COMP 110/L Lecture 15

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Slides adapted from Dr. Kyle Dewey

Outline

- Loops with arrays

Loops with Arrays

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Can *iterate* through arrays using loops

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```
for (int x = 0; x < arr.length; x++) {
  System.out.println(x);
}
```

Loops with Arrays

Can *iterate* through arrays using loops

Not <=, since arrays start from 0

```
for (int x = 0; x < arr.length; x++) {
  System.out.println(x);
}
```

Example:
`PrintArgs.java`

Computing a Single Result

Common pattern: build a single result via iteration.
Update this result for each iteration.

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Example: arithmetic product

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```
{ }
```

Computing a Single Result

Common pattern: build a single result via iteration. Update this result for each iteration.

Example: arithmetic product

```
{ }
1
```

Computing a Single Result

Common pattern: build a single result via iteration.
Update this result for each iteration.

Example: arithmetic product

```
{ }
1
```

```
{ 5 }
```

Computing a Single Result

Common pattern: build a single result via iteration.
Update this result for each iteration.

Example: arithmetic product

```
{ }
1
```

```
{ 5 }
1 * 5
```

Computing a Single Result

Common pattern: build a single result via iteration.
Update this result for each iteration.

Example: arithmetic product

```
{ }
1
```

```
{ 5 }
1 * 5
5
```

Example: arithmetic product

Example: arithmetic product

```
{5,8}
```

Example: arithmetic product

```
{5,8}
```

```
1 * 5 * 8
```

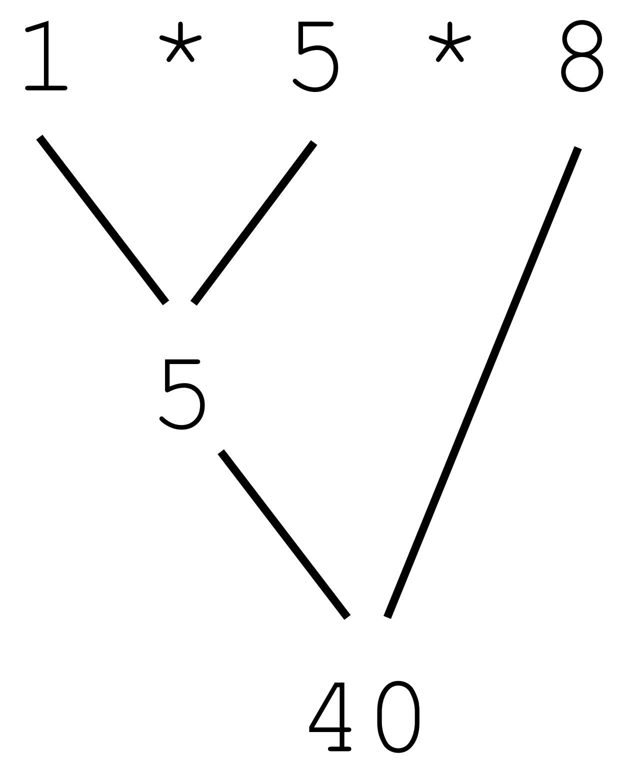
Example: arithmetic product

```
{5,8}
```

$$\begin{tikzcd}
1 \arrow[dr, no head] & * & 5 \arrow[dl, no head] & * & 8 \\
& 5 & & &
\end{tikzcd}$$

Example: arithmetic product

`{5,8}`



Example: arithmetic product

Example: arithmetic product

```
{5, 8, 3}
```

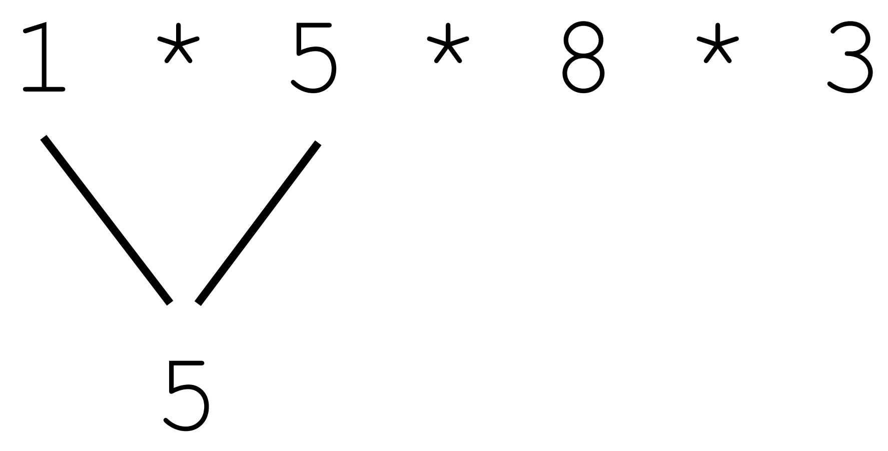
Example: arithmetic product

```
{5, 8, 3}
```

```
1 * 5 * 8 * 3
```

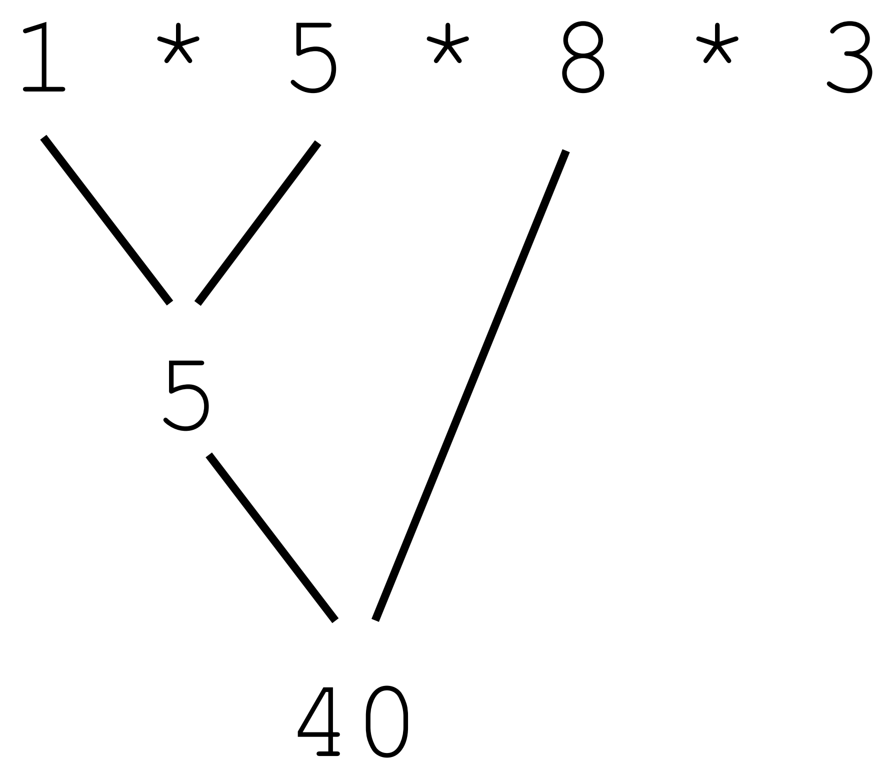
Example: arithmetic product

```
{5, 8, 3}
```



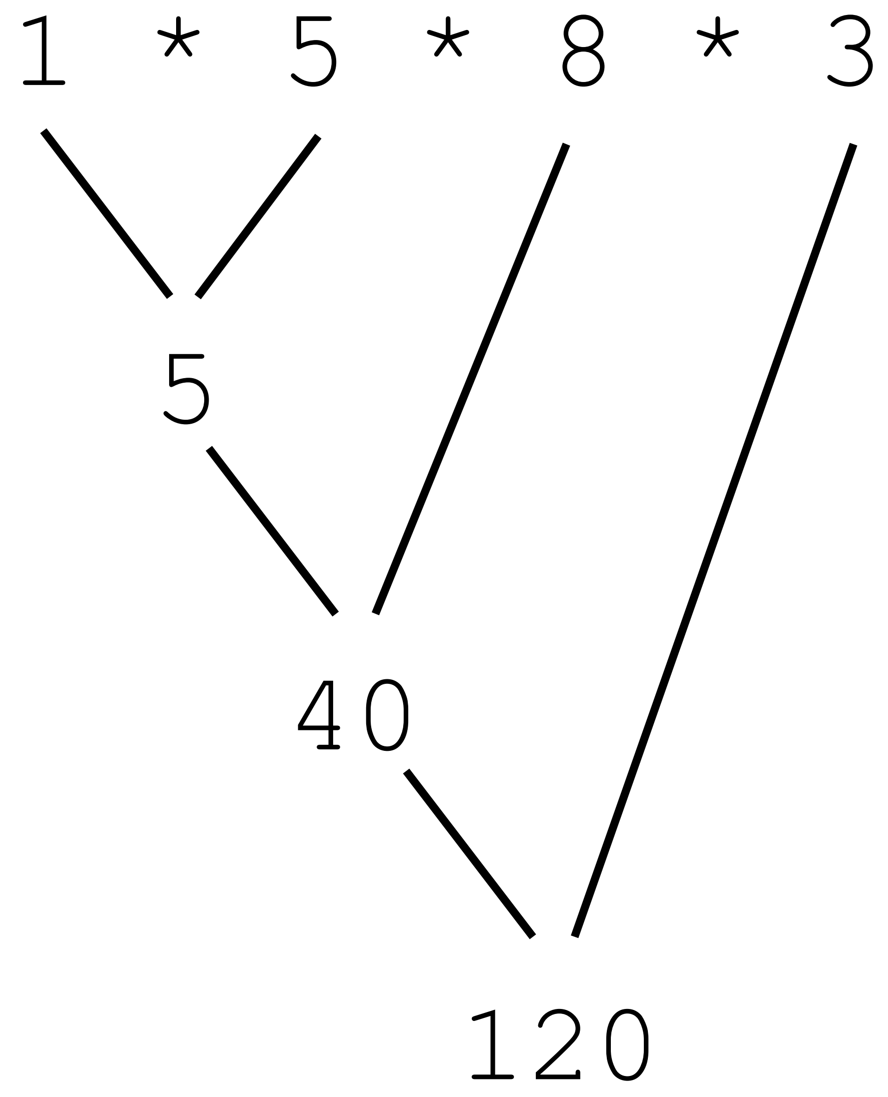
Example: arithmetic product

```
{5, 8, 3}
```



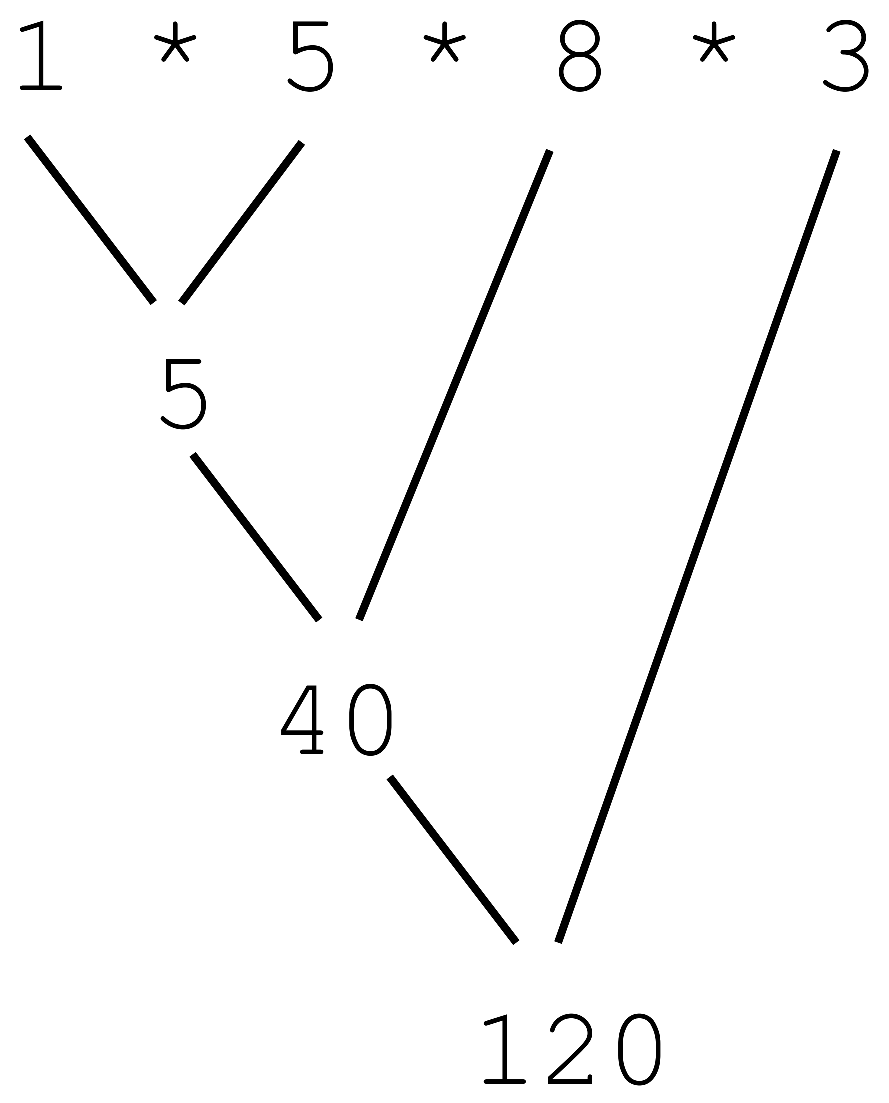
Example: arithmetic product

`{5, 8, 3}`



In Code

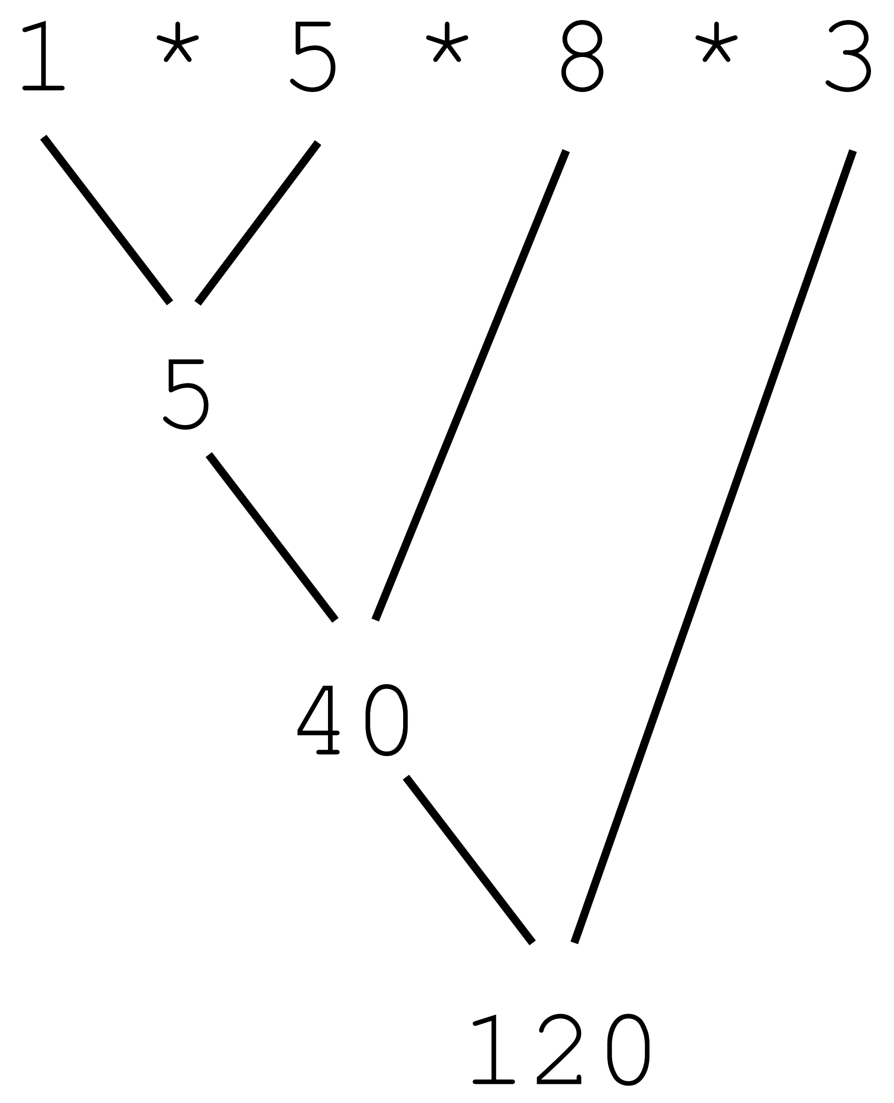
`{5, 8, 3}`



Variables needed:

In Code

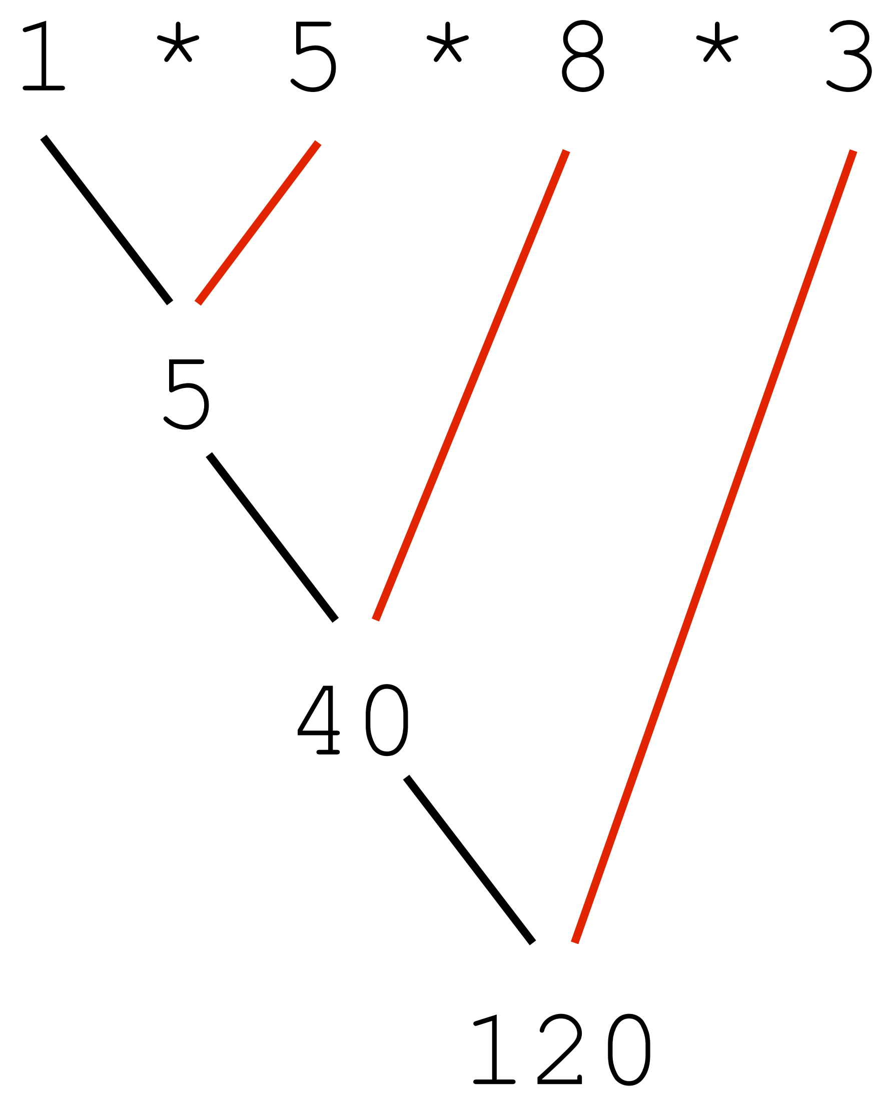
```
{5, 8, 3}
```



Variables needed: array

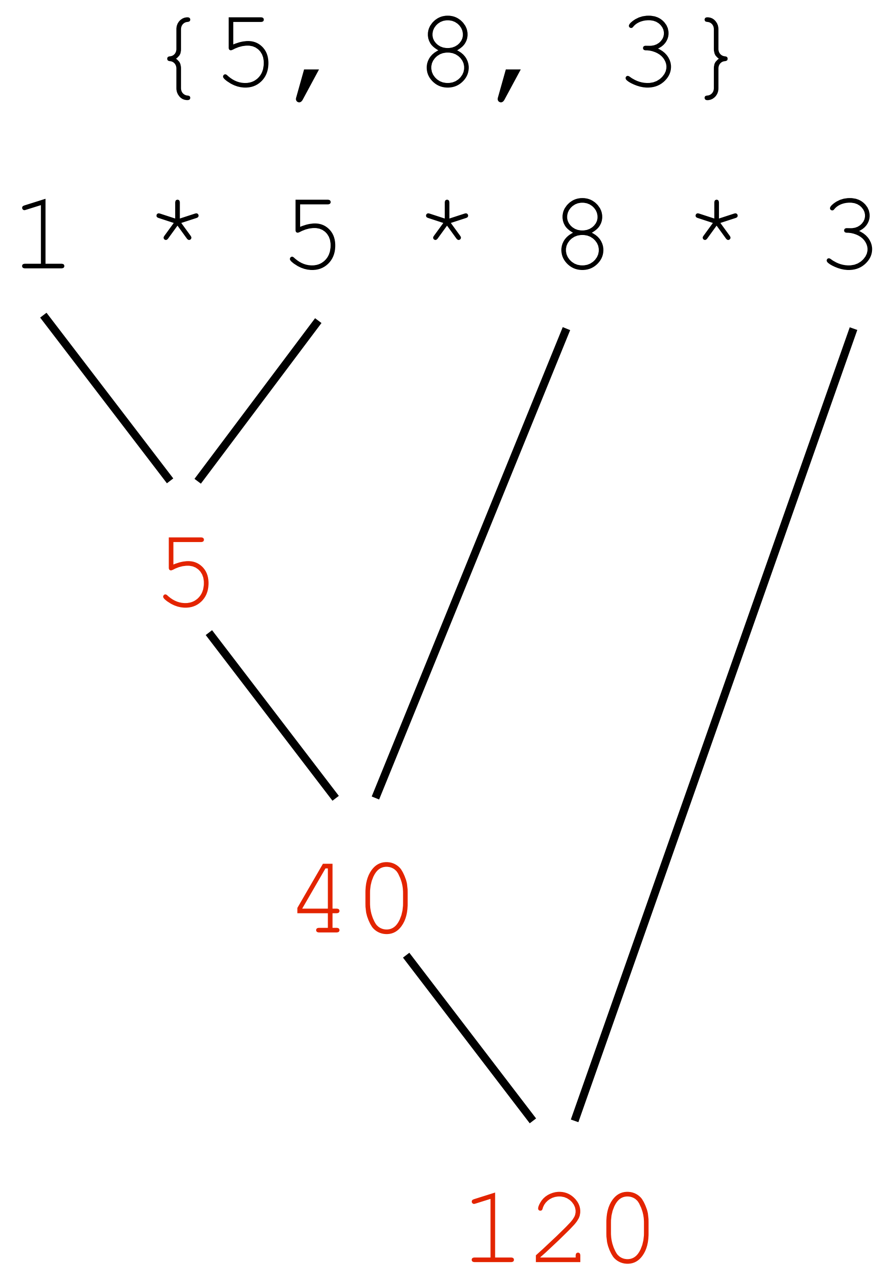
In Code

`{5, 8, 3}`



Variables needed: array, position in array

In Code



Variables needed: array, position in array, result

Example

- `Product.java`
- `ProductTest.java`

Another example: arithmetic sum

Another example: arithmetic sum

$$\{\ \}$$

Another example: arithmetic sum

```
{ }

0
```

Another example: arithmetic sum

```
{ }
0
```

```
{ 2 }
```

Another example: arithmetic sum

```
{ }

0
```

```
{ 2 }

0 + 2
```

Another example: arithmetic sum

{ }

0

{ 2 }

$$\begin{tikzcd}
0 \arrow[dr, dash] & + & 2 \arrow[dl, dash] \\
& 2 &
\end{tikzcd}$$

Another example: arithmetic sum

```
{2, 5}
```

Another example: arithmetic sum

```
{2, 5}
```

```
0 + 2 + 5
```

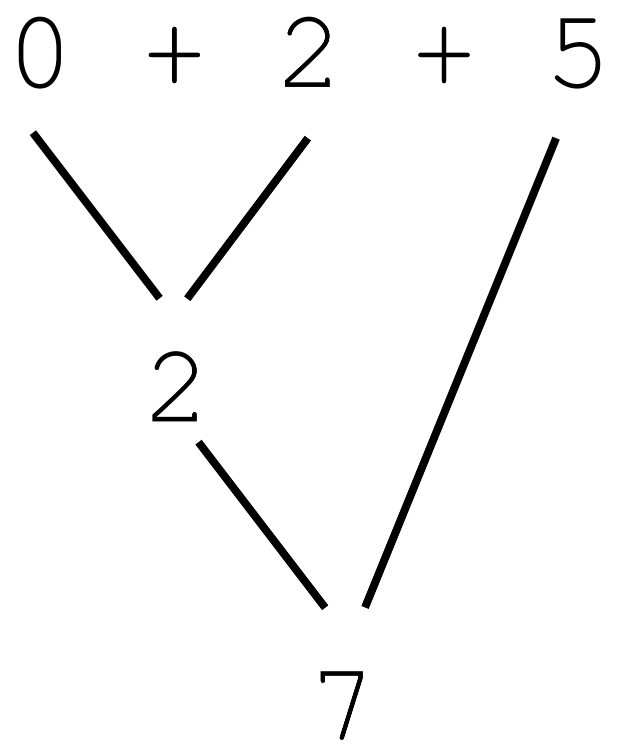
Another example: arithmetic sum

```
{2, 5}
```

$$\begin{tikzcd} 0 \arrow[dr, dash] & + & 2 \arrow[dl, dash] & + & 5 \\ & 2 & & & \end{tikzcd}$$

Another example: arithmetic sum

`{2, 5}`



Another example: arithmetic sum

```
{2, 5, 9}
```

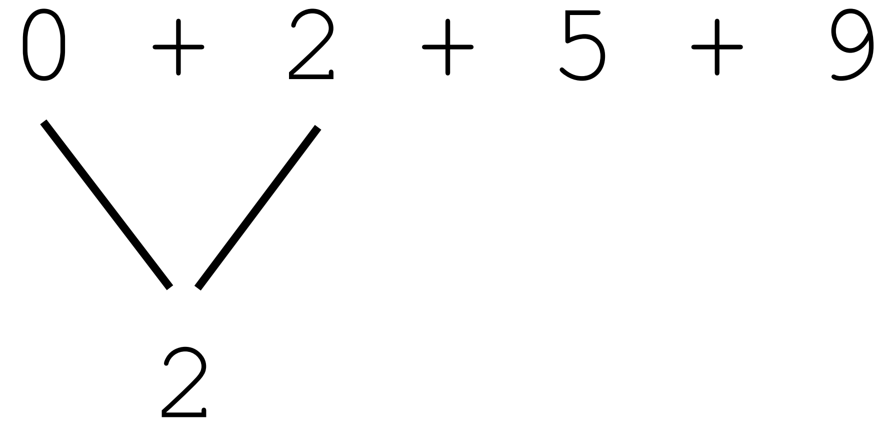
Another example: arithmetic sum

```
{2, 5, 9}

0 + 2 + 5 + 9
```

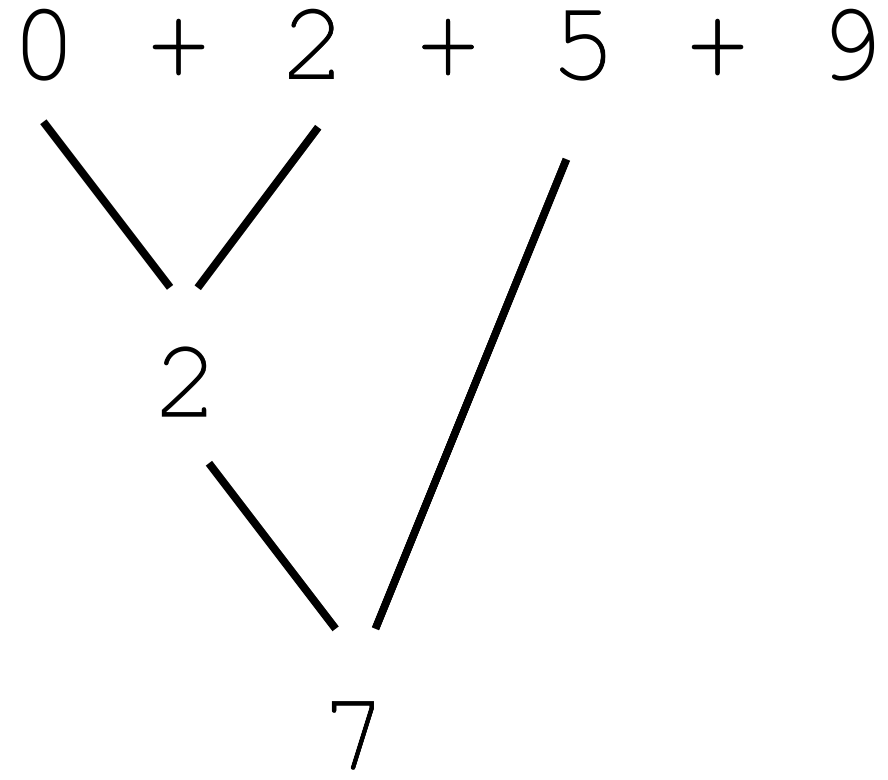
Another example: arithmetic sum

```
{2, 5, 9}
```



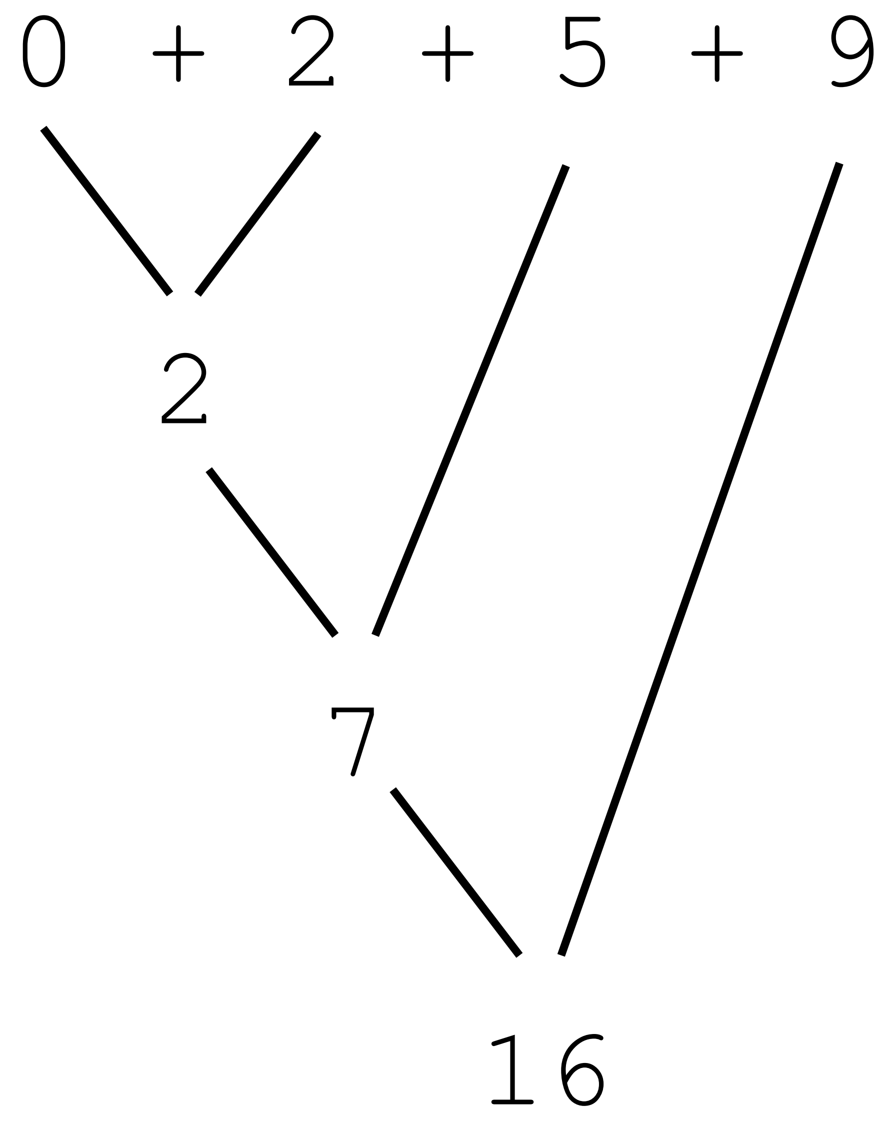
Another example: arithmetic sum

```
{2, 5, 9}
```



Another example: arithmetic sum

```
{2, 5, 9}
```



General Pattern

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```
ResultType result = initialResult;
```

General Pattern

```
ResultType result = initialResult;
for (int index = whereToStart;
```

General Pattern

```
ResultType result = initialResult;
for (int index = whereToStart;
     index < whereToEnd;
```

General Pattern

```
ResultType result = initialResult;
for (int index = whereToStart;
     index < whereToEnd;
     index++) {
```

General Pattern

```
ResultType result = initialResult;
for (int index = whereToStart;
     index < whereToEnd;
     index++) {
  result = oneStep(array[index],
                   result);
}
```