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Using Visual Studio Code to Write SAS Code - A Primer

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ABSTRACT

Using a new UI (User Interface) to write code may come at a cost - the learning curve can hamper a programmer's productivity. For instance, where are the shortcuts that used to work in my old UI, one might ask? How can I do [insert a task you've always done here] in the new UI? We have seen this happen even if a programmer moves between SAS UI options - such as a SAS 9.4 programmer moving to SAS Enterprise Guide. And if multiple programmers within an organization (SAS and R programmers, for example) use different editing tools, they may be less able to help each other when issues arise.

Visual Studio (VS) Code may provide an answer for this issue. Programmers of R and Python have been using this tool for a while. Recently, SAS Institute has created an extension for SAS coders to use VS Code as their editing tool. This talk will discuss getting started with the SAS extension for VS code, and programming tips.

INTRODUCTION

As a SAS programmer, you have a choice of text editors into which you type your code. You could enter your code into, say, Notepad, and then submit your code by using your operating system's command line, bypassing all SAS tools entirely.

However, you would greatly benefit from using one of these integrated SAS source-code editors:

- SAS 9.4 (aka SAS for Windows, PC/SAS)
- SAS Enterprise Guide
- SAS Studio

COMMON SAS UI FEATURES

Although each of the three main SAS User Interfaces (or Editing Environments, if you wish) – SAS 9.4, SAS Enterprise Guide and SAS Studio – may seem vastly different, they do share some similarities, as you are using them to write and submit SAS code:

- You type your SAS code into an "Editor" window. There is syntax color highlighting.
- In most (except for SAS 9.4), you get tooltip help while typing your code.
- To submit your SAS code, you press either a "Run" button or press F3.
- The LOG pane shows you the code you just ran, along with Notes, Warnings and Errors.
- The RESULTS pane displays reports, charts and tables generated by your SAS code.

All of these are written and supported by SAS Institute. As an alternative to these, you can add one of the most popular source-code editors – Visual Studio (VS) Code.

WHAT IS VISUAL STUDIO CODE (VS CODE)?

Visual Studio Code is a source-code editor environment originally developed by Microsoft. In 2015 it was released as an MIT-licensed open-source software available on GitHub. Soon after that, it was released

to the web. Some say it's now the most popular development environment tool. You can download it here: https://code.visualstudio.com/

Visual Studio Code has built-in features that most developers have come to expect in a source-code editor, including:

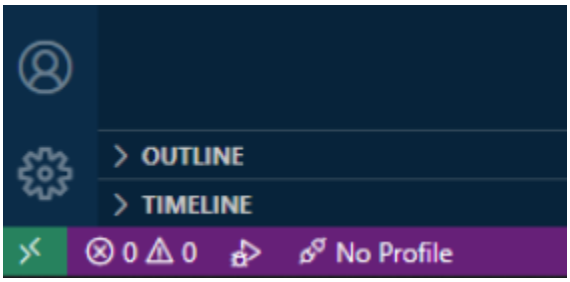
- Syntax highlighting
- Intelligent code completion
- Version control integration with Git
- Debugging

Visual Studio Code doesn't care which programming language you use – it is language-agnostic. Once installed, it includes IntelliSense support for JavaScript, JSON, CSS and HTML. If you want to use other languages – such as SAS or R or Python – you can install free extensions found on the VS Code Marketplace, here: https://marketplace.visualstudio.com/VSCode

INSTALLING THE SAS EXTENSION

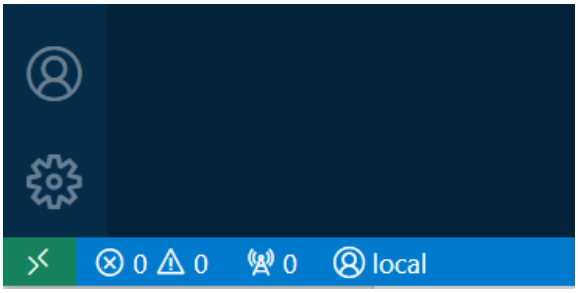
SAS is one of the free language extensions available on the VS Code Marketplace. Be sure to download the one written by SAS Institute, Inc.

Once it's installed, you must connect it to your SAS server via a Connection Profile. The first time you use the SAS extension, your Connection Profile will be set to "No Profile".



To add a connection profile, press F1 and run the SAS.addProfile command. Follow the prompts to create a new profile. You can connect VS Code to any remote SAS Server – SAS Viya or SAS 9. It can also connect to a "local" SAS 9 server, which is basically saying that you have SAS 9 installed on your own Windows laptop or desktop computer.

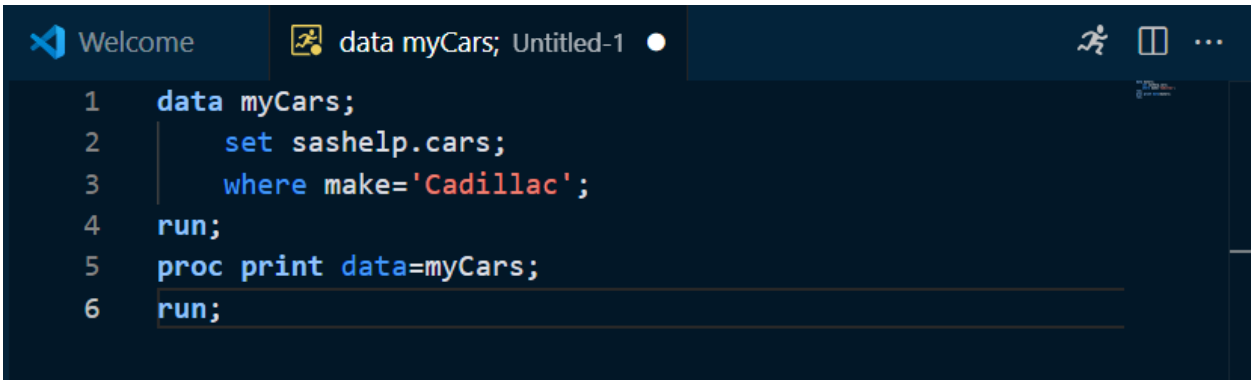
If you point to a local SAS 9.4 installation, you'll see this after adding your new profile (if you name it "local"):



WHAT DOES SAS CODE LOOK LIKE IN VS CODE EDITOR?

Although entirely configurable, SAS coding in VS Code looks very similar to other SAS-supported source-code editor interfaces. It implements the features listed in the Common SAS UI Features section above. For instance, you can view the standard EDITOR, LOG and RESULTS panes.

The SAS editor pane looks like this:



Notice the syntax color highlighting.

Like the other SAS source-code editors, to submit your SAS code you either press the “runner” icon at top right corner or press the F3 key. If you only want to submit a portion of your SAS code, you have a few choices.

To submit a random section of SAS code:

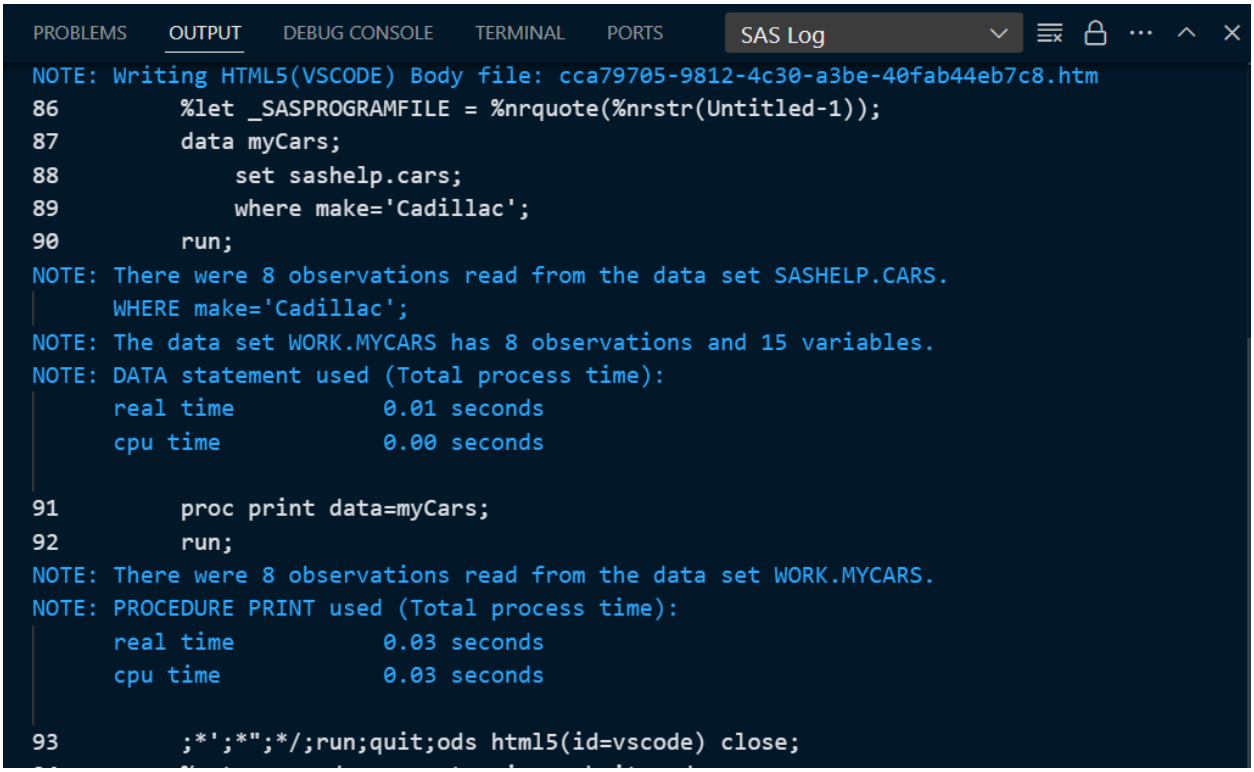
- Select the code you want to submit, right-click and choose “Run Selected or All SAS Code”

To submit a region of code, right-click within a region, then choose “Run Region”. A region of code is either:

- One PROC or DATA step
- One section of code between /*region*/ and /*endregion*/ tags

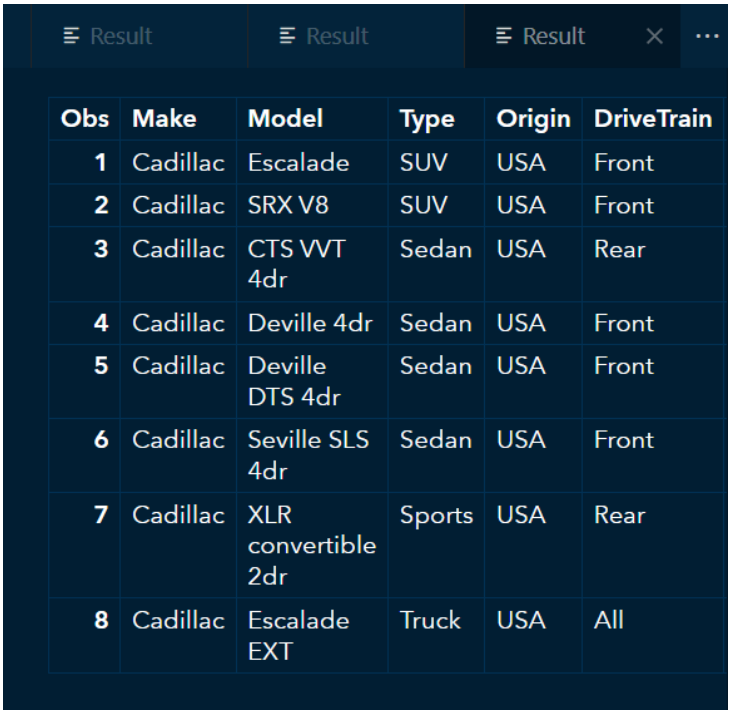
While SAS is processing your submitted code, you’ll see this pop-up panel:

A record of your submitted SAS code is sent to the “SAS Log” section of the OUTPUT window, and looks like this:



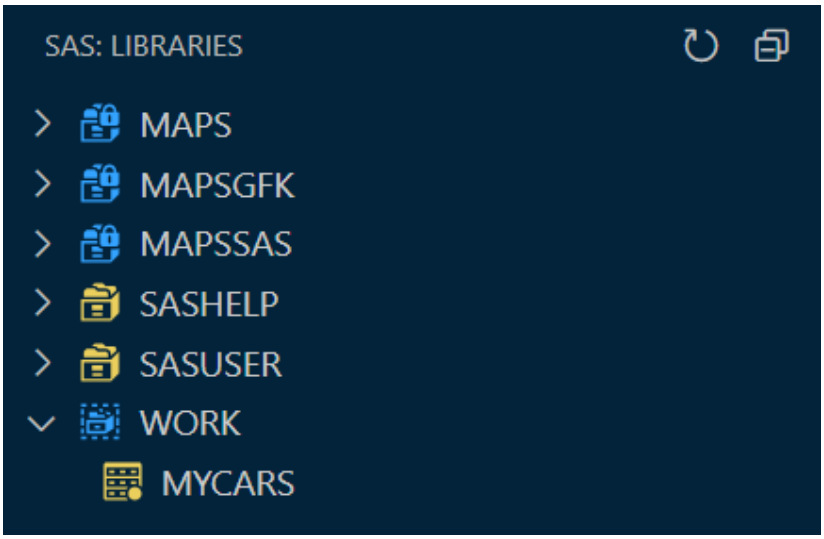
Note that, like SAS Enterprise Guide, the SAS VS Code extension submits some pre- and post-code to the SAS code you submit.

Any tables or reports you create are sent to the OUTPUT window:



Obs	Make	Model	Type	Origin	DriveTrain
1	Cadillac	Escalade	SUV	USA	Front
2	Cadillac	SRX V8	SUV	USA	Front
3	Cadillac	CTS VVT 4dr	Sedan	USA	Rear
4	Cadillac	Deville 4dr	Sedan	USA	Front
5	Cadillac	Deville DTS 4dr	Sedan	USA	Front
6	Cadillac	Seville SLS 4dr	Sedan	USA	Front
7	Cadillac	XLR convertible 2dr	Sports	USA	Rear
8	Cadillac	Escalade EXT	Truck	USA	All

If your SAS code creates temporary (WORK) datasets, you can view them in the SAS LIBRARIES navigation pane. In our case, it looks like this:



If you double-click MYCARS, the dataset will open for viewing in its own pane.

SAS EXTENSION – ADDITIONAL FEATURES

CUSTOMIZATION

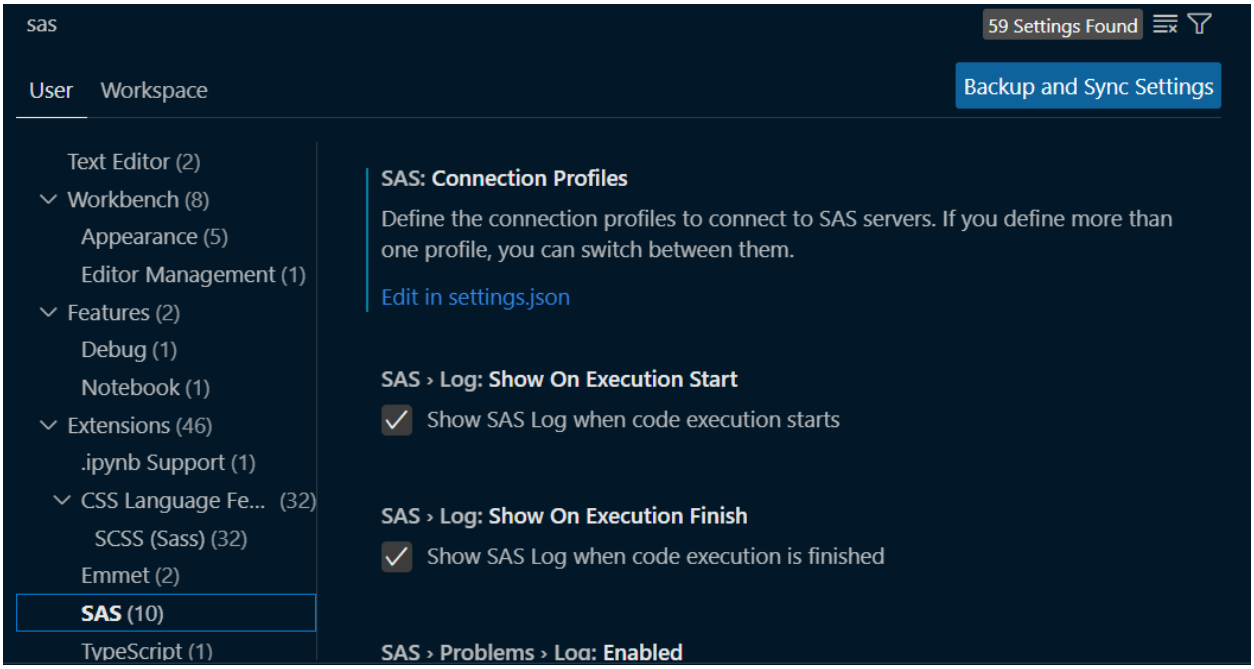
Compared to other SAS code-editor interfaces, the SAS extension for VS Code has a remarkable number of customization options. Of course, you can move and resize all the panels. If you frequently use SAS Enterprise Guide, you might want to customize VS Code to resemble SAS Enterprise Guide.

You can change all the colors of the fonts and backgrounds. Besides the standard out-of-the-box color themes included with VS Code, the SAS extension adds two SAS-specific themes – **SAS Light** and **SAS Dark**. You select one of these themes from this menu path:

File → Preferences → Theme → Color Theme

or use the Preferences: Color Theme shortcut – Ctrl+K Ctrl+T

You can customize a lot of things about your SAS session, which will remain in effect for future VS Code sessions. To access these settings, select File → Preferences → Settings. Search for “sas” and you’ll see something like this:

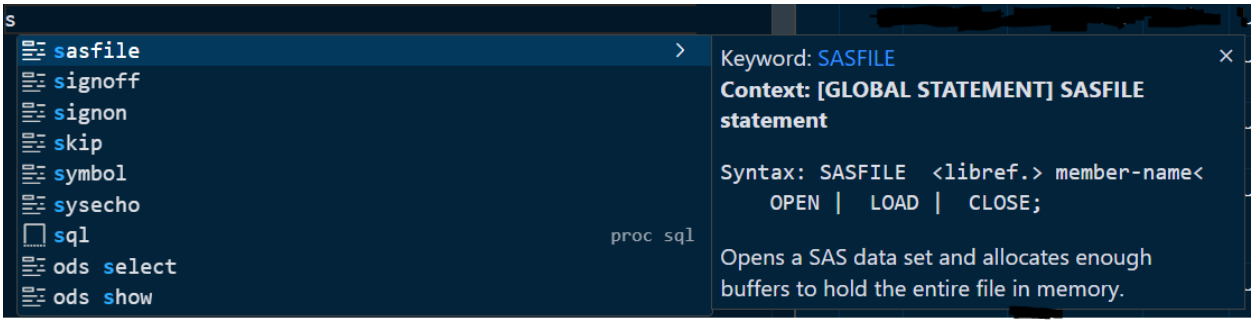


If you select SAS from the left pane, you can easily uncheck the settings affecting the SAS LOG pane. You can hide it at startup or hide it when code execution if finished.

As an alternative to changing settings here, you can edit the settings directly in the “settings.json” file by clicking the blue “Edit in settings.json” link shown above.

SNIPPETS

Snippets are lines of commonly used code or text which can be inserted into your code. One type of built-in snippet is a PROC template. If you forget, say, the basic structure of a PROC SQL step, you can just start typing the procedure name – in this case, if you just type S within a blank section of the code editor, you’ll see these suggestions:



If you select “sql” from the list, this code will be added to your code editor window:

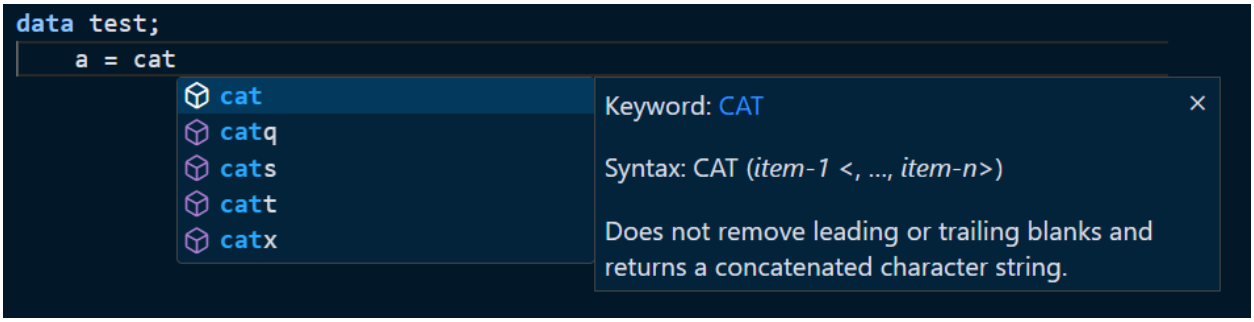
```
proc sql;
    select
    from
    where ;
quit;
```

Note: Not all SAS procedures are available via snippet shortcuts. [PROC PRINT, REPORT and TABULATE aren’t there, for example).

FUNCTION SIGNATURE HELP

As you type a function name, you’ll get pop-up help detailing how many parameters the function uses, and what each parameter means.

For example, I rarely remember each concatenation function. But if you start typing CAT as shown here, the SAS extension will display each CAT function’s signature details.



FORMATTING SAS CODE

If you don’t strictly adhere to SAS code indentation suggestions, you might know that SAS Enterprise Guide will reformat your code if you press Ctrl+Shift+B. You can do this in the SAS extension to VS Code by right-clicking in your code (open the context menu) and select “Format Document”.

That will convert this code:

```
data test; set sashelp.class; if sex="F"; run;
```

Into this:

```
data test;
    set sashelp.class;
    if sex="F";
run;
```

CONCLUSION

In addition to the standard SAS-provided source-code editors, Visual Studio Code makes another great option for SAS coders. For experienced SAS programmers, it provides a cross-platform interface. For those with VS Code experience from using it with a different language, it provides a familiar environment for learning or expanding your SAS skills.

REFERENCES

SAS online webinar, “Discover the Possibilities: SAS Visual Studio Code Extension”.
https://www.sas.com/en_us/webinars/sas-visual-studio-code-extension.html

SAS Blog, “What’s next for SAS 9 and SAS Enterprise Guide?”
https://blogs.sas.com/content/sasdummy/2024/03/22/sas-9-and-sas-eg/

SAS Extension for Visual Code Documentation
https://sassoftware.github.io/vscode-sas-extension/

Visual Studio Code Documentation
https://code.visualstudio.com/docs

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