

Hi-Degree Polynomials

Pei-yih Ting

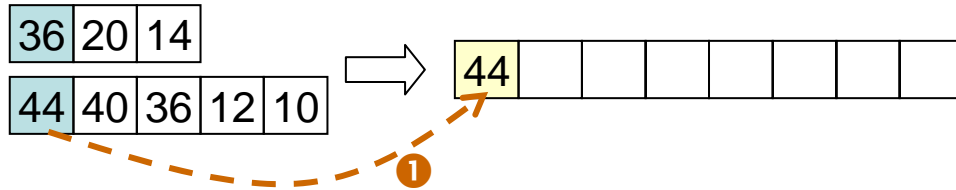
102/04/30

Merging Two Sorted Arrays

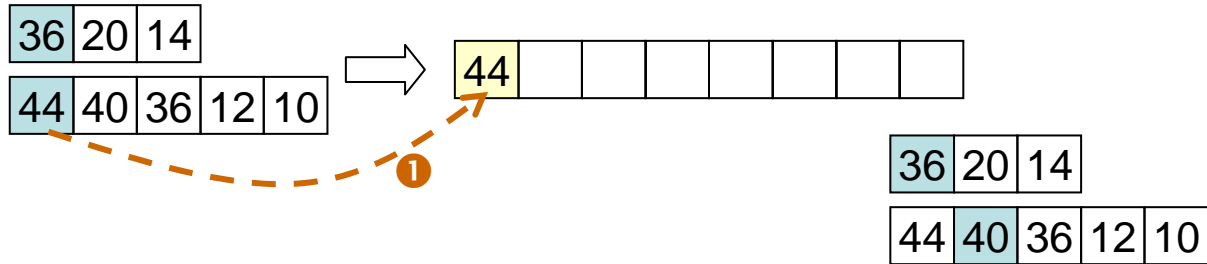
36	20	14
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44	40	36	12	10
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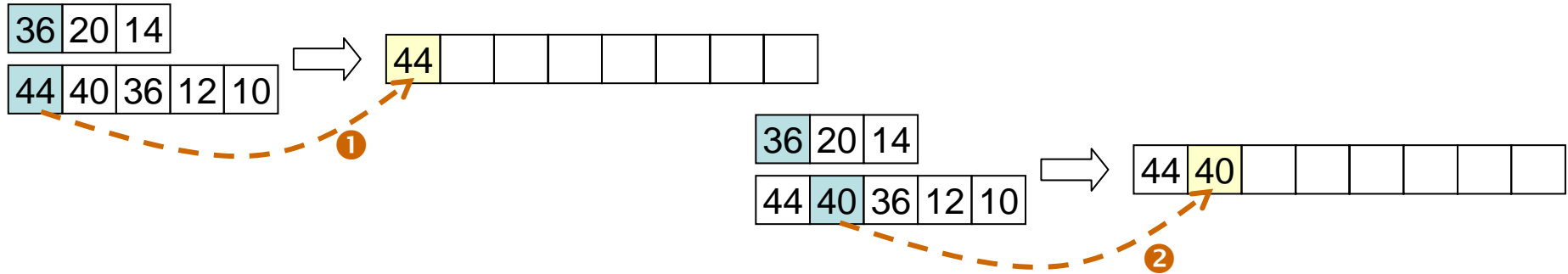
Merging Two Sorted Arrays



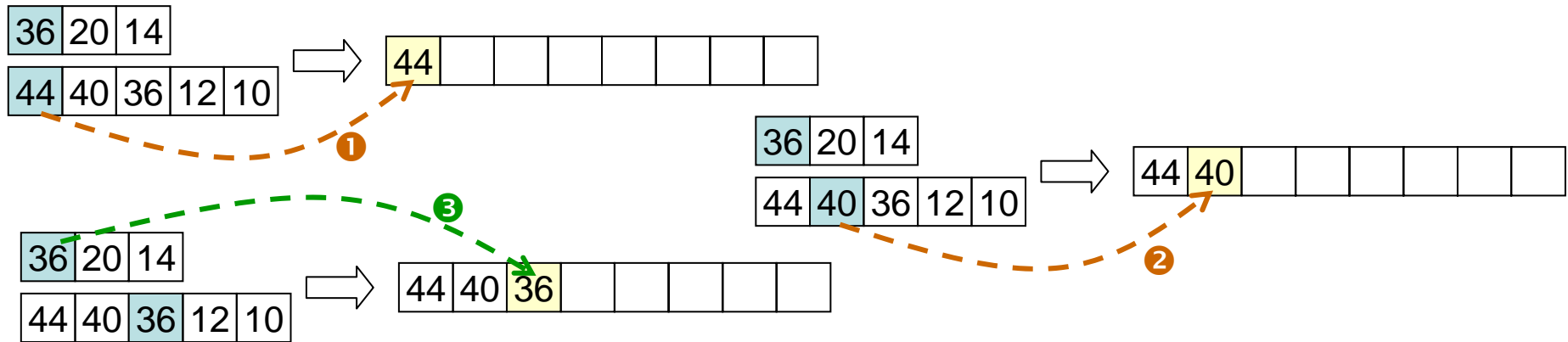
Merging Two Sorted Arrays



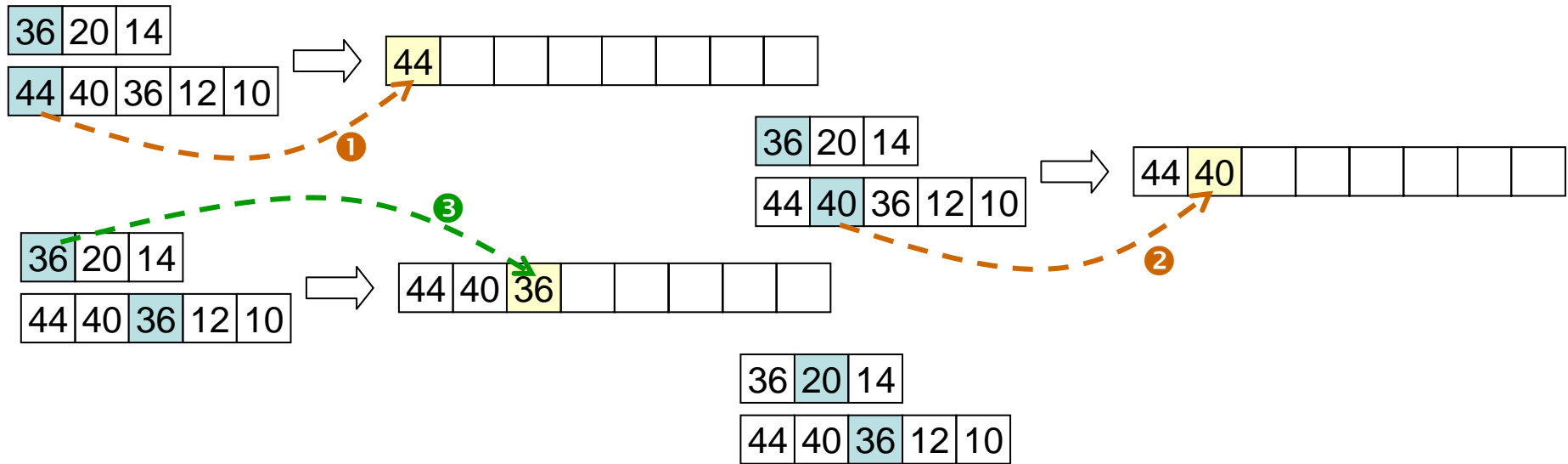
Merging Two Sorted Arrays



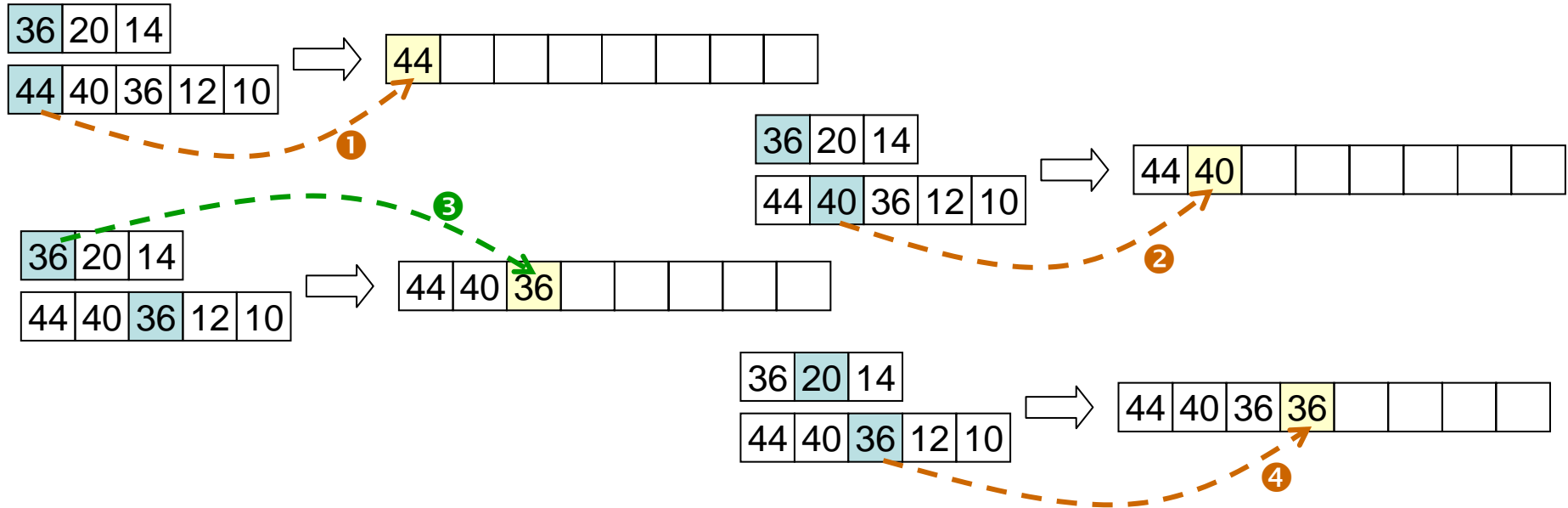
Merging Two Sorted Arrays



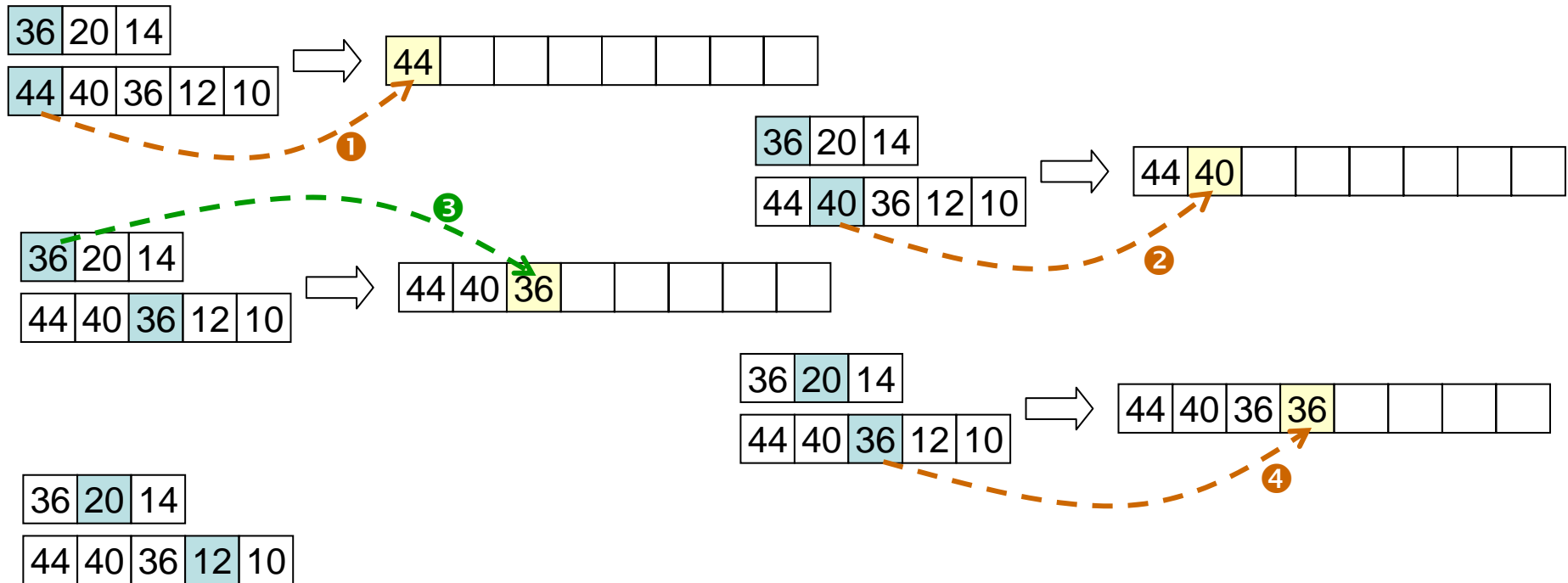
Merging Two Sorted Arrays



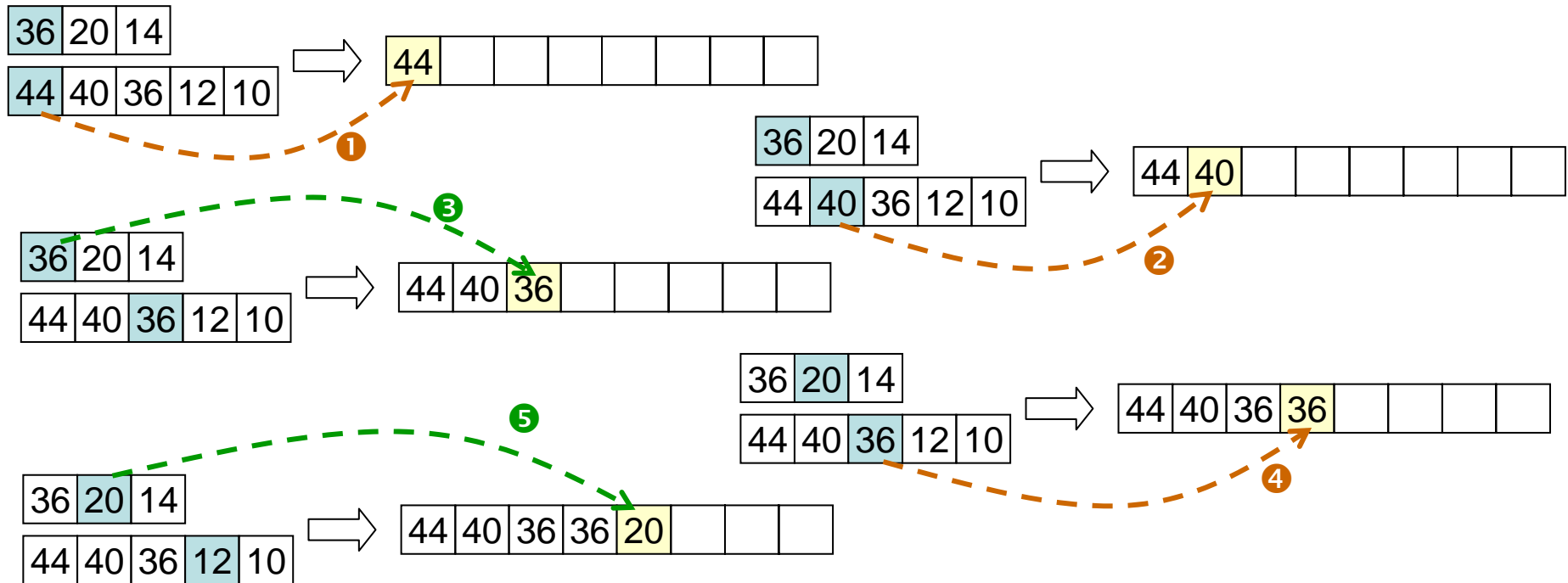
Merging Two Sorted Arrays



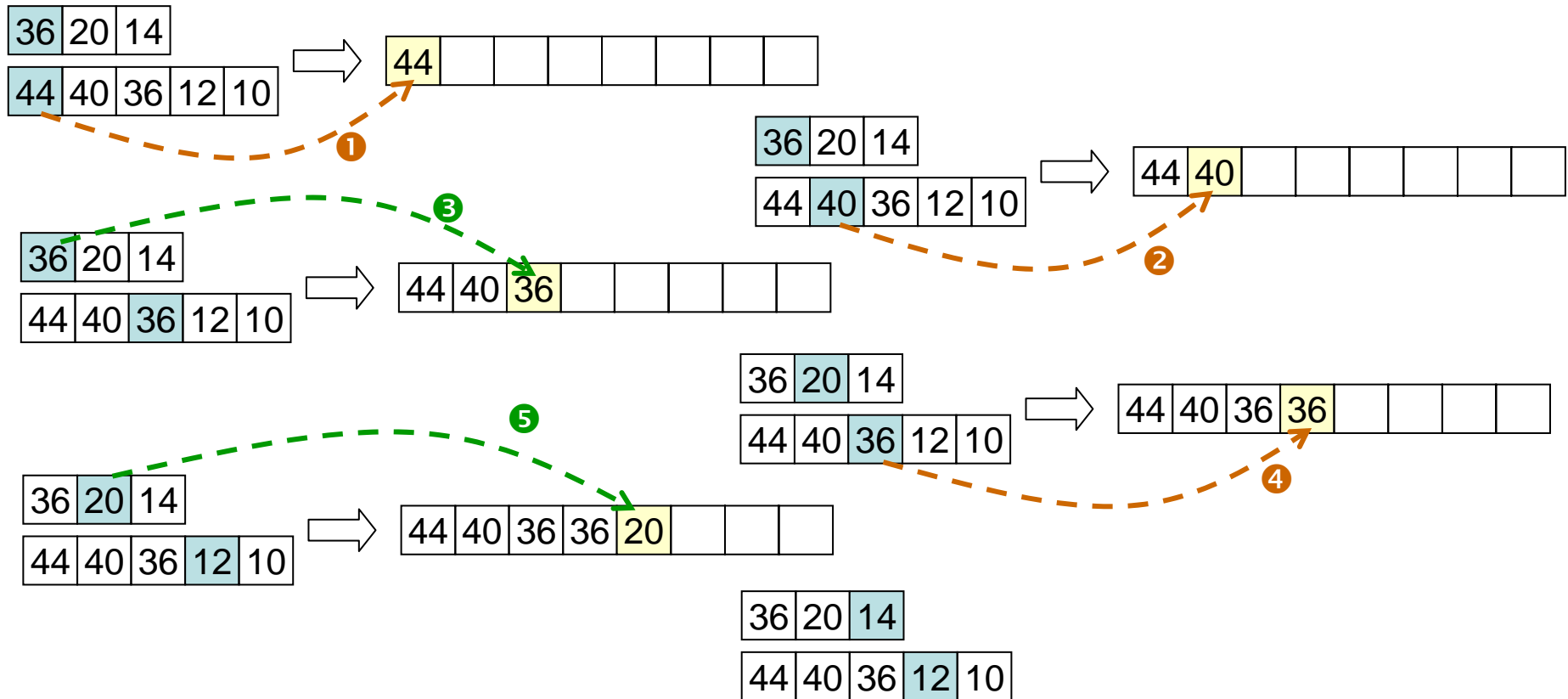
Merging Two Sorted Arrays



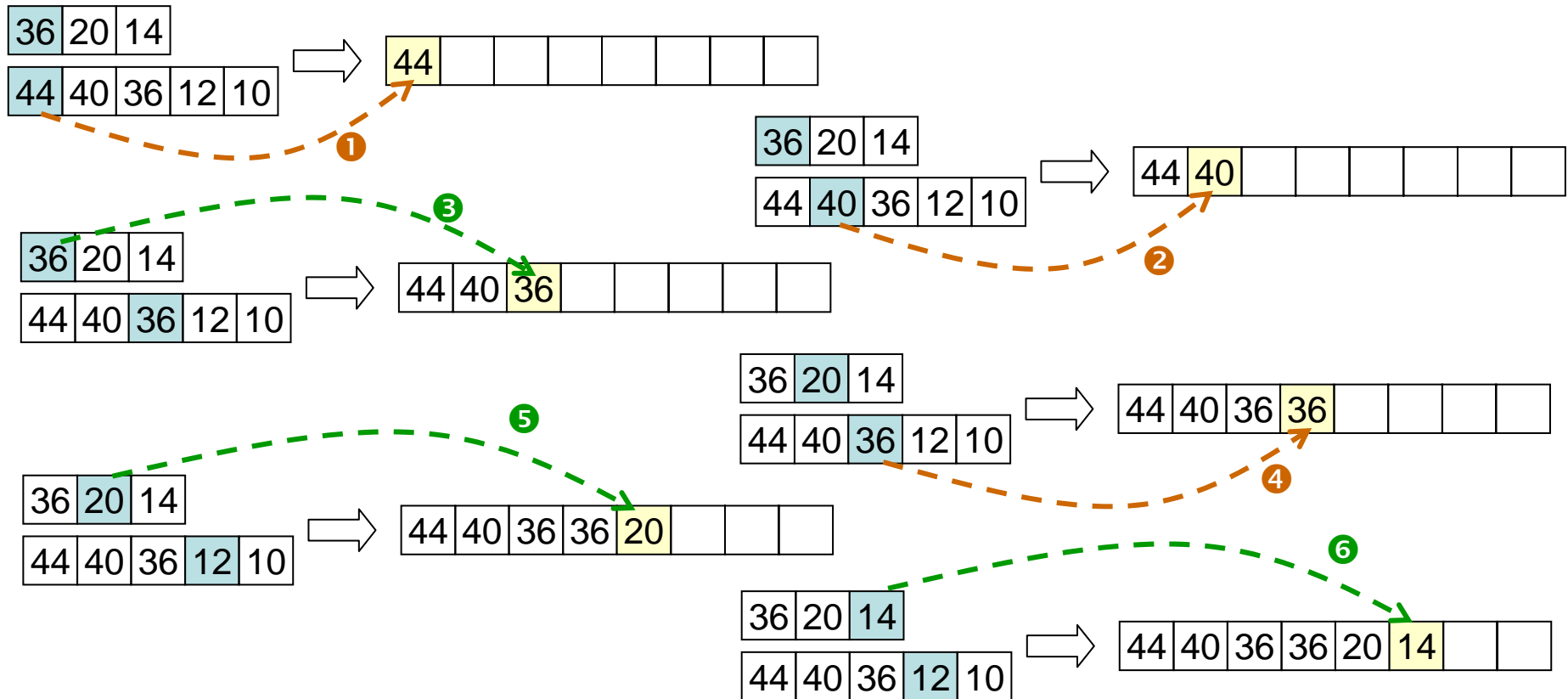
Merging Two Sorted Arrays



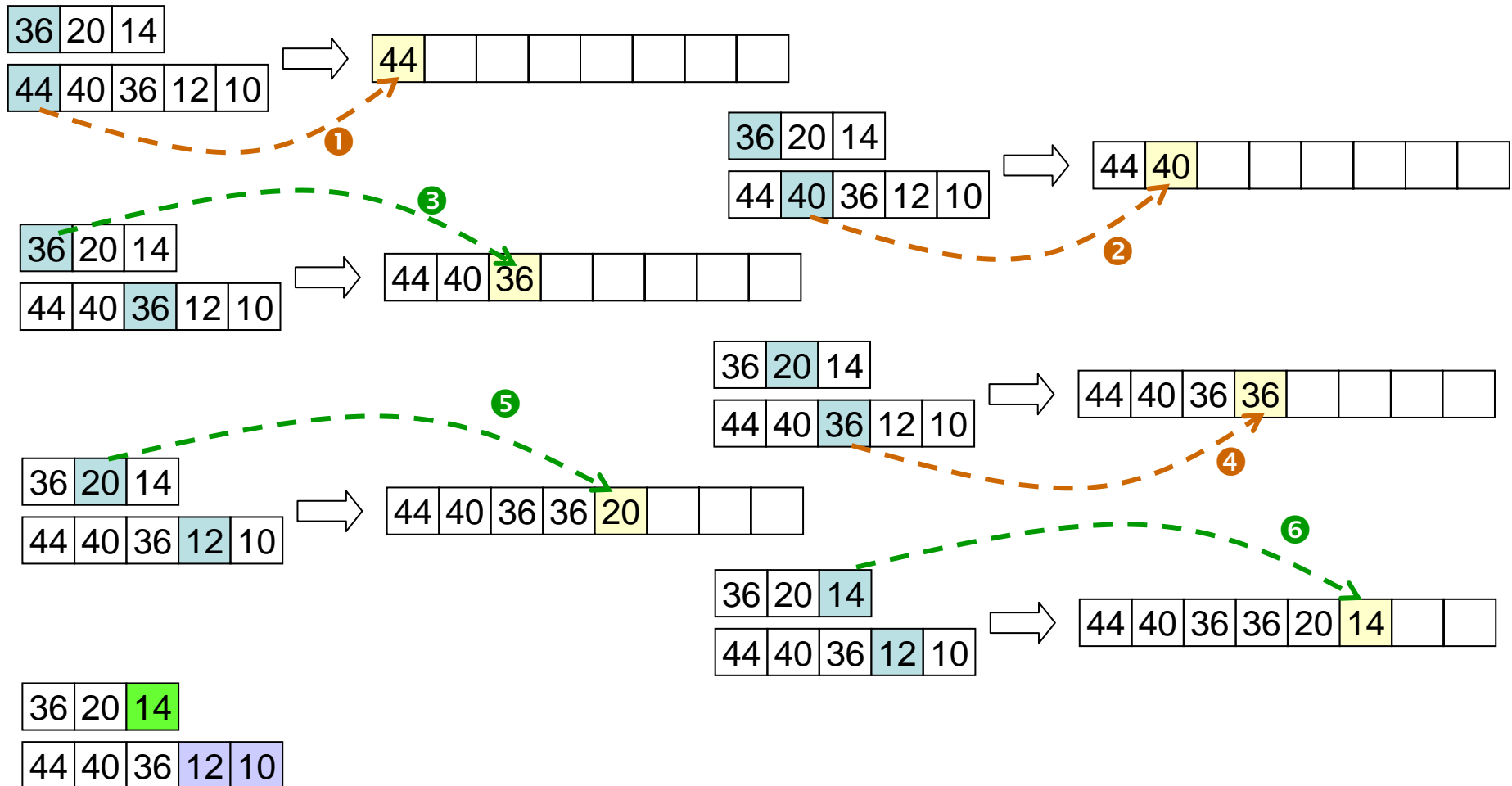
Merging Two Sorted Arrays



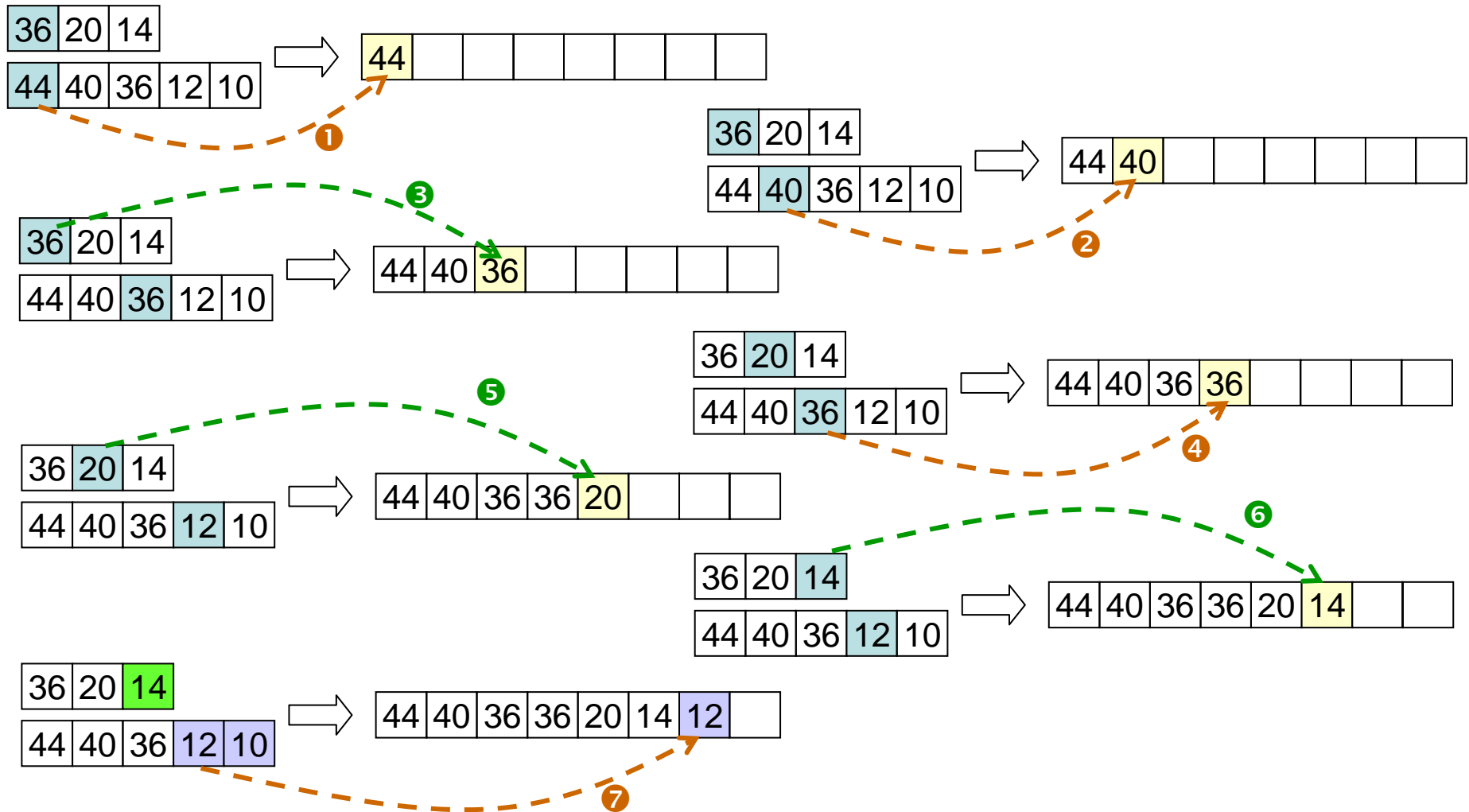
Merging Two Sorted Arrays



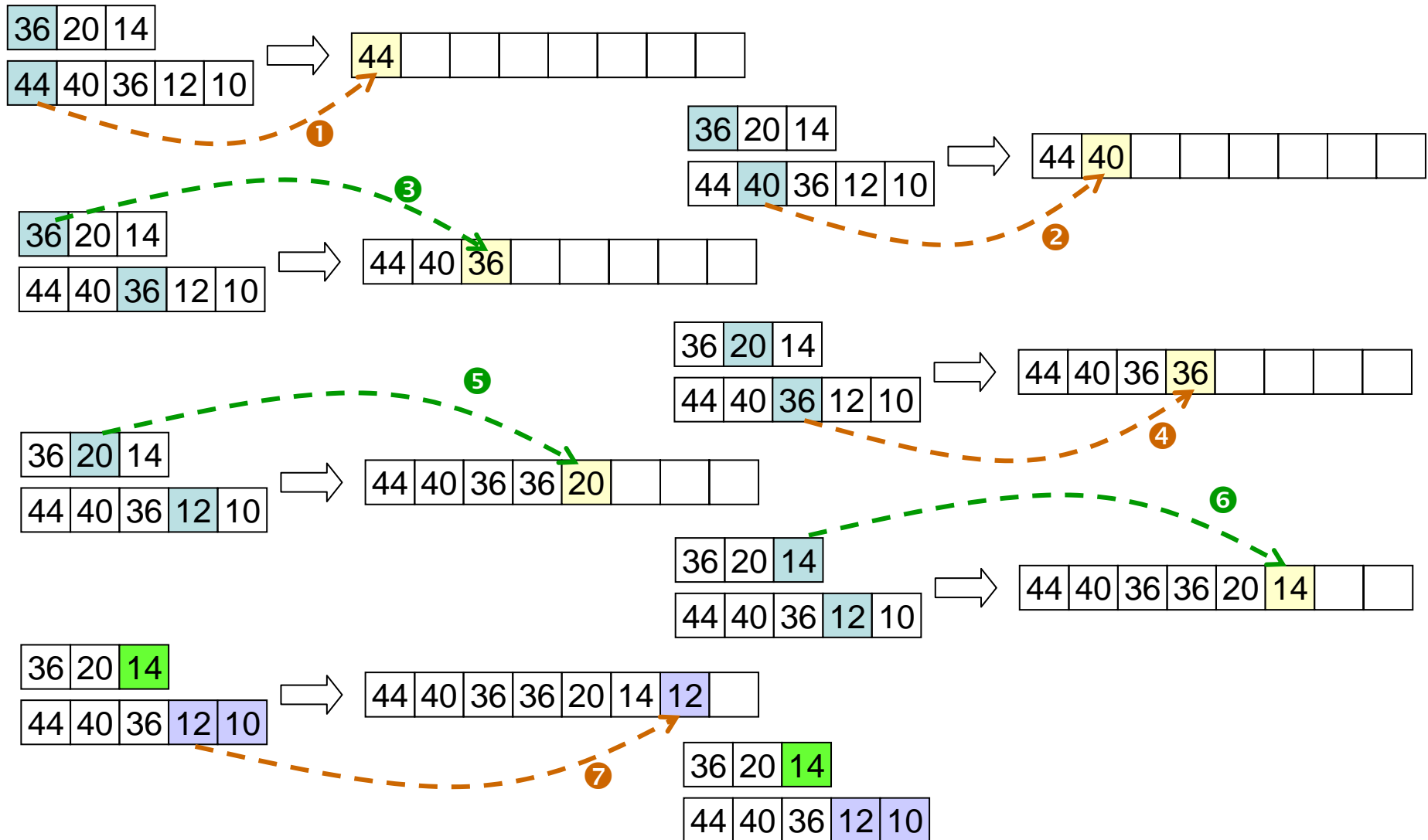
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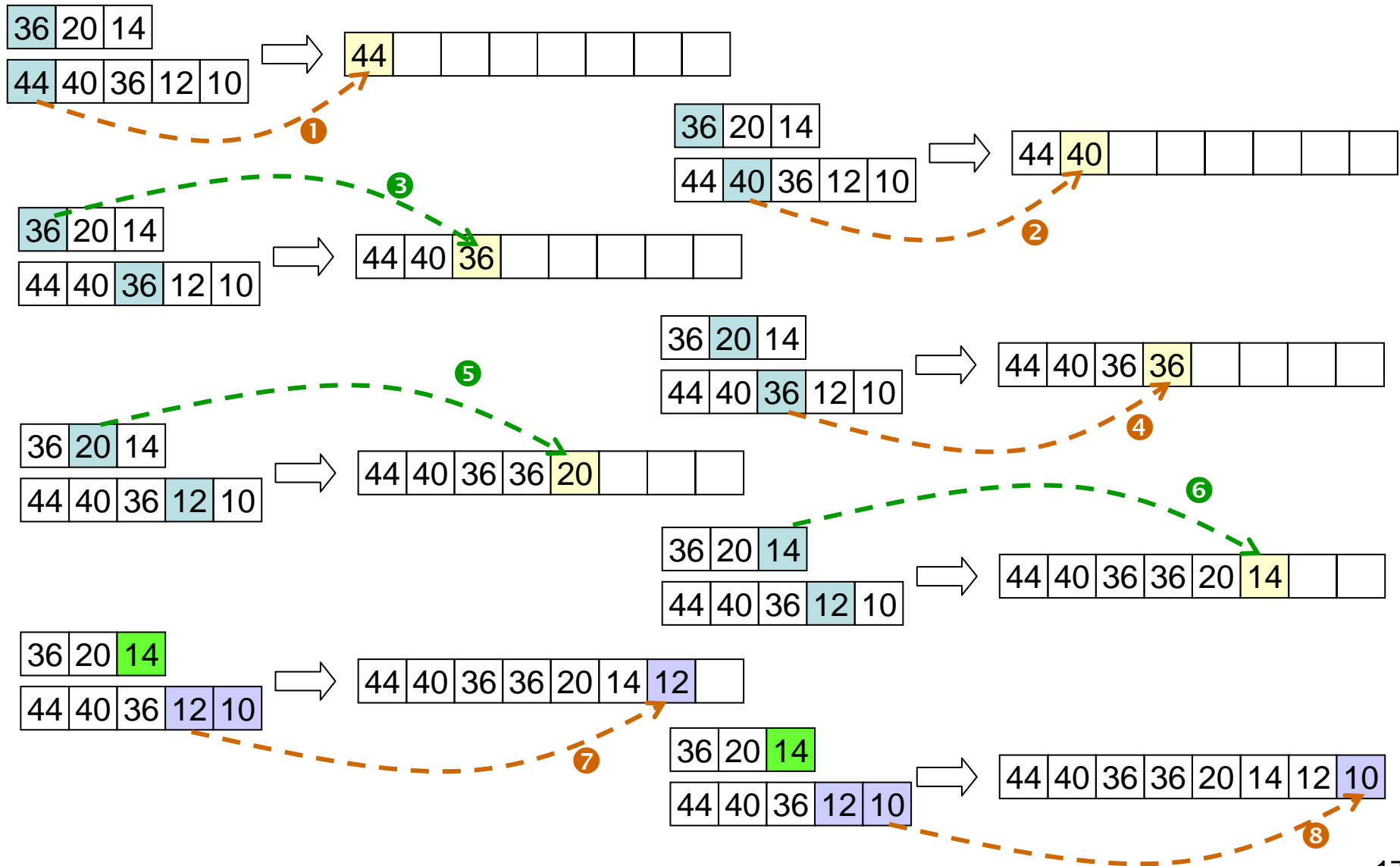
Merging Two Sorted Arrays



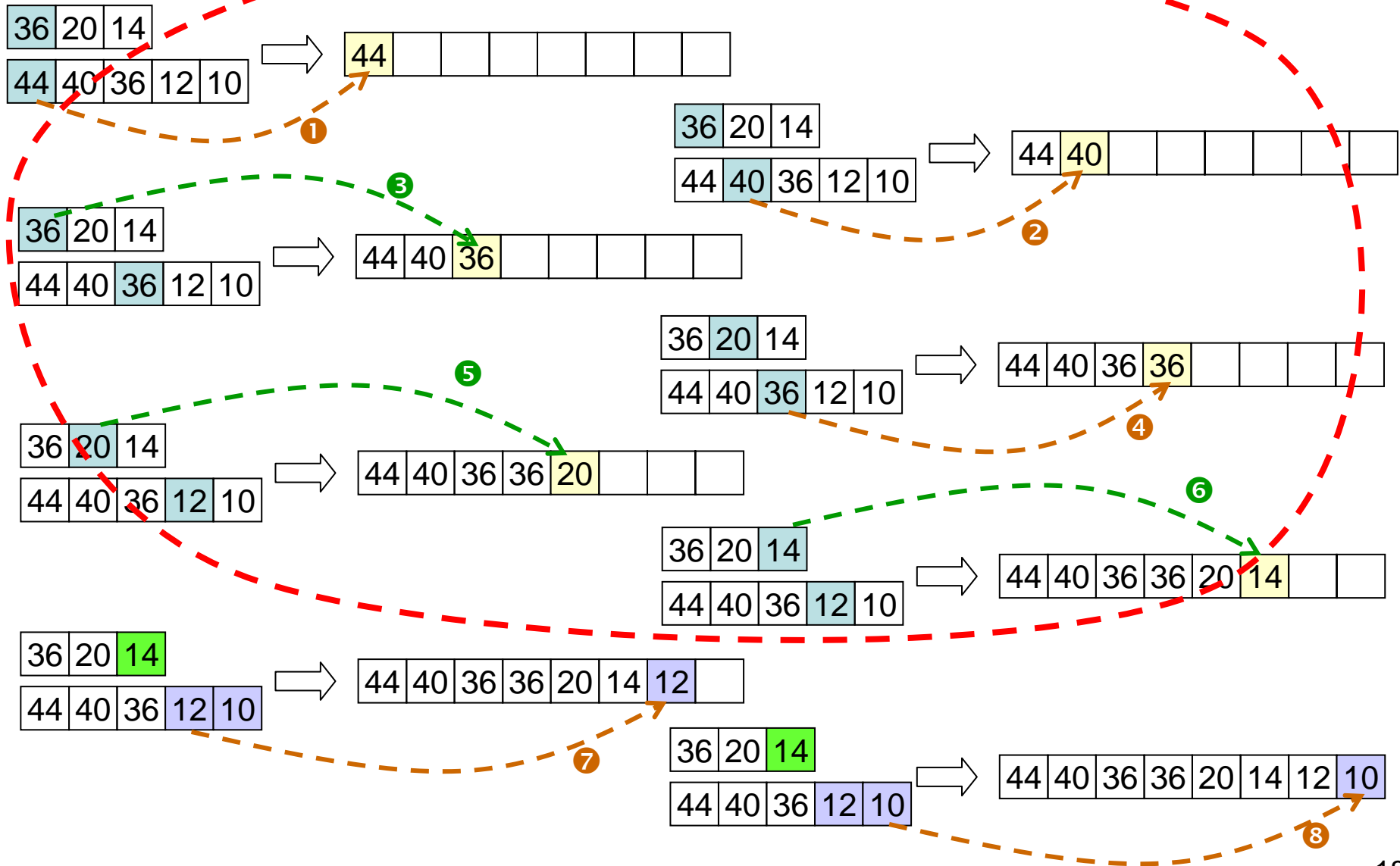
Merging Two Sorted Arrays



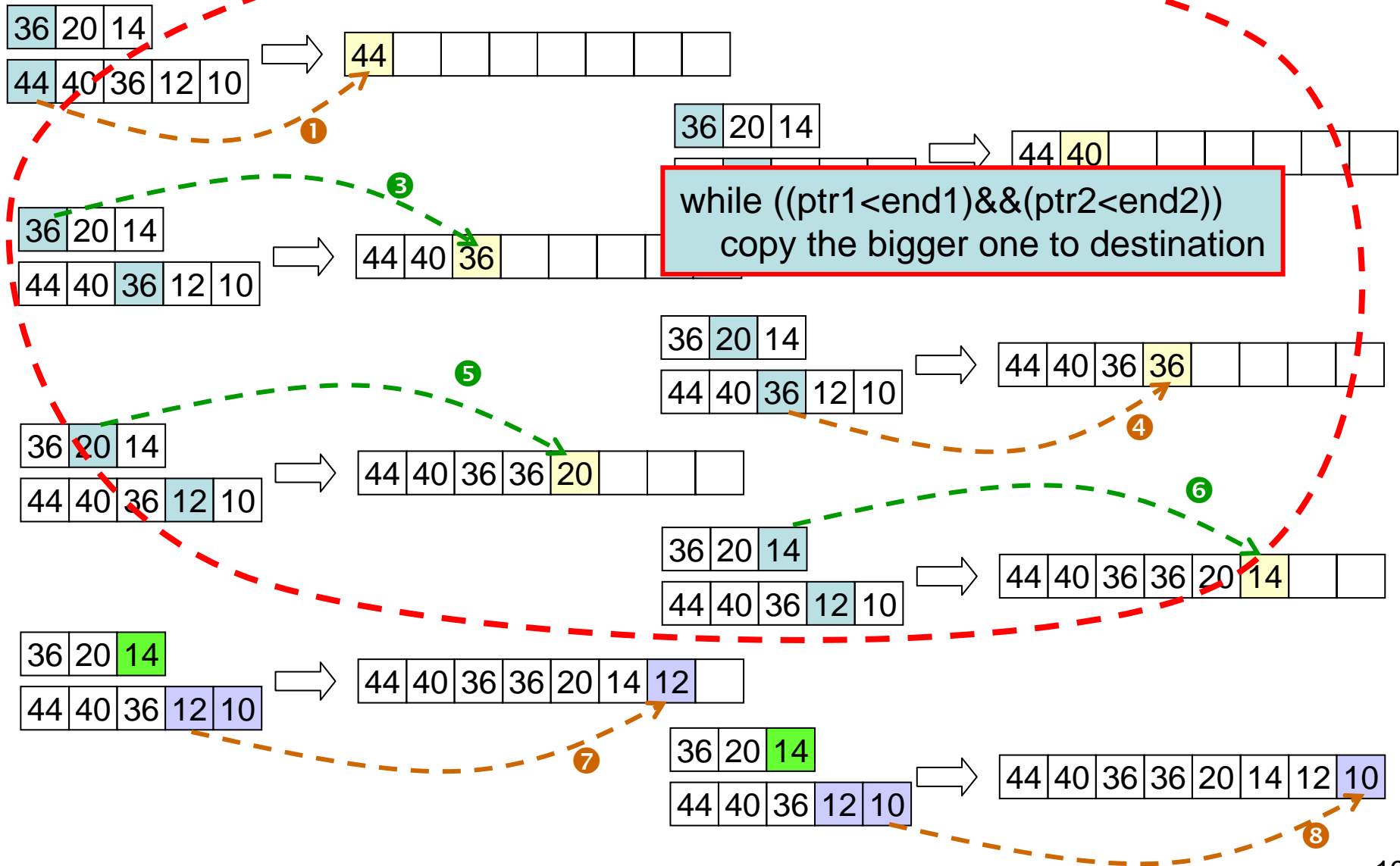
Merging Two Sorted Arrays



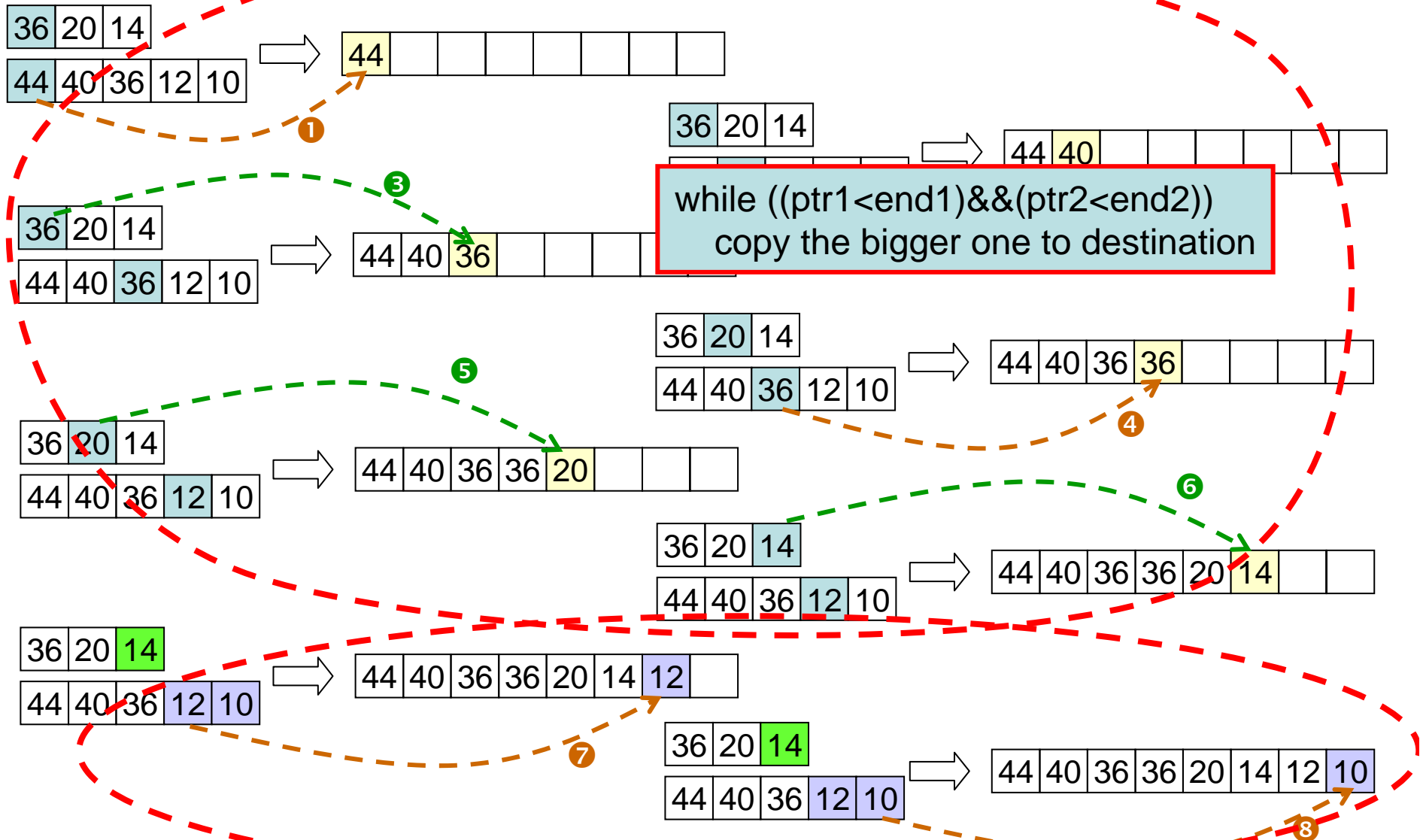
Merging Two Sorted Arrays



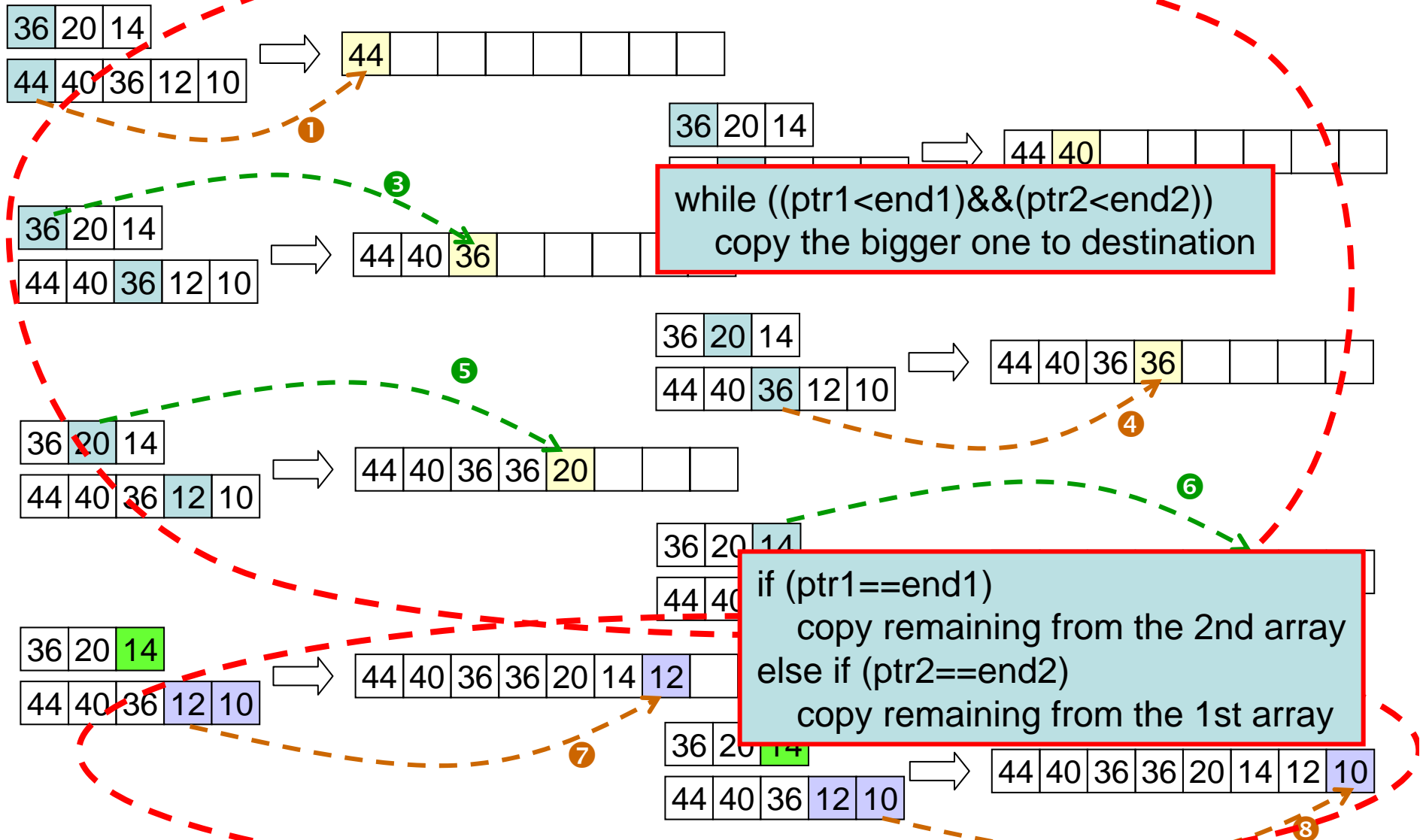
Merging Two Sorted Arrays



Merging Two Sorted Arrays



Merging Two Sorted Arrays



Multiply Two Polynomials

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

Multiply Two Polynomials

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

Multiply Two Polynomials

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

Multiply Two Polynomials

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

Note: A blue arrow in the original image points from the term $a_1 x^{10}$ to the $b_1 x^{21}$ term in the parentheses, with the label $a_1 b_1 x^{10+21}$ above it.

Multiply Two Polynomials

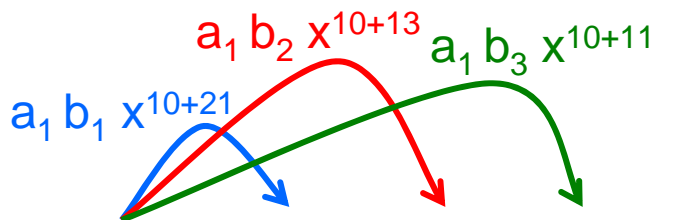
$$\left\{ \begin{array}{l} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{array} \right. \xrightarrow{?} f(x) = g(x) h(x)$$

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

The diagram illustrates the distribution of $a_1 x^{10}$ over the polynomial $h(x)$. A blue arrow connects $a_1 x^{10}$ to $b_1 x^{21}$, with the result $a_1 b_1 x^{10+21}$ written above it. A red arrow connects $a_1 x^{10}$ to $b_2 x^{13}$, with the result $a_1 b_2 x^{10+13}$ written above it. The other terms in the polynomial, $b_3 x^{11}$ and $b_4 x^7$, are shown in green and orange respectively, but no arrows are drawn for them in this specific diagram.

Multiply Two Polynomials

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


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

Multiply Two Polynomials

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

Multiply Two Polynomials

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

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

```

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

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

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

+

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

```

for (j=0; j<h.size(); j++)
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    tmp[j].coef = g[i].coef * h[j].coef;
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Multiply Two Polynomials

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

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

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

```

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

$$\left\{ \begin{array}{l} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{array} \right. \quad \xrightarrow{\quad ? \quad} \quad f(x) = g(x) h(x)$$

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

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

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

```

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;
}

```

```

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

```


Multiply Two Polynomials

$$\left\{ \begin{array}{l} g(x) = a_1 x^{10} + a_2 x^5 + a_3 x \\ h(x) = b_1 x^{21} + b_2 x^{13} + b_3 x^{11} + b_4 x^7 \end{array} \right. \quad \xrightarrow{\quad ? \quad} \quad f(x) = g(x) h(x)$$

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

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

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

```

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;
}

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

```