**Link: “**[**Cadence SKILL (seomastering.com)**](https://www.seomastering.com/wiki/Cadence_SKILL)**”.**

Cadence SKILL

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| [File:Edit-clear.svg](https://www.seomastering.com/wiki/File:Edit-clear.svg) | This article **may require**[**cleanup**](http://en.wikipedia.org/wiki/cleanup)**to meet Wikipedia's**[**quality standards**](http://en.wikipedia.org/wiki/Manual_of_Style)**.** Please [improve this article](https://www.seomastering.com/w/index.php?title=Cadence_SKILL&action=edit) if you can. *(October 2008)* |

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| **SKILL** | |
| [**Paradigm**](https://www.seomastering.com/wiki/Programming_paradigm) | [OOP](https://www.seomastering.com/w/index.php?title=Object-oriented_programming&action=edit&redlink=1) or [functional](https://www.seomastering.com/w/index.php?title=Functional_programming&action=edit&redlink=1) |
| **Appeared in** | 1990 |
| [**Developer**](https://www.seomastering.com/w/index.php?title=Software_developer&action=edit&redlink=1) | [Cadence Design Systems](https://www.seomastering.com/w/index.php?title=Cadence_Design_Systems&action=edit&redlink=1) |
| [**Stable release**](https://www.seomastering.com/w/index.php?title=Software_release_life_cycle&action=edit&redlink=1) | ? (?) |
| [**Typing discipline**](https://www.seomastering.com/w/index.php?title=Type_system&action=edit&redlink=1) | [dynamic](https://www.seomastering.com/w/index.php?title=Dynamically-typed_language&action=edit&redlink=1) |
| [**Major implementations**](https://www.seomastering.com/wiki/Programming_language_implementation) | Cadence Allegro, Cadence APD, Cadence Concept HDL and Cadence Virtuoso. Major LISP implementation — Cadence UniCAD. |
| [**Dialects**](https://www.seomastering.com/w/index.php?title=Programming_language_dialect&action=edit&redlink=1) | SKILL, SKILL++ |
| **Influenced by** | [Common Lisp](https://www.seomastering.com/wiki/Common_Lisp) |

**SKILL** is the [Lisp](https://www.seomastering.com/wiki/Lisp_(programming_language))-like [scripting language](https://www.seomastering.com/wiki/Scripting_language) and [PCell](https://www.seomastering.com/w/index.php?title=PCell&action=edit&redlink=1" \o "PCell (page does not exist)) (Parameterized Cells) description language used in many [EDA](https://www.seomastering.com/w/index.php?title=Electronic_design_automation&action=edit&redlink=1) software suites by [Cadence Design Systems](https://www.seomastering.com/w/index.php?title=Cadence_Design_Systems&action=edit&redlink=1) (e.g. [Cadence Allegro](https://www.seomastering.com/w/index.php?title=Cadence_Allegro&action=edit&redlink=1) and [Cadence Virtuoso](https://www.seomastering.com/w/index.php?title=Cadence_Virtuoso&action=edit&redlink=1)). It was originally put forth in an [IEEE](https://www.seomastering.com/w/index.php?title=Institute_of_Electrical_and_Electronics_Engineers&action=edit&redlink=1) paper[[1]](https://www.seomastering.com/wiki/Cadence_SKILL#cite_note-0) in [1990](https://www.seomastering.com/w/index.php?title=1990&action=edit&redlink=1).

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| **Contents**   [[hide](javascript:toggleToc())]   * [1 History](https://www.seomastering.com/wiki/Cadence_SKILL#History) * [2 Syntax](https://www.seomastering.com/wiki/Cadence_SKILL#Syntax) * [3 Examples](https://www.seomastering.com/wiki/Cadence_SKILL#Examples) * [4 References](https://www.seomastering.com/wiki/Cadence_SKILL#References) * [5 User Groups](https://www.seomastering.com/wiki/Cadence_SKILL#User_Groups) * [6 External links](https://www.seomastering.com/wiki/Cadence_SKILL#External_links) |

History

SKILL was originally based on a flavor of Lisp called “[Franz Lisp](https://www.seomastering.com/w/index.php?title=Franz_Lisp&action=edit&redlink=1)” created at [UC Berkeley](https://www.seomastering.com/w/index.php?title=University_of_California,_Berkeley&action=edit&redlink=1) by the students of Professor [Richard J. Fateman](https://www.seomastering.com/w/index.php?title=Richard_Fateman&action=edit&redlink=1). SKILL is not an acronym, it is a name. For trademark reasons Cadence prefers it be capitalized[[2]](https://www.seomastering.com/wiki/Cadence_SKILL#cite_note-1).

[Franz Lisp](https://www.seomastering.com/w/index.php?title=Franz_Lisp&action=edit&redlink=1) and all other flavors of [LISP](https://www.seomastering.com/w/index.php?title=LISP&action=edit&redlink=1) were eventually superseded by an [ANSI](https://www.seomastering.com/w/index.php?title=ANSI&action=edit&redlink=1) standard for Lisp called "[Common Lisp](https://www.seomastering.com/wiki/Common_Lisp)." Historically, SKILL was known as IL. SKILL was a library of IL functions. The name was originally an initialism for Silicon Compiler Interface Language (SCIL), pronounced "SKIL," which then morphed into "SKILL," a plain English word that was easier for everyone to remember.'

"IL" was just Interface Language. Whilst SKILL was used initially to describe the [API](https://www.seomastering.com/w/index.php?title=API&action=edit&redlink=1) rather than the language, the snappier name stuck. The name "IL" remains in the de-facto file extension used for [SKILL](https://www.seomastering.com/w/index.php?title=SKILL&action=edit&redlink=1) code ".il".

Syntax

SKILL programmers have a choice of expression syntaxes. Traditional [Lisp](https://www.seomastering.com/wiki/Lisp_(programming_language)) syntax such as

(car mylist)

can be mixed with [C-like syntax](https://www.seomastering.com/w/index.php?title=C-like_syntax&action=edit&redlink=1) such as

car(mylist)

However, unlike C, no white space is allowed between the function name and the opening parenthesis, as in

car (mylist)  ; Error

Certain arithmetic operations can be also called using an [infix notation](https://www.seomastering.com/w/index.php?title=Infix_notation&action=edit&redlink=1). Thus

(plus 1 2)

plus(1 2)

1+2

are all recognized. This was introduced to make it easier for programmers familiar with [C](https://www.seomastering.com/wiki/C_(programming_language)) and other procedural languages to understand and write SKILL code.

Note that all [variables](https://www.seomastering.com/w/index.php?title=Variable_(programming)&action=edit&redlink=1) in SKILL are considered [special](https://www.seomastering.com/w/index.php?title=Scope_(programming)&action=edit&redlink=1).

Additional commands are added to the language for functions specific to a certain tool. For example, functions specific to the PCB Editor have the prefix “axl” (e.g. axlDBGetDesign), and commands specific to the Design Entry tool have the prefix “cn” (e.g. cnGetDwgInfo).

Examples

Here are some examples of SKILL.

First, a basic “[Hello world](https://www.seomastering.com/w/index.php?title=Hello_world_program&action=edit&redlink=1)”:

println("Hello, world!")

As SKILL relaxes the traditional Lisp requirement that everything is an [S-expression](https://www.seomastering.com/wiki/S-expression), more elaborate examples look quite different to their Lisp equivalents. For example, the factorial function in SKILL looks like this:

procedure( factorial(n)

if( n<=1 then

1

else

n \* factorial(n-1)

)

)

This example shows how variables are assigned and scoped, using = and let, respectively:

procedure( swap()

let( (a b)

a = 1

b = 2

c = a

a = b

b = c

printf("%d %d %d**\n**" a b c)

)

)

The variables a and b are scoped within the let function, but variable c is not. As a result, c becomes a global variable that can be accessed without the scope of the swap function. Here is what happens when swap is executed and a, b and c are then printed:

> swap

2 1 1

t

> a

\*Error\* toplevel: undefined variable - a

> b

\*Error\* toplevel: undefined variable - b

> c

1

Comments are delimited by either the traditional Lisp semicolon

car(mylist) *; Comment from semicolon to end of the line*

or C-style comments

*/\* Comment \*/* car(mylist) */\* Another comment \*/*

References

1. [↑](https://www.seomastering.com/wiki/Cadence_SKILL#cite_ref-0) Barnes, T. J.: [“SKILL: a CAD system extension language”](http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=114865), *27th ACM/IEEE*[*Design Automation Conference*](https://www.seomastering.com/w/index.php?title=Design_Automation_Conference&action=edit&redlink=1)*, 1990. Proceedings;* pp. 266-271
2. [↑](https://www.seomastering.com/wiki/Cadence_SKILL#cite_ref-1) ["Re: SKILL stands for ...?"](http://www.cadence.com/Community/forums/p/12204/16701.aspx#16701). <http://www.cadence.com/Community/forums/p/12204/16701.aspx#16701>.

Academic:

* G. Wood and H-F S. Law, "SKILL - An Interactive Procedural Design Environment," Proceedings of Custom Integrated Circuits Conference, 1986, pp.544–547
* Quan Nguyen, "CAD Scripting Languages", "A collection of Perl, Ruby, Python,Tcl and SKILL Scripts". Published by RAMACAD INC. [ISBN 0977781224](https://www.seomastering.com/wiki/Special:BookSources/0977781224),9780977781225. [A Sample from Google Books](http://books.google.com/books?id=v8l72QBDzD0C&printsec=frontcover&dq=quan+nguyen+cad+scripting)

 A Quick Tour of SKILL Programming with command-line examples of SKILL codes versus Perl, Ruby, Python & TCL (go to the end of the blog)  
<http://www.cadence.com/community/forums/T/10274.aspx>

User Groups

* A SKILL [users' group](https://www.seomastering.com/w/index.php?title=Users%27_group&action=edit&redlink=1) is currently hosted on [Yahoo! Groups](https://www.seomastering.com/w/index.php?title=Yahoo!_Groups&action=edit&redlink=1) under the name "skill\_school" ([link](http://tech.groups.yahoo.com/group/skill_school/)).
* Cadence also hosts two SKILL users' group forums on their [Cadence Community](http://www.cadence.com/Community/) website. One is dedicated to Allegro PCB SKILL (PCB SKILL), and one dedicated to [IC](https://www.seomastering.com/w/index.php?title=Integrated_circuit&action=edit&redlink=1) SKILL (Custom IC SKILL).
* No known users' group currently exists for Cadence Concept SKILL scripting (as of Jan 2009).

Note: due to Wikipedia's copyright policy, direct links to all three SKILL users' groups cannot be given here. Visit [Yahoo! Groups](http://groups.yahoo.com/) or the [Cadence Community](http://www.cadence.com/Community/) website and search by the exact users' group name.

More SKILL Programming Examples: <http://www.cadence.com/community/forums/T/10274.aspx>

External links

* [Cadence Design Systems](http://www.cadence.com/)
* [CopperCAD Design](http://www.coppercad.com/) — a commercial site for Custom and Pre-Packaged SKILL programs