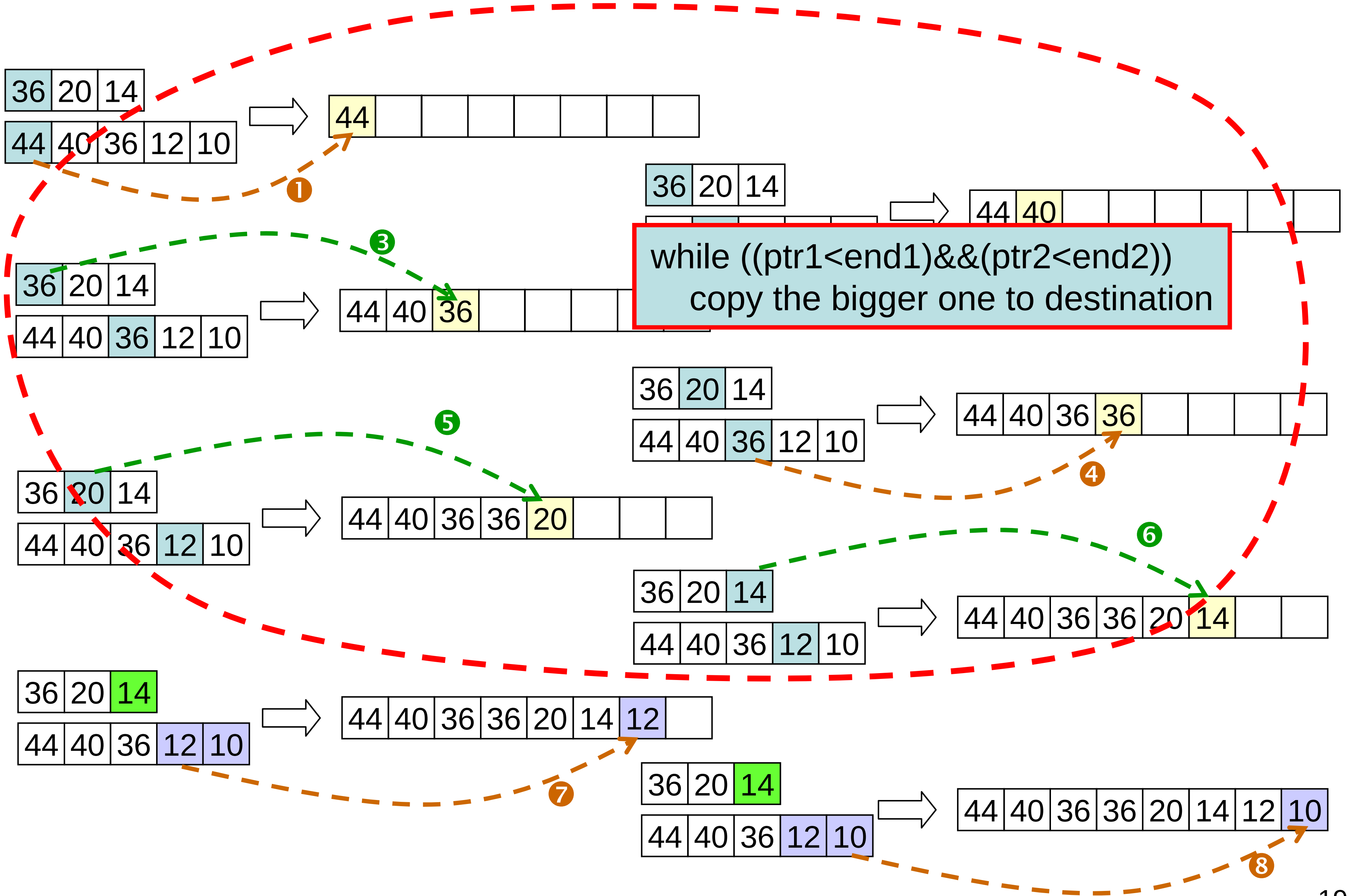

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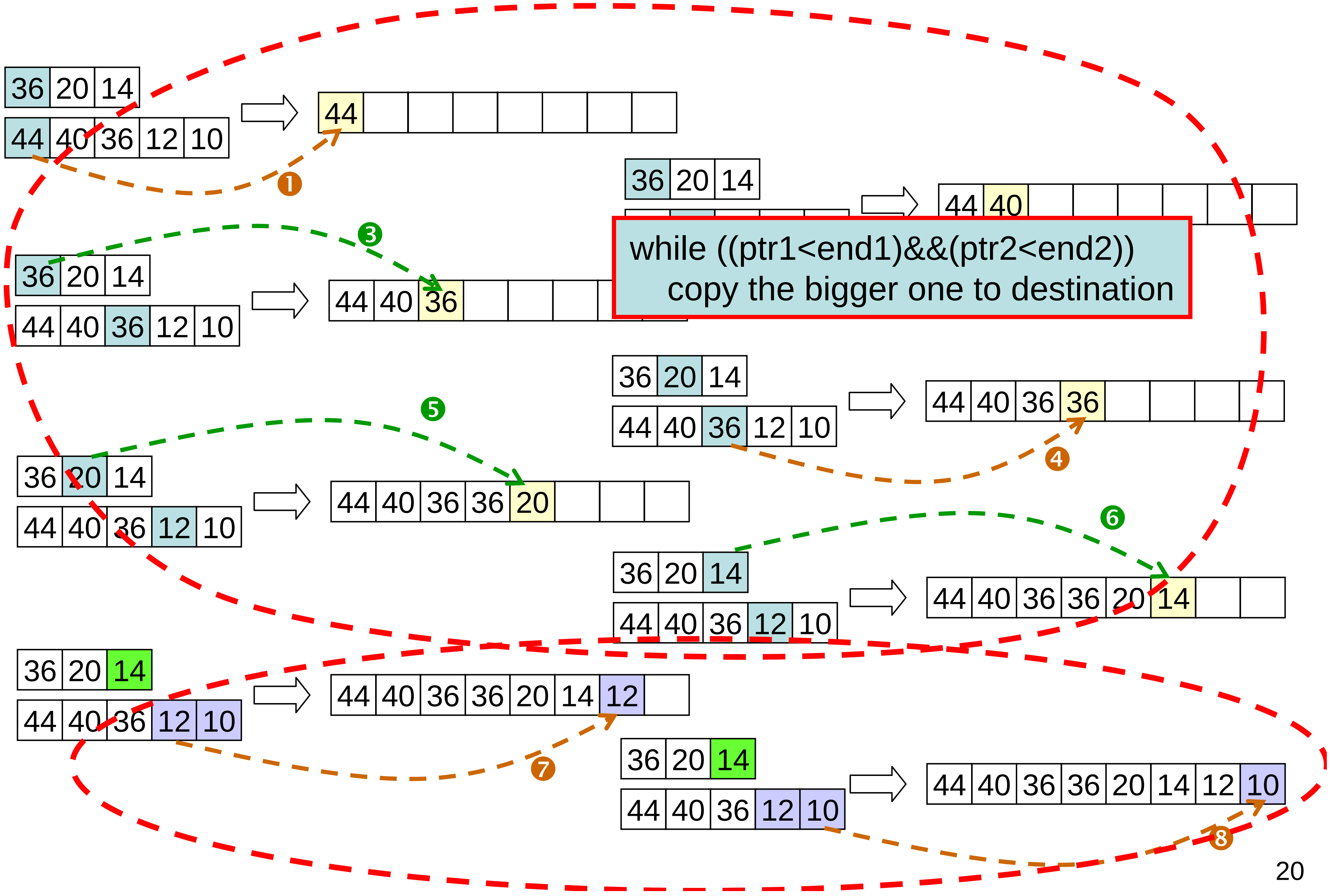
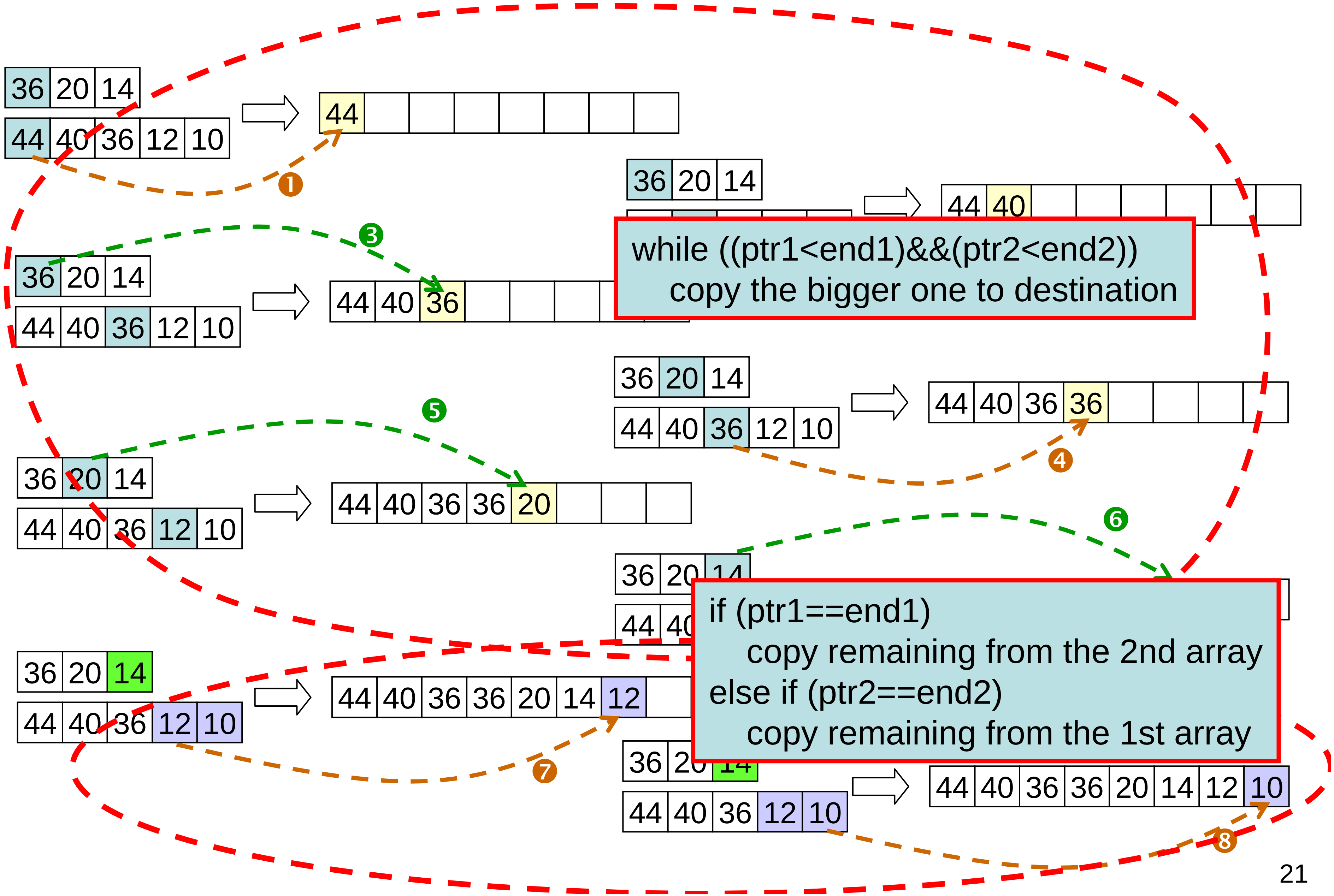


Merging Two Sorted Arrays



```
while ((ptr1<end1)&&(ptr2<end2))
    copy the bigger one to destination
```

```
if (ptr1==end1)
    copy remaining from the 2nd array
else if (ptr2==end2)
    copy remaining from the 1st array
```

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1\, x^{10} + a_2\, x^5 + a_3\, x \\ h(x) = b_1\, x^{21} + b_2\, x^{13} + b_3\, x^{11} + b_4\, x^7 \end{cases}$$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1\, x^{10} + a_2\, x^5 + a_3\, x \\ h(x) = b_1\, x^{21} + b_2\, x^{13} + b_3\, x^{11} + b_4\, x^7 \end{cases} \overset{?}{\Longrightarrow} f(x) = g(x)\, h(x)$$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1\, x^{10} + a_2\, x^5 + a_3\, x \\ h(x) = b_1\, x^{21} + b_2\, x^{13} + b_3\, x^{11} + b_4\, x^7 \end{cases} \quad \overset{?}{\Longrightarrow} \quad f(x) = g(x)\, h(x)$$

$$a_1\, x^{10} \cdot h(x) \;=\; a_1\, x^{10} \cdot (b_1\, x^{21} + b_2\, x^{13} + b_3\, x^{11} + b_4\, x^7)$$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \overset{?}{\Longrightarrow} f(x) = g(x)\, h(x)$$

$a_1 b_1 x^{10+21}$

$$a_1 x^{10} \cdot h(x) = a_1 x^{10} \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7)$$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \overset{?}{\Longrightarrow} f(x) = g(x)\, h(x)$$

$a_1 b_2 x^{10+13}$

$a_1 b_1 x^{10+21}$

$$a_1 x^{10} \cdot h(x) \;=\; a_1 x^{10} \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7)$$

Multiply Two Polynomials

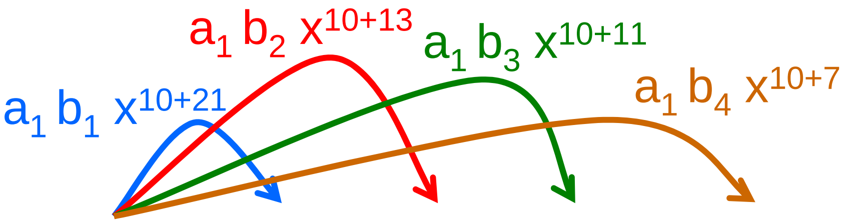
$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \overset{?}{\Longrightarrow} f(x) = g(x)\, h(x)$$

$a_1 b_1 x^{10+21}$ $a_1 b_2 x^{10+13}$ $a_1 b_3 x^{10+11}$

$$a_1 x^{10} \cdot h(x) = a_1 x^{10} \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7)$$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \overset{?}{\Longrightarrow} f(x) = g(x)\, h(x)$$



$$a_1 x^{10} \cdot h(x) = a_1 x^{10} \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7)$$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \overset{?}{\Longrightarrow} f(x) = g(x)\, h(x)$$

$a_1 b_2 x^{10+13}$

$a_1 b_1 x^{10+21}$

$a_1 x^{10} \cdot h(x) \;=\; a_1 x^{10} \cdot (b_1 x^{21} + b$

```
for (j=0; j<h.size(); j++)
{
    tmp[j].coef = g[i].coef * h[j].coef;
    tmp[j].degree = g[i].degree + h[j].degree;
}
```

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \quad \overset{?}{\Longrightarrow} \quad f(x) = g(x)\, h(x)$$

$a_1 b_2 x^{10+13}$

$a_1 b_1 x^{10+21}$

$a_1 x^{10} \cdot h(x) = a_1 x^{10} \cdot (b_1 x^{21} + b$

```
for (j=0; j<h.size(); j++)
{
    tmp[j].coef = g[i].coef * h[j].coef;
    tmp[j].degree = g[i].degree + h[j].degree;
}
```

+

$a_2 x^5 \cdot h(x) = a_2 x^5 \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7)$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \xrightarrow{?} f(x) = g(x)\, h(x)$$

$a_1 b_2 x^{10+13}$

$a_1 b_1 x^{10+21}$

```
for (j=0; j<h.size(); j++)
{
    tmp[j].coef = g[i].coef * h[j].coef;
    tmp[j].degree = g[i].degree + h[j].degree;
}
```

$$a_1 x^{10} \cdot h(x) \quad = \quad a_1 x^{10} \cdot (b_1 x^{21} + b$$

$$+$$

$$a_2 x^5 \cdot h(x) \quad = \quad a_2 x^5 \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7)$$

$$+$$

$$a_3 x \cdot h(x) \quad = \quad a_3 x \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7)$$

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases} \xrightarrow{?} f(x) = g(x)\, h(x)$$

$a_1 b_2 x^{10+13}$

$a_1 b_1 x^{10+21}$

$a_1 x^{10} \cdot h(x) \quad = \quad a_1 x^{10} \cdot (b_1 x^{21} + b$

```
for (j=0; j<h.size(); j++)
{
    tmp[j].coef = g[i].coef * h[j].coef;
    tmp[j].degree = g[i].degree + h[j].degree;
}
```

$+$

$a_2 x^5 \cdot h(x) \quad = \quad a_2 x^5 \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4$

$+$

$a_3 x \cdot h(x) \quad = \quad a_3 x \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x$

```
for (i=0; i<g.size(); i++)
{
    for (j ….)
    {
        …
    }
    f.addEqual(tmp);
}
```

Multiply Two Polynomials

$$\begin{cases} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{cases}$$

? ⇒ $f(x) = g(x)\, h(x)$

$a_1 b_2 x^{10+13}$

$a_1 b_1 x^{10+21}$

```
for (j=0; j<h.size(); j++)
{
    tmp[j].coef = g[i].coef * h[j].coef;
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}
```

$a_1 x^{10} \cdot h(x) \quad = \quad a_1 x^{10} \cdot (b_1 x^{21} + b$

$+$

$a_2 x^5 \cdot h(x) \quad = \quad a_2 x^5 \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4$

$+$

$a_3 x \cdot h(x) \quad = \quad a_3 x \cdot (b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x$

```
for (i=0; i<g.size(); i++)
{
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    f.addEqual(tmp);
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```