

Here we demonstrate how algorithms or pseudocode can be typeset using the `algorithm` environment provided by the `algorithm2e` package.

*You should not load the `algorithm`, `algpseudocode`, `algcompatible`, `algorithmic packages` if you have already loaded `algorithm2e`.*

Note that the command and argument syntax provided by `algorithm2e` are very different from those provided by `algpseudocode`. It is important to know clearly which package that you are using, and then accordingly write the relevant commands with the correct syntax.

```

 $i \leftarrow 10;$ 
if  $i \geq 5$  then
|    $i \leftarrow i - 1;$ 
else
|   if  $i \leq 3$  then
|   |    $i \leftarrow i + 2;$ 
|   end
end

```

Every line in your source code **must** end with `\;` otherwise your algorithm will continue on the same line of text in the output. Only lines with a macro beginning a block should not end with `\;`.

The above algorithm example is uncaptioned. If you need a caption for your algorithm, use `\caption{...}` inside the `algorithm` environment. You can then use `\label{...}` after the `\caption` so that the algorithm number can be cross-referenced, e.g. Algorithm 1 and ??.

By default, the `plain` algorithm style is used. But if you prefer lines around the algorithm and caption, you can add the `ruled` package option when loading `algorithm2e`, or write `\RestyleAlgo{ruled}` in your document.

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**Algorithm 1:** An algorithm with caption

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```

Data:  $n \geq 0$ 
Result:  $y = x^n$ 
 $y \leftarrow 1;$ 
 $X \leftarrow x;$ 
 $N \leftarrow n;$ 
while  $N \neq 0$  do
|   if  $N$  is even then
|   |    $X \leftarrow X \times X;$ 
|   |    $N \leftarrow \frac{N}{2};$ 
|   else
|   |   if  $N$  is odd then
|   |   |    $y \leftarrow y \times X;$ 
|   |   |    $N \leftarrow N - 1;$ 
|   |   end
|   end
end

```

/\* This is a comment \*/

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The `algorithm` environment is a *float*, like `table` and `figure`, so you can add float placement modifiers [`hbt!`] after `\begin{algorithm}` if necessary.

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**Algorithm 2:** Bubble Sort Algorithm

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**Data:** An array  $A$  of  $n$  elements  
**Result:** The array  $A$  sorted in non-decreasing order  
**for**  $i \leftarrow 0$  **to**  $n - 1$  **do**  
    **for**  $j \leftarrow 0$  **to**  $n - i - 1$  **do**  
        **if**  $A[j] > A[j + 1]$  **then**  
            swap  $A[j]$  and  $A[j + 1]$ ;  
        **end**  
    **end**  
**end**

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The `algorithm2e` package also provides a `\listofalgorithms` command that works like `\listoffigures`, but for captioned algorithms:

## List of Algorithms

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