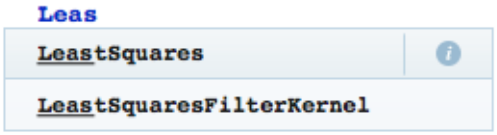
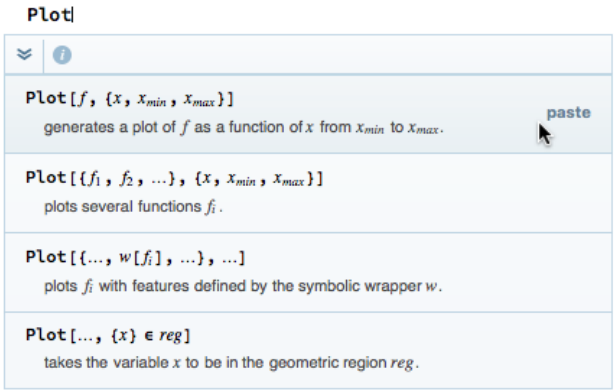
Comparison of Ease-of-Use Features in Mathematica 11.3 and Maple 2018

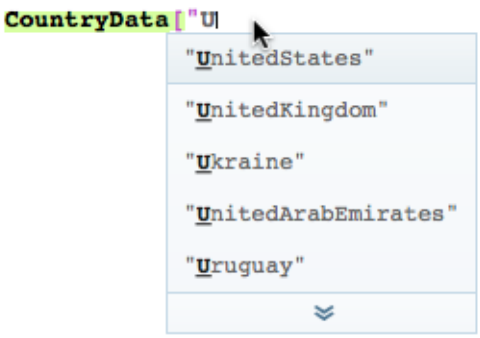
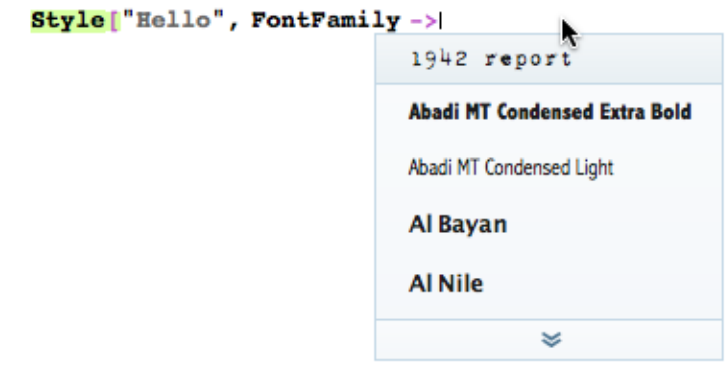
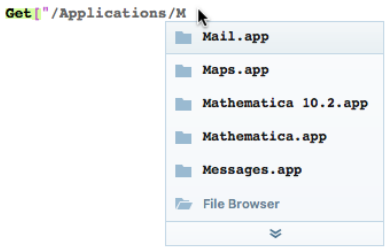
Summary

Ensuring ease of operation is particularly important for a system as vast as Mathematica. A steady focus on automation and good user-interface design has meant that Mathematica has become progressively easier to use even as its computational capabilities have grown.

Maplesoft claims that Maple is easier to use than Mathematica, but a systematic cataloging of ease-of-use features shows that Maple supports almost none of the tools, hints or good design principles that are built into Mathematica.

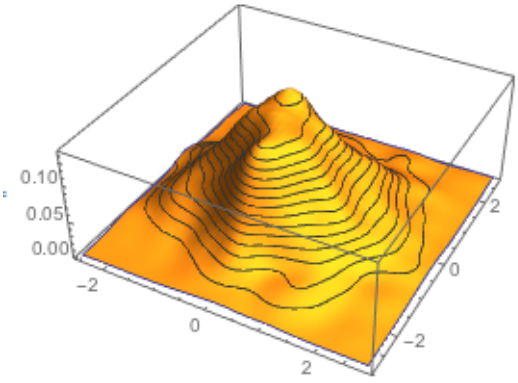
Code editing

Mathematica	Details	Maple
Autocompletion: function names	Start typing a command, and Mathematica automatically provides completion choices. Just press return to save typing the rest. 	Provided only in code–edit regions not in Worksheets.
Autocompletion: command templates	Mouse over a command or use a keystroke after typing a command, and you are offered standard usage templates. Select one by mouse or keyboard and then tab between the arguments as you fill them in. 	Maple provides templates only via keyboard access.

Mathematica	Details	Maple
Autocompletion: strings	Start typing a string in a place where there are finite choices, and Mathematica will offer you autocompletions. 	✗
Autocompletion: iconic preview	Some autocompletions, such as styles, fonts and colors, are shown with visual cues, so you can see what the effect of the choice will be.  	✗
Autocompletion: path browser	Start typing a file name, and Mathematica helps you navigate your files system. 	Provided only in code–edit regions not in Worksheets.

Mathematica	Details	Maple
Inline evaluation	You can evaluate part of an input expression in place to simplify your input without having to do a side calculation. `data = {1, 2 + 3 + 4 + 5, 6}` → `data = {1, 14, 6}`	✗

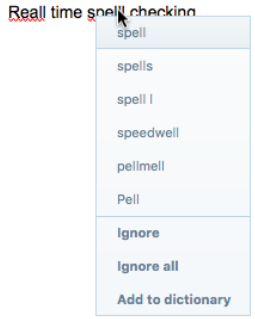
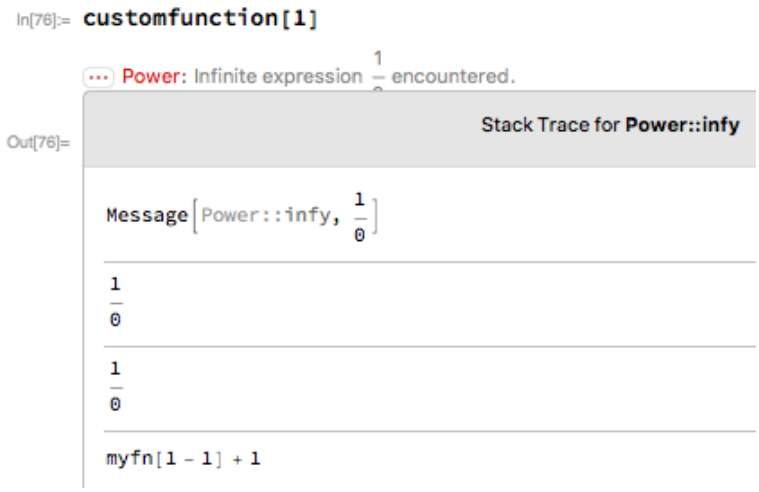
Generalized input	You can use any formatted content in Mathematica input, not just typeset math or text. Input can include images, 3D images, geometry, graphs, color swatches and more. It makes code easier to read.
	`EdgeDetect[`  `]`
	`ListPlot[{1, 2, 3}, PlotStyle →` ■ `]`
		✗

Iconized input	You can collapse large input into an icon that make your notebooks easier to read while still saving all data in the same file. Use the icon as input, or expand it to see the contents.
	`data =` Experimental data `;`
	`SmoothHistogram3D[data]`
	 
		✗

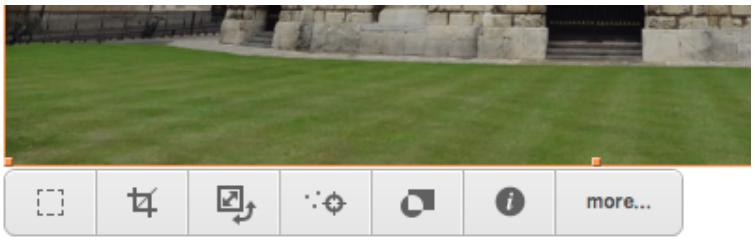
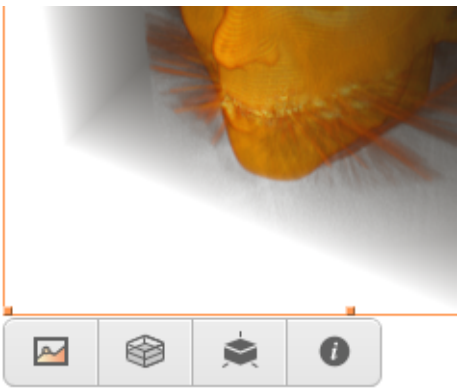
Extend selection	Multi–click inside a math expression or use a keyboard shortcut to extend the selection in a mathematically valid way. $1+\sqrt{2+\frac{3}{4+x}}$ $1+\sqrt{2+\frac{3}{4+x}}$ $1+\sqrt{2+\frac{3}{4+x}}$ $1+\sqrt{2+\frac{3}{4+x}}$	✗
Custom notations	You can create your own 2D mathematical typeset notations for input or output.	✗
Edit during evaluation	In Mathematica, you can continue to edit the working document while long calculations are being performed.	✗

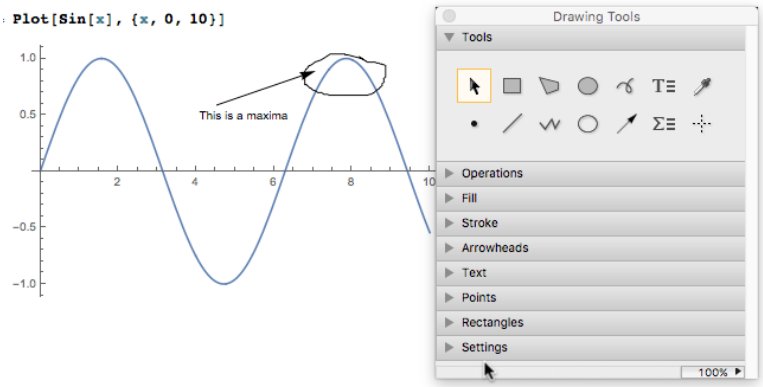
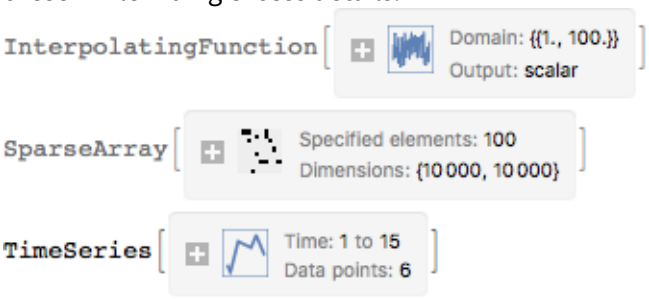
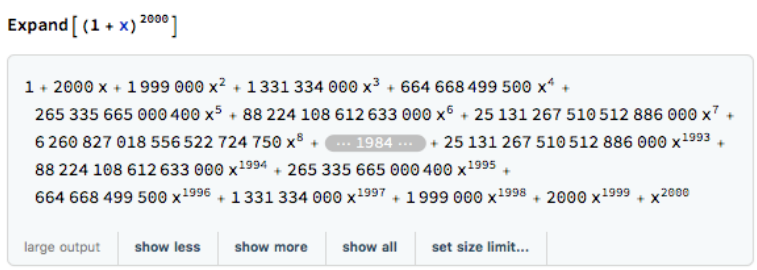
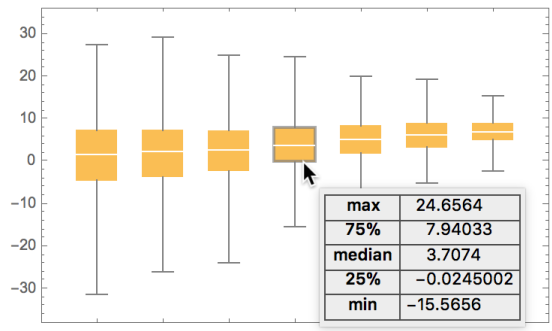
Error detection

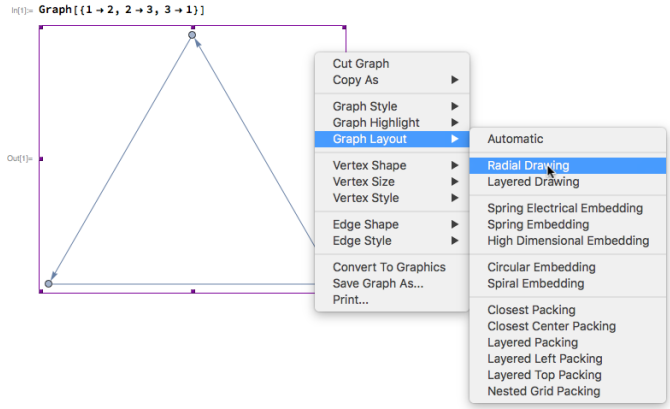
Mathematica	Details	Maple
Syntax coloring: bracket matching	Mismatched brackets are automatically colored to highlight the error. `Sin[x + Cos[x]`	✗
Syntax coloring: missing arguments	Functions that require more arguments than you have provided are highlighted with a marker. `Mod[3,]`	✗
Syntax coloring: excess arguments	If you enter too many arguments for a function, Mathematica highlights the excess arguments. `Sin[2, 3]`	✗
Syntax coloring: undefined symbols	Undefined symbols (usually because you have misremembered or misspelled a function name) are automatically colored blue. `Plott[Sin[x], {x, 0, 10}]`	✗
Syntax coloring: unrecognized options	Mathematica automatically highlights option names that do not apply where you have entered them. `Plot[Sin[x], {x, 0, 10}, PlotArea → 100]`	✗
Syntax coloring: scoping conflicts	If you try to localize the same variable name twice, Mathematica highlights it to warn you. `With[{local = 1}, With[{local = 2}, local]`	Parsing errors are reported in a dialog for code-edit regions only.
Syntax coloring: code comments	Comments are automatically colored gray so that they are easily distinguished from code. `x = 2; (*Comment*)`	✗
Syntax coloring: string content	Strings are colored dark gray to distinguish them in your code. `text = "some text"`	✗
Syntax coloring: current function	The start and end of the function immediately surrounding the cursor are highlighted automatically so that you can more clearly see where you are in complex nested expressions. `Sin[x + Cos[x + 1] + Sin[x] +]`	✗

Mathematica	Details	Maple
Number formatting	Mathematica automatically displays long numbers with additional spacing between digit blocks to make them easier to read. **1 234 567 890**	✗
Real–time spellchecking	Mathematica automatically underlines misspelled words as soon as you have typed them. 	In Maple, you must manually invoke spellchecking.
Visual hinting of computation dependency	Both Mathematica's and Maple's interfaces provide REPL interfaces where outputs are displayed alongside inputs. If you edit the input without reevaluating it so the output no longer matches, Mathematica warns you by automatically fading the out–of–date output.	✗
Error source feedback	Error messages in Mathematica are accompanied by a "Stack Trace" button that displays information on the computational history that lead to the error. 	✗

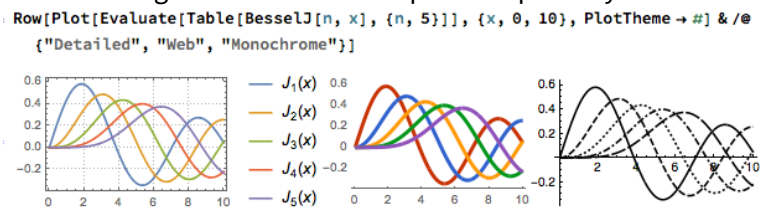
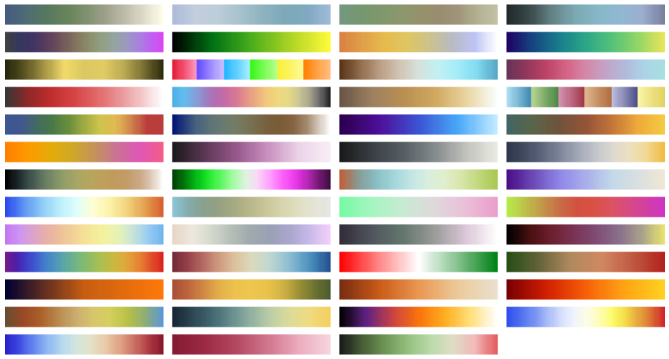
Interacting with output

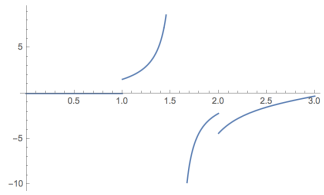
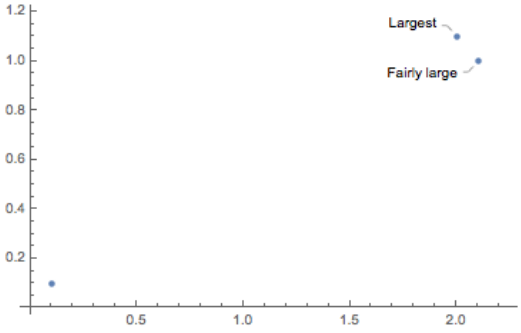
Mathematica	Details	Maple
Image editor	Click any image in Mathematica, and a toolbar automatically appears providing point–and–click tools for selecting regions, cropping, transforming, masking, image information and more. 	✗
Image editor 3D	Click a 3D image (voxel data), and a toolbar appears providing point–and–click tools for coloring, clipping, information and more. 	Maple does not support 3D images.
Color swatches	Colors appear as visual swatches. Mouse over them for numeric specification, or click them to interact with the values. 	✗

Mathematica	Details	Maple
Drawing tools	You can manually annotate graphics and edit generated graphics elements in Mathematica using a drawing tools palette. 	✓
Elided forms	Many computations return complex results that are intended as inputs for further computation. Mathematica provides a uniform way to present the key information for these while hiding excess details. 	Maple provides similar functionality for arrays and graphs only.
Large–output suppression	When any very large expression is returned to the notebook, Mathematica automatically presents a compact view that displays the start and end of the expression and an indication of the amount of omitted content. The following example would take around 300 pages to fully display. 	✗
Tooltips in graphics	Mathematica graphics incorporate tooltips to provide extra information without increasing the complexity of the image. For example, mouse over a box in a box–whisker plot, and you get statistics on that dataset. 	✗

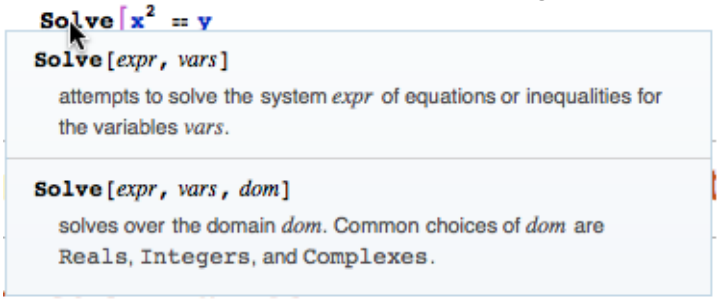
Mathematica	Details	Maple
Context–sensitive menus	The menu that appears when you right–click content depends on the type of content selected. 	✓

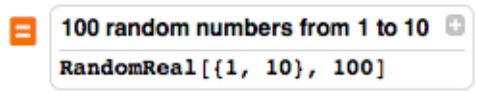
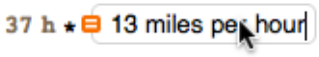
Automation & convenience

Mathematica	Details	Maple
Predefined document styles	Mathematica provides over 20 document stylesheets that collect together coherent style choices for title, section, text, math, etc. to let you create a great–looking document quickly. You can also create your own stylesheet.	Maple provides only one stylesheet, though you can create your own.
Predefined graphics styles	Mathematica provides a collection of predefined styles as an alternative to setting all of the different options separately. 	✗
Predefined color schemes	Mathematica provides over 170 named color gradients and collections that can be applied to most visualizations. 	✗
Plotting: automatic range selection	Mathematica plots can automatically choose their plot ranges to ensure that the majority of the plot yields useful information.	Maple provides this functionality only for 2D plots.

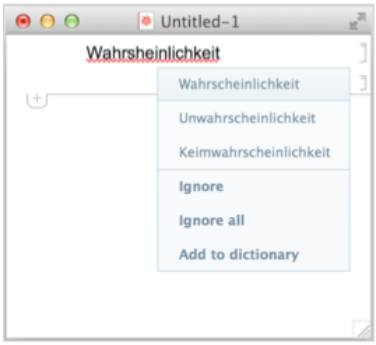
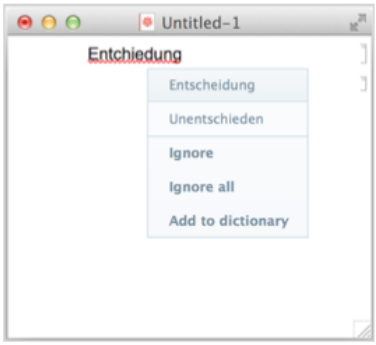
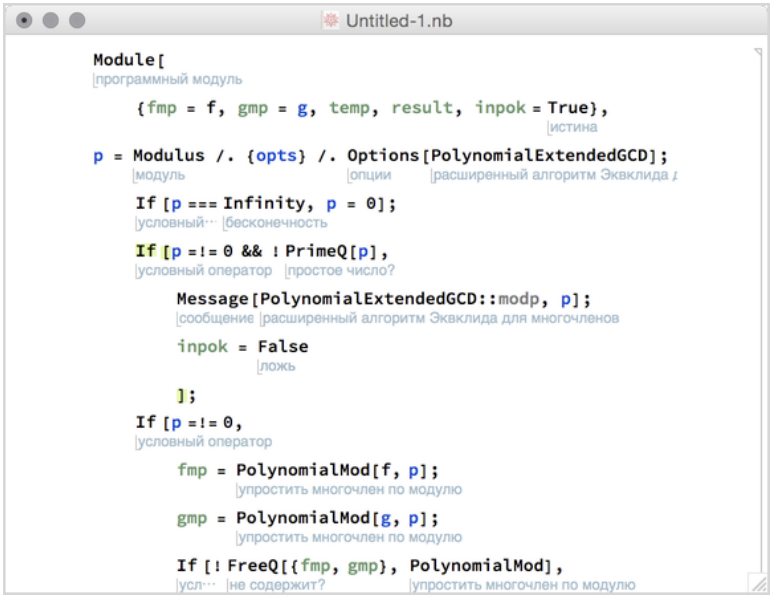
Mathematica	Details	Maple
Plotting: automatic resampling	Mathematica adaptively increases sampling in 2D and 3D plots in areas of high curvature to give accurate yet efficient visualizations.	Maple provides this functionality only for 2D plots.
Plotting: automatic branch–cut detection	Mathematica automatically detects discontinuities in many plots to accurately depict the break. `Plot[Floor[x] Tan[x], {x, 0, 3}]` 	✗
Plotting: automatic point sizing	By default, Mathematica automatically makes some features, such as points, smaller if there are many of them in a single visualization.	✗
Plotting: automatic point label positioning	Mathematica can use symbolic wrappers for data points to automatically place labels, callouts or tooltips on plotted points, automatically optimizing their locations to avoid overlap. `ListPlot[{{0.1, 0.1}, Callout[{2, 1.1}, "Largest"], Callout[{2.1, 1}, "Fairly large"]}]` 	✗
Automatic import filters	Mathematica supports 200 different import and export filters for data, images, sound, video, graphs, geometry and more.	Maple supports 56 formats.

Help

Mathematica	Details	Maple
Help on errors	When an error is generated, it includes a hyperlink to documentation on the error, including example causes. In[43]:= 1 / 0 Power::infy : Infinite expression $\frac{1}{0}$ encountered. » 	✗
Evaluatable help	Mathematica help contains over 10,000 examples. The help also acts as a sandbox where you can edit and experiment with the examples in situ, without changing them permanently.	✗
Suggestion Bar	Mathematica automatically suggests calculations you may wish to perform next after each calculation. Just click to perform the action. You can even roll together several steps to automatically write programs. Out[12]= {0.470063, 0.150947, 0.43559, 0.805856, 0.312563, 0.482064, 0.663087, 0.507534, 0.609561, 0.271254} 	✓
Hovering help box	Mouse over a command in Mathematica and see a tooltip reminding you what the function does and its typical arguments. 	✗

Mathematica	Details	Maple
Linguistic input	Type a short English phrase and have Wolfram|Alpha translate it into a Wolfram Language expression.  You can even do it in the middle of an expression—for example, to choose the right unit names. 	✗
Function names	While good programming–language design is too complex to summarize in this document, one simple aspect can be seen in the choice of function names. Mathematica uses a consistent set of naming conventions for its functions, mostly using full English words like `FactorInteger`, `LinearProgramming`, `Integrate`, `Counts`, `ContinuedFraction` and `Gamma`, making code readable and names easier to predict. Maple follows this convention for recently added functions, but most of its older functionality is inconsistent in the use of case and abbreviation, making it harder to learn and remember. For example, the Maple equivalents to the above functions are called `ifactor`, `LPSolve`, `Int`, `numboccur`, `cfrac` and `GAMMA`.	

International support

Mathematica	Details	Maple
Local language spellchecking	Mathematica provides real–time spellchecking in over 25 languages.  	Maple has English spellchecking only, and it isn't in real time.
Code captions	Mathematica can automatically display captions over code to clarify its meaning in 12 different languages. 	✗

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