

PHUSE: Coding Tips and Techniques

SAS Studio – Time to move on from Display Manager and Enterprise Guide

This session will provide an overview of the latest version of SAS Studio and the new features available to make life as a SAS Programmer in Life Sciences easier and more efficient. It will also show how you can easily create reusable “snippets” and “customer tasks” and integrate with GitHub for version control and governance.

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SAS®STUDIO

WHAT IS SAS STUDIO?

SAS Studio is the web based interface for SAS Programmers.

With SAS Studio, you can access your data files, libraries, and existing programs and write new programs.

You can also use the predefined tasks in SAS Studio to generate SAS code..

Available with SAS 9.4 since May 2014

WHO IS IT FOR?



PROGRAMMERS



DATA ANALYST



CITIZEN ANALYTICS



DATA SCIENTIST



CODING

SAS Studio includes a color-coded, syntax-checking editor for editing new or existing SAS programs. It includes code snippets, commonly used code or text that you can save and reuse.

TASKS

Tasks provide a way for you to run some of the most commonly used analyses on your data without requiring you to write any SAS code yourself. Tasks generate SAS code and results based on the options that you select in the user interface.

QUERIES

You can build queries to join multiple datasets, create simple and complex expressions, filter and sort data. When you create a query, SAS Studio generates Structured Query Language (SQL) or FedSQL code, which you can view and edit.

GIT INTEGRATION

SAS Studio includes integration with Git, a system for tracking changes and managing version control among multiple users. Git can be used with many different repository hosting services such as GitHub and Bitbucket.

DATA ACCESS

With SAS Studio, you can access your data files, libraries, and existing programs. You can import a range of data sources including CSV and Excel.



SAS® Enterprise Guide and SAS® STUDIO

MOVING FROM SAS ENTERPRISE GUIDE TO SAS STUDIO

If you're moving from SAS Display Manager or SAS Enterprise Guide your code will work in the same way as before. If you prefer using tasks then most SAS Enterprise Guide tasks have a SAS Studio equivalent. There are, however, some changes



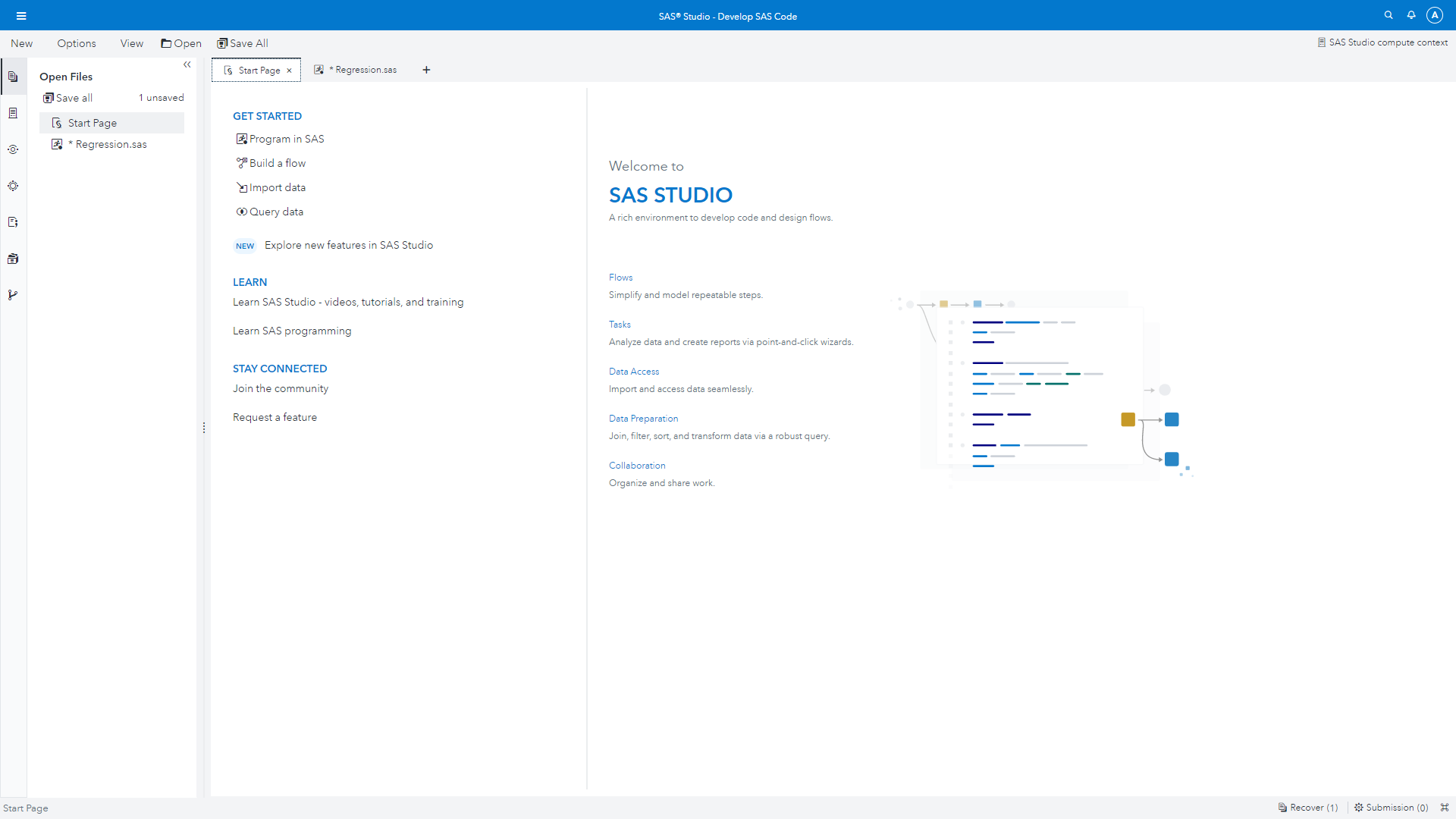
[Click here](#) for a comprehensive list of the differences between SAS Enterprise Guide vs SAS Studio

FEATURE	SAS EG	SAS STUDIO
Advanced Programming Editor	✓	✓✓
Tab Layout	✗	✓
SAS defined codesnippet	✗	✓
SAS defined tasks	✓	✓
Data step debugger	✓	✓
GIT Integration	✓	✓
Process Flows	✓	✓
Direct connection to SASViya	✗	✓



Benefits of SAS Studio

- Accessed via a web browser via SAS drive
- Your SAS code will work in much the same way.
- Access to other tools, eg VA for adhoc data discovery and interactive analysis.
- Background Submit
- Code Snippet and Task
- Git integration



New Options View Open Save All

Open Files

Programs

Explore

Snippets

Tasks

Libraries

GIT

Interactive Code Editor

Log / Results / Output

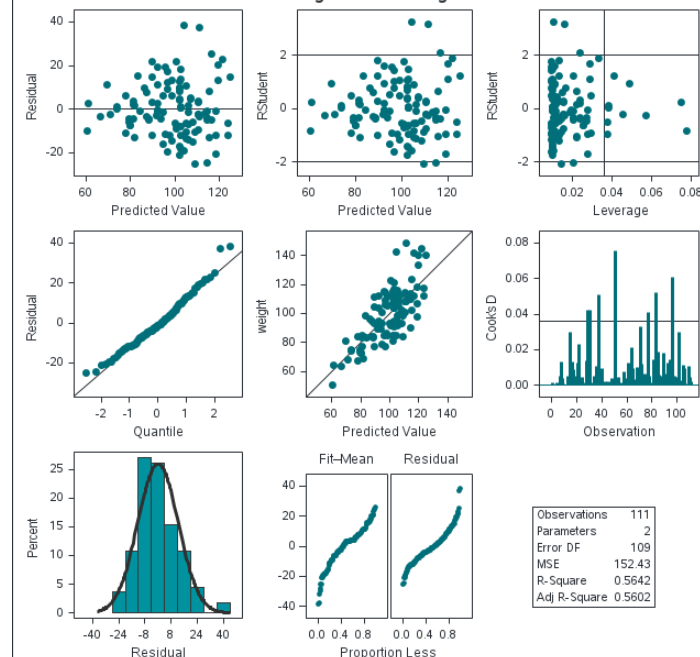
Sep 3, 2020, 11:31:04 AM

Log Results Output Data

```

The Reg Procedure
├─ sex=f
│   └─ eq1
│       └─ Fit
│           └─ weight
│               └─ Number of Observati...
│               └─ Analysis of Variance
│               └─ Fit Statistics
│               └─ Parameter Estimates
├─ Observation-wise Statistics
│   └─ weight
│       └─ Diagnostic Plots
│       └─ Residual Plots
│       └─ Fit Plot
├─ eq2
│   └─ Fit
│       └─ weight
│           └─ Number of Observati...
│           └─ Analysis of Variance
│           └─ Fit Statistics
│           └─ Parameter Estimates
├─ Observation-wise Statistics
│   └─ weight
│       └─ Diagnostic Plots
│       └─ Residual Plots
│       └─ Panel 1
└─ sex=m

```



Residuals for weight

New Options View Open Save All

Start Page *Regression.sas x +

Run Cancel

```
3  
4 TITLE: PROC REG  
5     Age, Weight, and Height of Children  
6 DATA: htw  
7 PRODUCT: STAT  
8 SYSTEM: ALL  
9 KEYS: Output data sets, BY processing  
10 PROCS: REG  
11  
12 -----*/  
13 proc reg outest=est1 outsscp=sscp1 rsquare;  
14     by sex;  
15     eq1: model weight=height;  
16     eq2: model weight=height age;  
17     run;  
18  
19 proc print data=sscp1;  
20     title2 'SSCP type data set';  
21     run;  
22  
23 proc print data=est1;  
24     title2 'EST type data set';  
25     run;
```

Log

Results x

Log / Results / Output

The Reg Procedure

sex=f

eq1

Fit

weight

Number of Observations

Analysis of Variance

Fit Statistics

Parameter Estimates

Observation-wise Statistics

weight

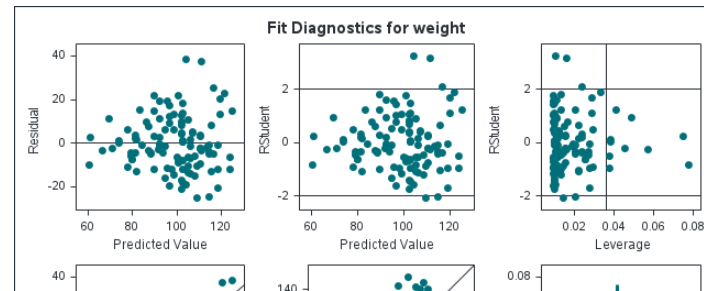
Diagnostic Plots

Fit Diagnostics

Residual Plots

Dependent Variable: weight

sex=f



```

1  /*-----
2      SAS SAMPLE LIBRARY
3  */
4  TITLE: PROC REG
5      Age, Weight, and Height of Children
6  DATA: htwt
7  PRODUCT: STAT
8  SYSTEM: ALL
9  KEYS: Output data sets, BY processing
10 PROC: REG
11
12
13
14 proc reg data=htwt outest=est1 outsscp=sscp1 rsquare;
15
16
17
18
19
20
21
22 run;
23
24
25
26

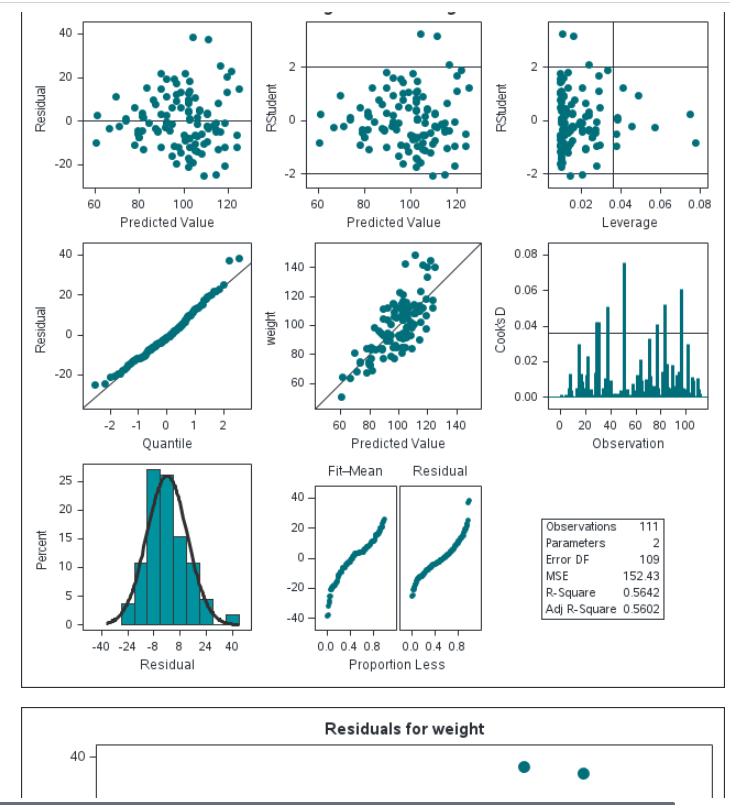
```

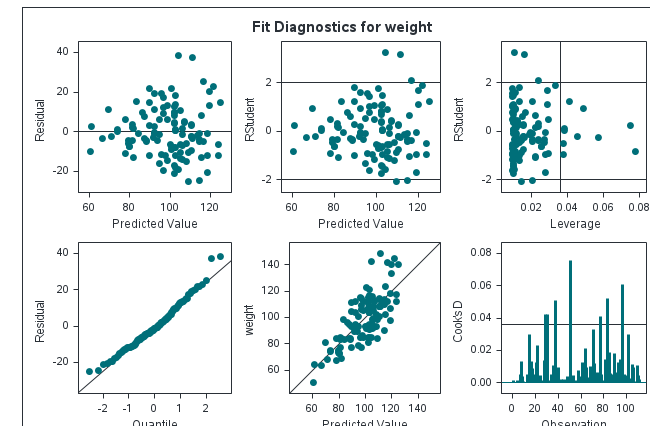
Keyword: REG
Context: [PROCEDURE DEFINITION] PROC REG

Syntax: PROC REG <options>;
<label>MODEL dependents=<regressors> </ options>;
BY variables;
FREQ variable;
ID variables;
VAR variables;
WEIGHT variable;
ADD variables;
DELETE variables;
<label>MTEST <equation, ..., equation> </ options>;
OUTPUT <OUT=SAS-data-set> < keyword=names> <... keyword=names>;
PAINT <condition | ALLOBS> </ options> | < STATUS | UNDO>;
RESTRICT equation, ..., equation;
REWEIGHT <condition | ALLOBS> </ options> | < STATUS | UNDO>;
PRINT <options> <ANOVA> <MODELDATA>;
REFIT;
RESTRICT equation, ..., equation;
REWEIGHT <condition | ALLOBS> </ options> | < STATUS | UNDO>;
<label>TEST equation <... equation> </ options>;

Log Results Output Data

- The Reg Procedure
 - sex=f
 - eq1
 - Fit
 - weight
 - Number of Observati...
 - Analysis of Variance
 - Fit Statistics
 - Parameter Estimates
- Observation-wise Statistics
 - weight
 - Diagnostic Plots
 - Fit Diagnostics
 - Residual Plots
 - height
 - Fit Plot

- eq2
- Fit
 - weight
 - Number of Observati...
 - Analysis of Variance
 - Fit Statistics
 - Parameter Estimates
- Observation-wise Statistics
 - weight
 - Diagnostic Plots
 - Fit Diagnostics
 - Residual Plots
 - Panel 1
- sex=m




Code

```
proc reg data=htwt outest=est1 outsscp=sscp1 rsquare;
  by sex;
  eq1: model weight=height;
  eq2: model weight=height age;
run;
```

```
roc print data=sscp1;
      title2 'SSCP type data set';
un;
```

```
proc print data=est1;
  title2 'EST type data set';
run;
```

Submission Status x

Filter

▼ Status (no filter)

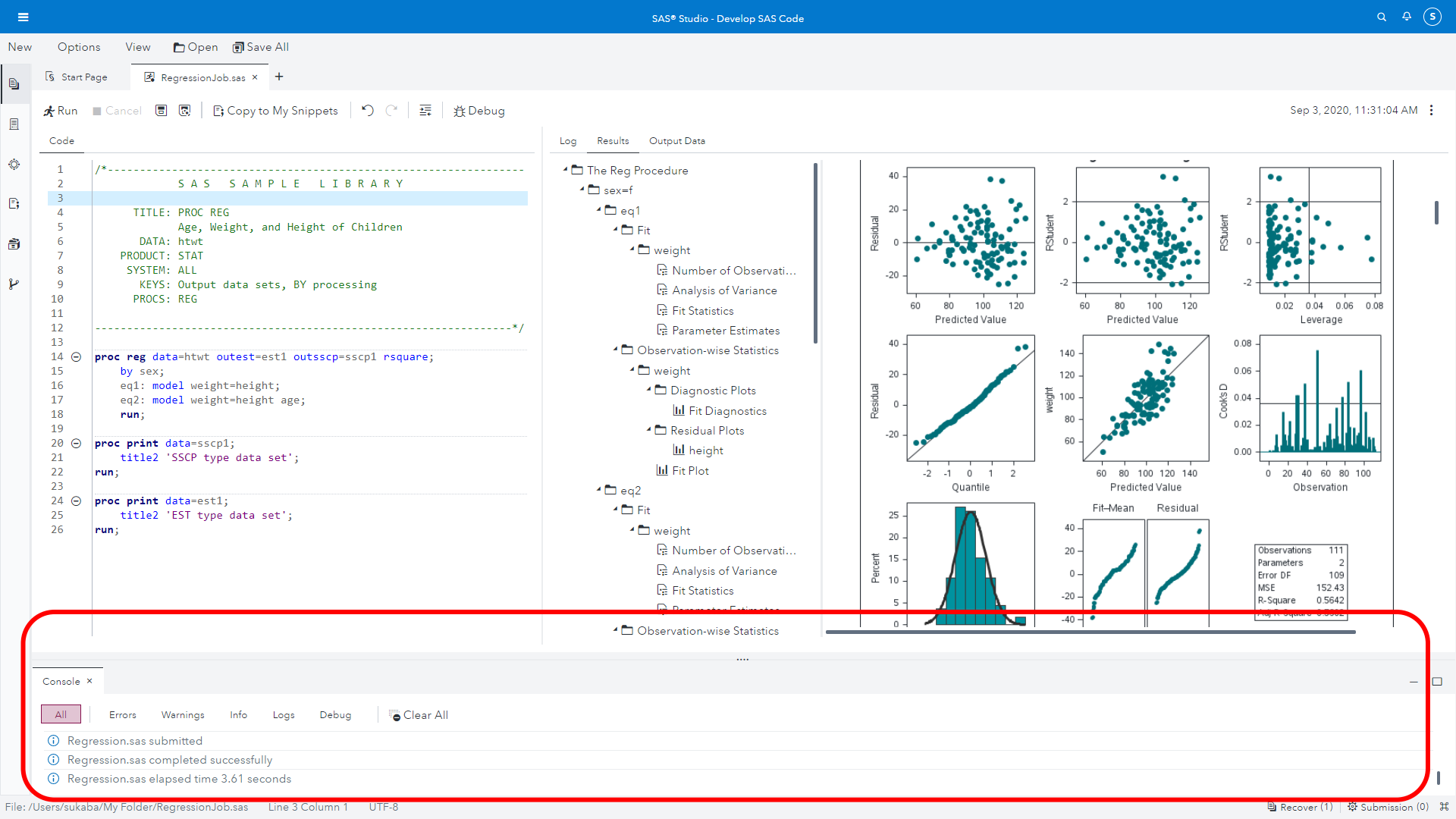
☐ Successful

 Filter submissions list

Cancel All

Clear All

	▼	📄	Name	Type	Run Time	Submitted	Completed	Server
(1)	✓		Regression.sas	Program	14.693s	8/21/2020, 3:49:48 PM	8/21/2020, 3:50:03 PM	SAS Studio compute context



Snippets



Filter snippets

SAS Snippets My Snippets

Data

- DS2 Code
- DS2 Package
- DS2 Thread
- Generate CSV File
- Generate PowerPoint Slide
- Generate XML File
- Import CSV File
- Import XLSX File
- Simulate Linear Regression Data
- Simulate One-Way ANOVA Data

Data Quality

Descriptive

Graph

IML

Macro

SAS Viya Cloud Analytic Services

SAS Viya Image Processing

SAS Viya Machine Learning

Start Page Import CSV File.sas x +

Run Cancel Copy to My Snippets + Code to Flow Debug

Code

```
1 /* Import a csv file from the location specified on the filename statement */
2 /* The SAS data set created is named by substituting a name for work.mycsv */
3
4 filename csv "<location on file system of the CSV file>";
5
6 /* Import the CSV file */
7 proc import datafile=csv out=work.mycsv dbms=csv;
8     getnames=yes;
9     run;
10
11 /* Print the first 10 observations */
12 proc print data=work.mycsv(obs=10);
13     run;
14
15 filename csv;
16
```

Log

Characterize Data.ctlk [temp] Line 1 Column 1 | Submission (0)

Categorical Variables

- ☒ Frequency table
- ☒ Frequency chart
- ☐ Treat missing values as valid level
- ☐ Limit categorical values

- ✓ Numeric Variables

- ✓ Descriptive statistics
- ✓ Histogram

> Date Variables

Task Console (0)

No items

Code Log

```

1  /*
2  *
3  * Task code generated by SAS® Studio 6.0
4  *
5  * Generated on '8/21/20, 3:02 PM'
6  * Generated on server 'sas-launcher-328af5fc-47b5-440f-bbda-968495fefda7-tvbws'
7  * Generated on SAS platform 'Linux LIN X64 3.10.0-957.1.3.el7.x86_64'
8  * Generated on SAS version 'V.04.00M0P082020'
9  * Generated on browser 'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko)'
10 * Generated on web client 'http://d2mwf.ingress-nginx.d2mwf-m1.quest.sashq-d.openstack.sas.com/SASStudio'
11 */

```

```
13 ods noproctitle;
```

```
15 /** Analyze categorical variables */
16 title "Frequencies for Categorical Variables";
```

```
18 proc freq data=SASHELP.HEART;  
19     tables Sex / plots=(freqplot);  
20 run;
```

```
22  /*** Analyze numeric variables ***/
23  title "Descriptive Statistics for Numeric Variables";
```

```
25 proc means data=SASHELP.HEART n nmiss min mean median max std;
26     var AgeAtStart Height Weight;
27 run;
```

```
29 title;
```

```
31 proc univariate data=SASHELP.HEART noprint;
32     histogram AgeAtStart Height Weight;
33 run;
```

Tasks

Filter tasks

SAS Tasks : My Tasks

- Econometrics
- Forecasting
- Optimization and Network Analysis
- Prepare Data
 - Examine Data
 - Characterize Data
 - Describe Missing Data
 - List Data
 - List Table Attributes
 - Transform Data
- SAS Viya Cloud Analytic Services
- SAS Viya Econometrics
- SAS Viya Evaluate and Implement M...
- SAS Viya Forecasting
- SAS Viya Machine Learning
- SAS Viya Optimization and Network ...
- SAS Viya Prepare and Explore Data
- SAS Viya Statistics
- SAS Viya Text Analytics
- Statistical Process Control
- Statistics
- Visualize Data

Start Page Import CSV File.sas * Characterize Data.ctlk x +

Run Cancel Copy to My Tasks + Code to Flow

Code Log Results

- The Freq Procedure
 - Table Sex
 - One-Way Frequencies
 - Distribution Plots
 - Frequency Plot
- The Means Procedure
 - Summary statistics
- The Univariate Procedure
 - AgeAtStart
 - Histogram 1
 - Panel 1
 - Height
 - Histogram 1
 - Panel 1
 - Weight
 - Histogram 1
 - Panel 1





Git Repositories

- Clone Add
- Current Repository
 - Local
 - ✓ master (1)

Start Page Local x +

Local Current repository | master Current branch | Pull master Last pulled: Nov 13, 2019,... | Push master Last pushed: Nov 13, 2019,... 1

Commit History

Unstaged Changes (0)

No items

Staged Changes (0)

No items

Enter a commit comment

Commit



WORKING WITH GIT.

- Edit**
Edit files in your working directory. As you work, the files you change and save are added to the Unstaged Changes area of the Commit tab.
- Stage**
Move the changed files that you want to keep together to the Staged Changes area. It is good practice to group related changes together in the same commit.
- Commit**
Enter a short description of your changes and commit the files to your local repository. Each commit represents a snapshot of the changes since your last commit.
- Push**
Share your committed changes with others by pushing them to the remote repository.

Tasks



Filter tasks

SAS Tasks My Tasks

Flow Tasks

- File
- Import
- Query
- SAS Program
- Table
- Prepare Data
- SAS Viya Cloud Analytic S...
- SAS Viya Econometrics
- SAS Viya Evaluate and Im...
- SAS Viya Forecasting
- SAS Viya Machine Learning
- SAS Viya Optimization an...
- SAS Viya Prepare and Expl...
- SAS Viya Statistics
- SAS Viya Text Analytics
- Statistical Process Control
- Statistics
- Visualize Data

Start Page

* Flow.flw x



Run



Add



View

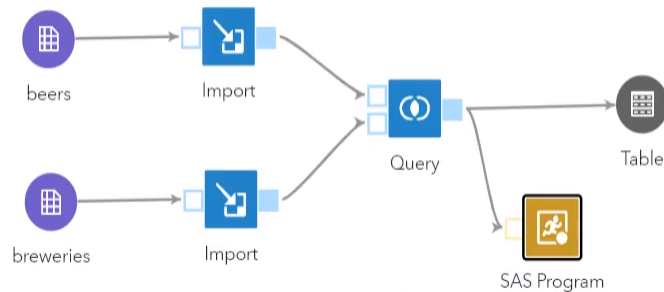


Apr 20, 2020 05:20 PM

Flow

Generated Code

Submission



SAS Program

Code Node

```
1 proc freq data=&input1;  
2 tables beer_name;  
3 where state = "ND";  
4 run;
```

SAS Studio – Additional Material

Main references



SAS Studio website

<https://support.sas.com/en/software/studio-support.html>



Tutorial Video: Getting Started with SAS Studio

<https://video.sas.com/detail/video/4573016757001/getting-started-with-sas-studio?autoStart=true&q=getting%20started%20with%20sas%20studio>



SAS Studio Fact Sheet

https://www.sas.com/content/dam/SAS/en_us/doc/factsheet/sas-studio-107188.pdf



SAS Studio FAQ

<https://support.sas.com/software/products/sas-studio/faq/index.html>



SAS Studio Community

https://communities.sas.com/t5/SAS-Studio/bd-p/sas_studio



SAS Studio – Additional Material

Main references



SAS Studio documentation

<https://go.documentation.sas.com/?docsetId=webeditorug&docsetTarget=n1lynjknlzrukln1cxencems3iec.htm&docsetVersion=5.2&locale=en>



SAS Studio Programming Guide

<https://go.documentation.sas.com/?docsetId=webeditorug&docsetTarget=n0tyf6c7kxkp54n1wqfsd0ava758.htm&docsetVersion=5.2&locale=en>



SAS Studio Vs SAS Enterprise Guide

https://support.sas.com/software/products/sas-studio/faq/SASStudio_vsEG.htm



SAS Studio Tasks

<https://go.documentation.sas.com/?docsetId=webeditorug&docsetTarget=n1omecs2luwpb0n1x8btX0ya00uv.htm&docsetVersion=5.2&locale=en>



SAS Studio Integration with Git

<https://go.documentation.sas.com/?docsetId=webeditorug&docsetTarget=p0puc7muifjiycn1uemlm9lj1jkt.htm&docsetVersion=5.2&locale=en>