



Abstract

This report includes notes about running SAS on Linux systems, generally speaking, and on the KU Advanced Computing Facility cluster computer in particular.

Contents

1 Overview 1
1.1 Important Note about GNOME vs. KDE Desktop on NoMachines 2
2 SAS on Windows and Linux: A Brief Comparison of Similarities and Differences 2
3 Starting Up SAS on NoMachine (GNOME Desktop Example) 3
3.1 How to Find and Start SAS (GNOME Desktop Example) 4
4 Starting Up SAS on NoMachine (KDE Desktop Example) 9
4.1 How to Find and Start SAS (KDE Desktop Example) 9
5 Customizing the Program Editor 13
5.1 Removing the Line Numbers and Splitting Lines on Carriage Return 13
5.2 Changing the Cursor 17
6 Customizing Keyboard Shortcuts 20
6.1 Submit 20
6.2 Copy and Paste 23
6.3 Redo and Undo 25

1 Overview

The purpose of this tutorial is to help you understand how to launch SAS on the NoMachine systems. NoMachine runs on Linux. At this point, the reader may be like "What the heck I have never used Linux before in my life. That stuff is for those mega nerds. How the heck will I use SAS now?" I initially felt this way when I first tried SAS on Linux and now feel differently and want to share some tips to help make the transistion more smoothly. In this manual, I cover how to start up SAS on the NoMachine systems step by step and explain some of the similarities and differences between SAS on Windows and SAS on Linux. Next, I explain to customize the SAS program editor to be more like Windows. Lastly, I also show how to customize some keyboard shortcuts that are common on SAS for Windows so that they will work on the Linux NoMachine systems.

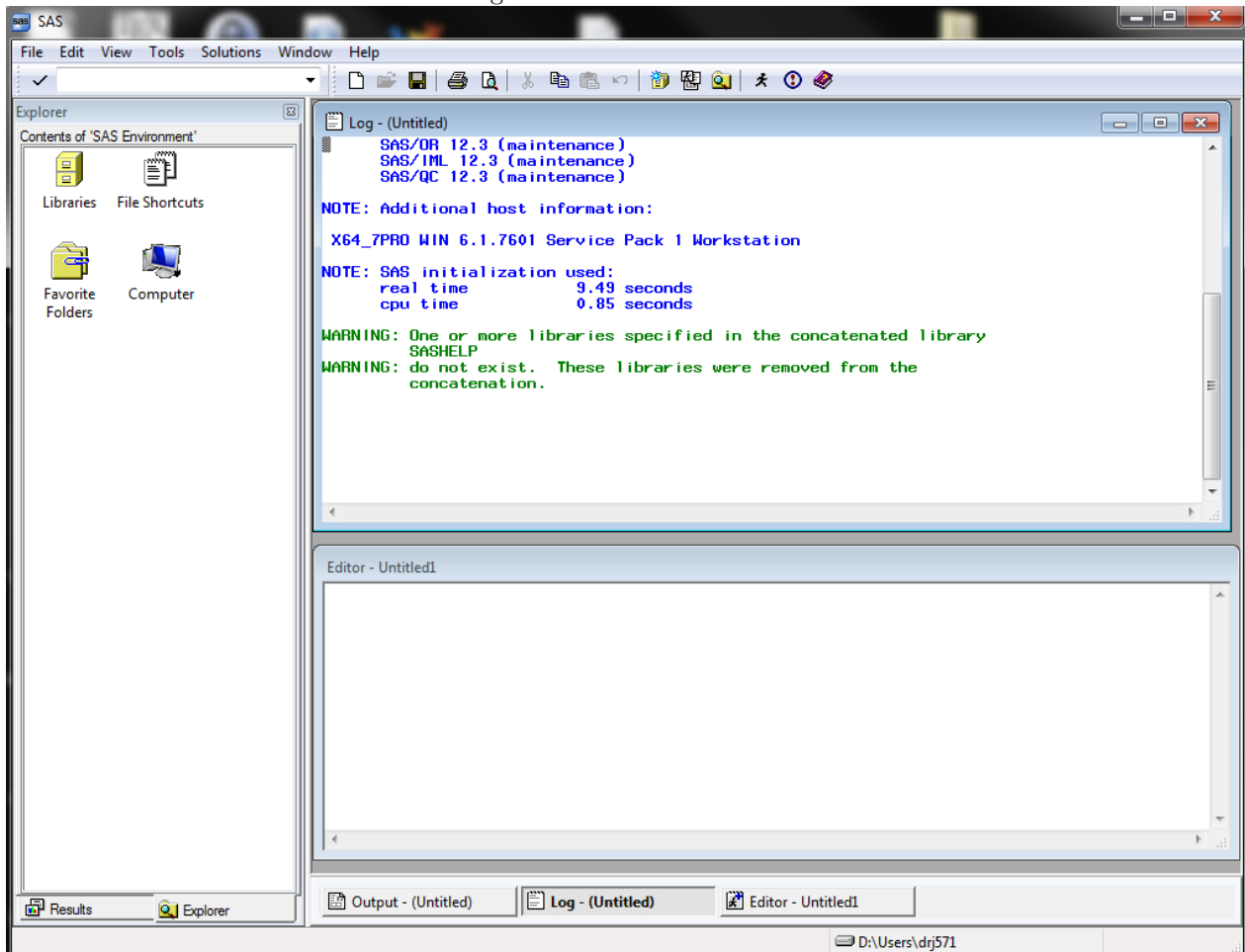
## 1.1 Important Note about GNOME vs. KDE Desktop on NoMachines

Note for the purposes of this tutorial I will use the GNOME desktop from NoMachine when using SAS. When NoMachine starts up there are several options of desktops, GNOME, KDE, XDM, VNC, RDP, CDE, or a custom session. For the purposes of this tutorial I recommend either KDE or GNOME (this is what I use) as your desktop for SAS. If you use with other desktops, these instructions may not map out very well. I demonstrate how to start SAS on Linux in both the KDE and GNOME desktops. However, when I talk about customizing the desktop experience and key shortcuts, that will all be done on GNOME. The differences between GNOME and KDE once SAS is initialized is mute.

## 2 SAS on Windows and Linux: A Brief Comparison of Similarities and Differences

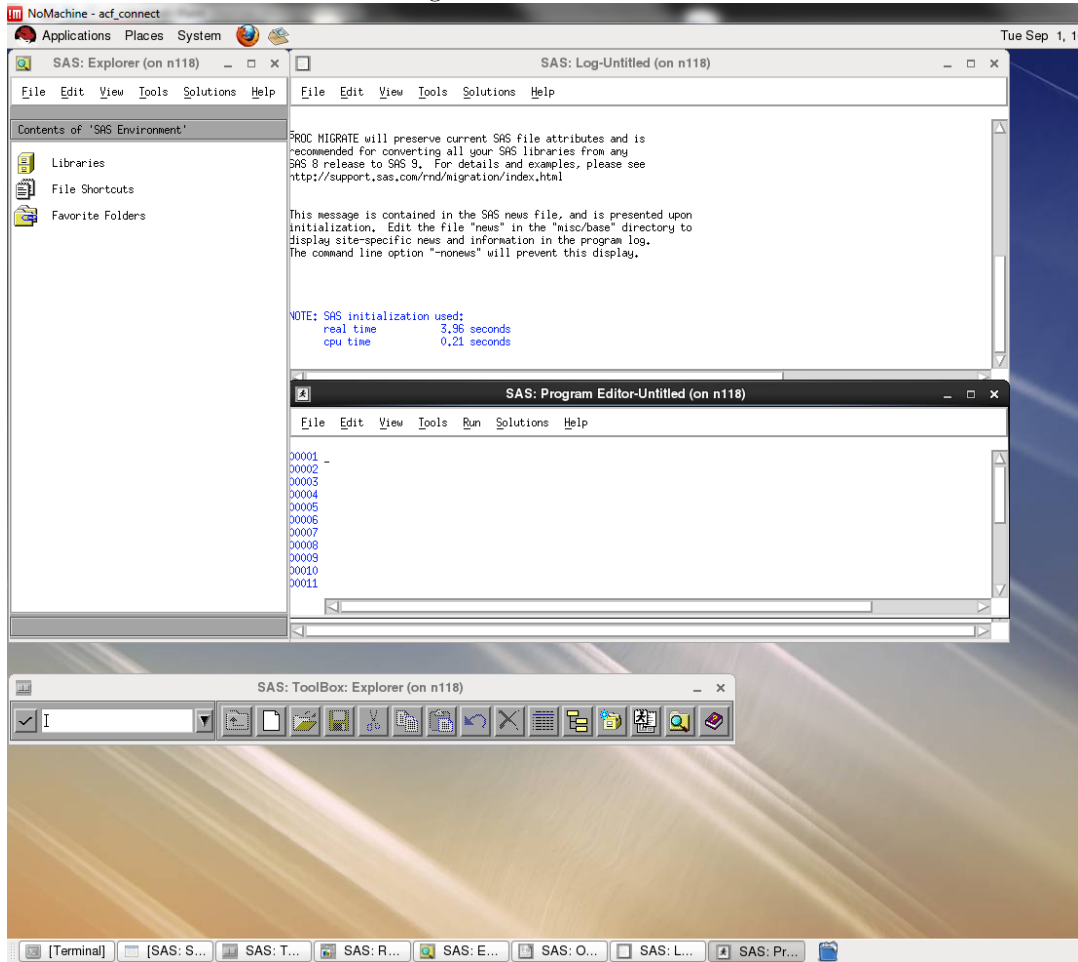
There are many similarities for SAS on Windows and SAS on Linux. In Figure 1 a screen shot of the SAS session is given. Users familiar with the Linux interface will have an easier time than I did, because I had to learn from the Windows perspective. In this window there is a log, editor, toolbar at the top, explorer, and results pane. SAS on Linux has the same things albeit they look different and have different initial settings which can make SAS on Linux somewhat intimidating.

Figure 1: SAS on Windows



When SAS is first fired up this is the general look of SAS on Linux with the GNOME desktop (illustrated in Figure 2). Notice in Figure 2 that there is a log, program editor, tool box (think tool bar), and explorer window. At the bottom of the picture, there are several boxes with SAS on them. These correspond to the functionalities (i.e. log, program editor, tool box, and explorer) and also the output, results, and SAS session manager windows. Note in Windows there is not a SAS session manager box readily visible. Clearly, the look and feel is different as Windows and Linux are different operating systems. One big difference is that the program editor now will have line numbers. Don't worry; I will show how to get rid of these! In the rest of this tutorial I will orient the user with how to start up SAS on the NoMachine systems step by step and provide some pointers on how to customize the experience to match Windows.

Figure 2: SAS on Linux



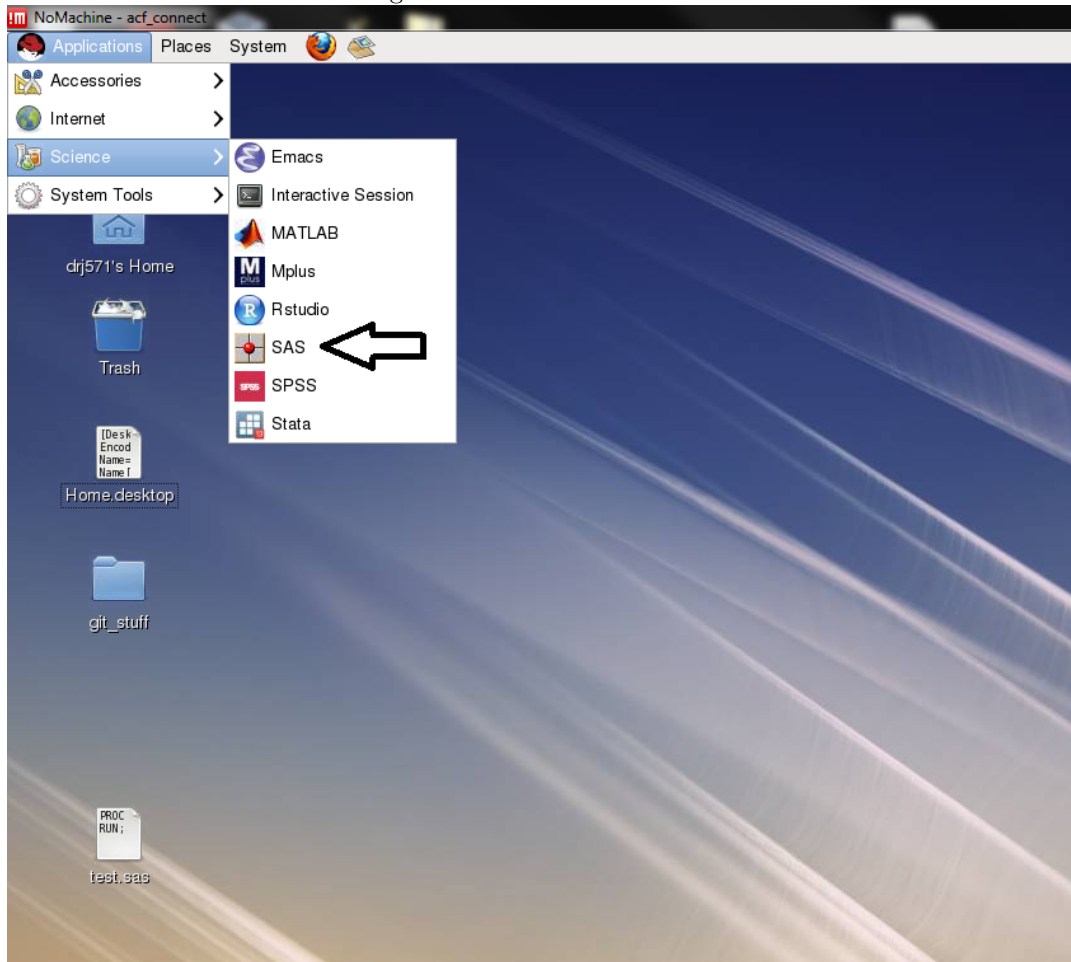
### 3 Starting Up SAS on NoMachine (GNOME Desktop Example)

Each user must have an ACF account to access NoMachine. If you do not have an account information can be found here regarding access <http://crmda.ku.edu/accounts>. Then download and install NoMachine. There is a poetic guide that brilliantly spells out how to do this at the following url: <http://crmda.dept.ku.edu/resources/guides/30.NoMachineTutorial.pdf>. When those two things are taken care of, login to the NoMachine account by following the NoMachine tutorial. Note that in this tutorial I use the GNOME Desktop for NoMachine (because I find it more intuitive). I will also provide an brief tutorial of starting up SAS using KDE in the next section.

### 3.1 How to Find and Start SAS (GNOME Desktop Example)

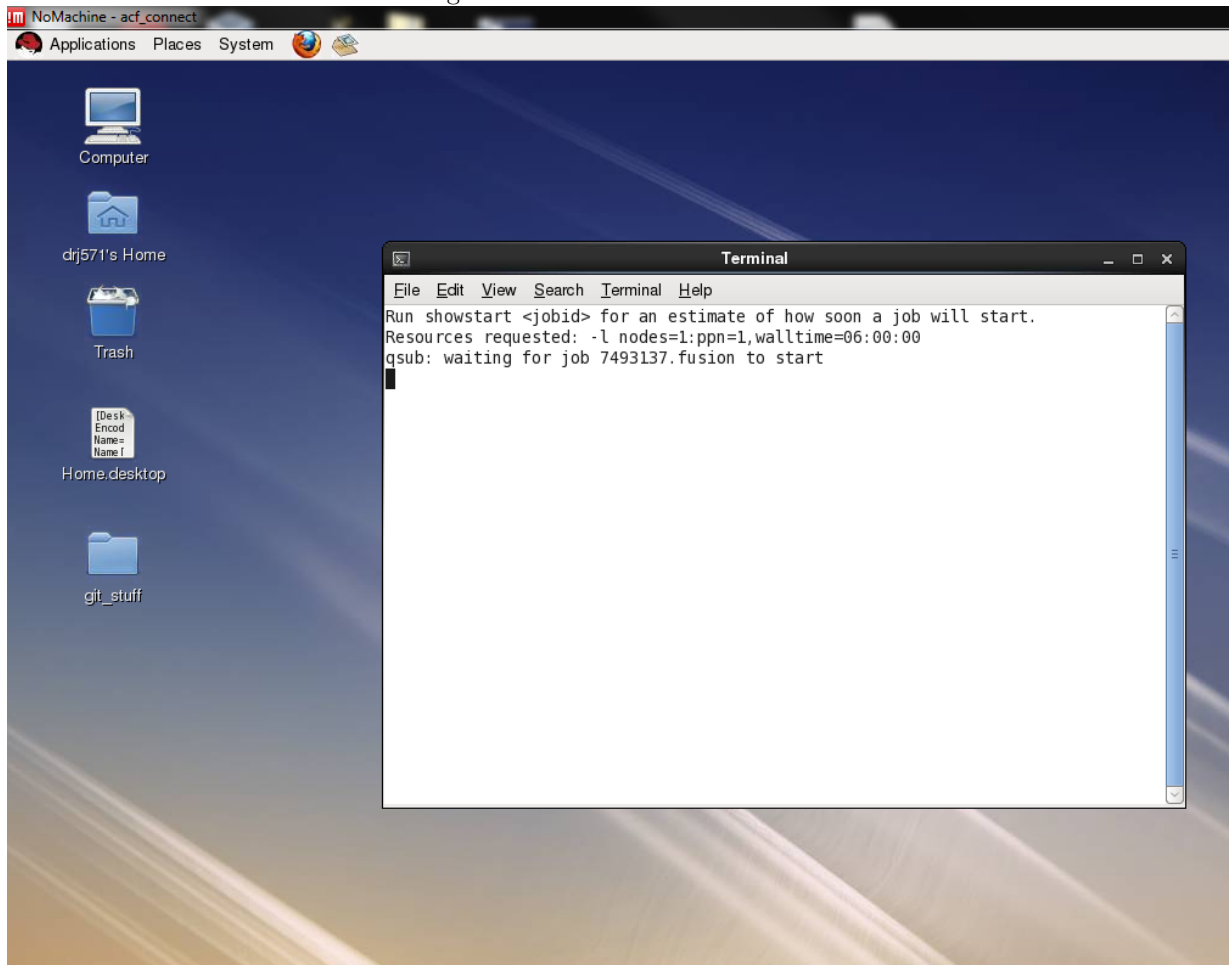
In the NoMachine desktop, click Applications, then Science, then Select SAS. See the Figure 3 below for details.

Figure 3: SAS Initial GNOME



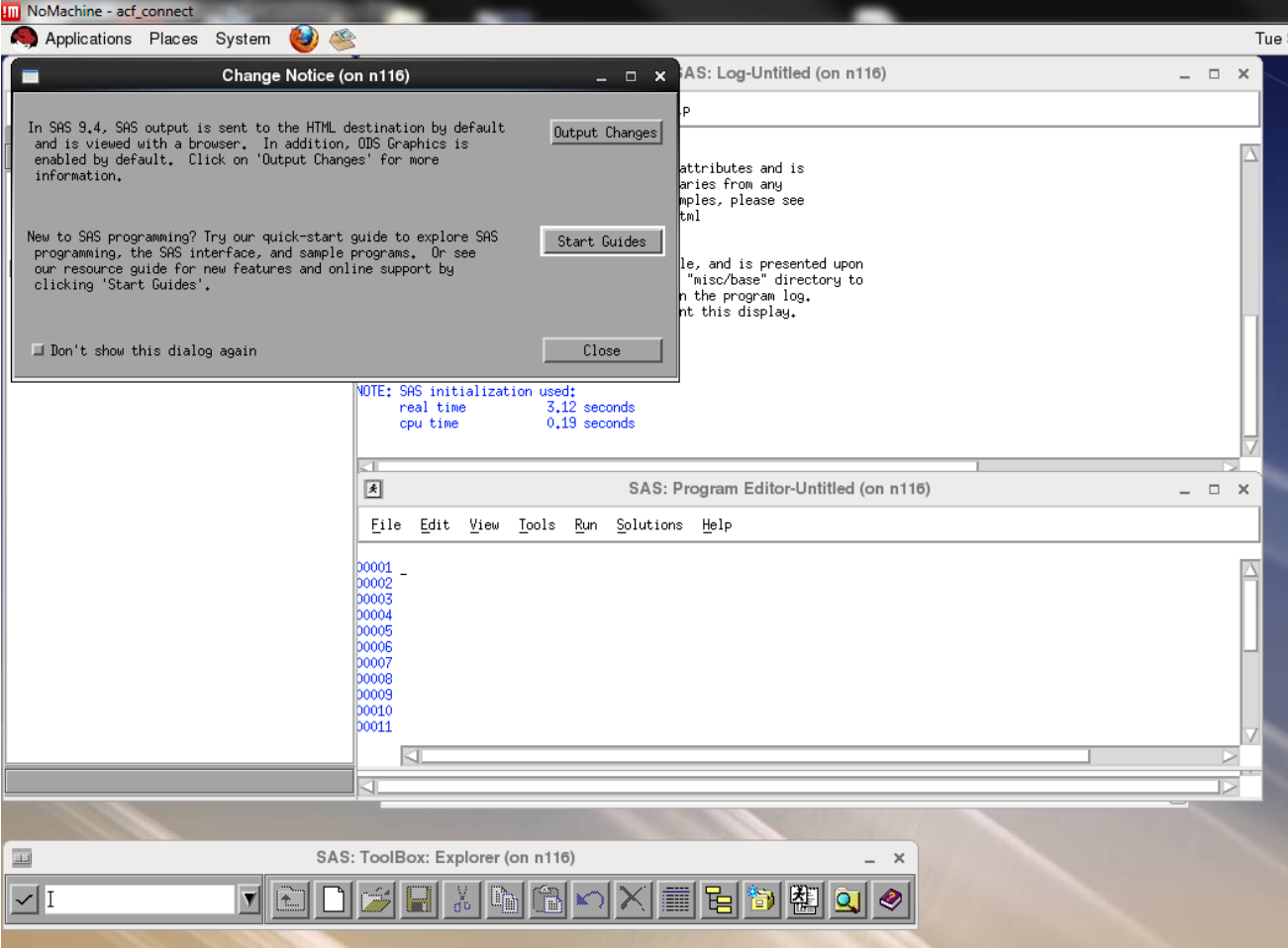
The terminal window will pop-up. Do not close this as this is necessary for properly starting and configuring SAS. See Figure 4 below for details

Figure 4: SAS Terminal GNOME



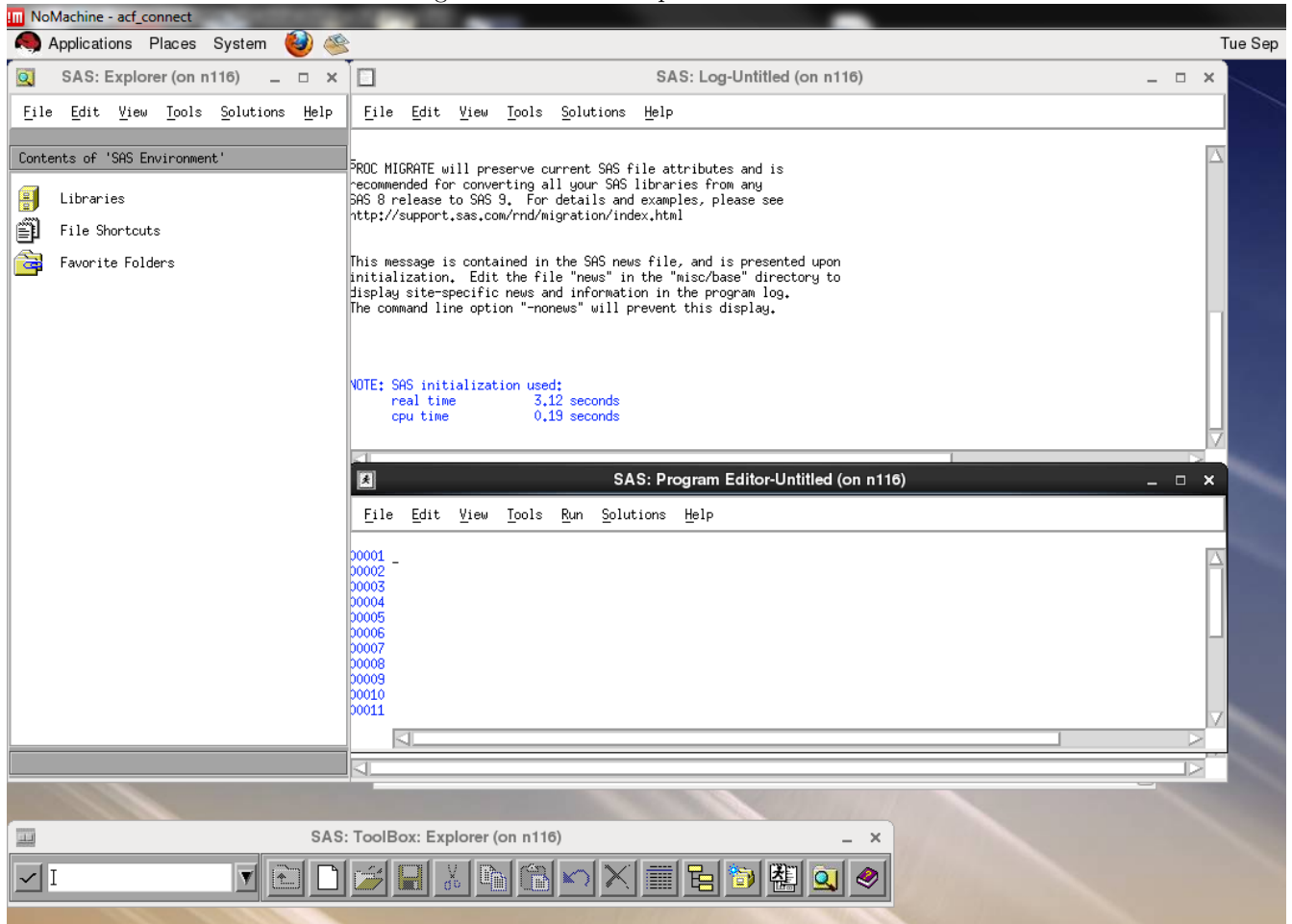
Once the terminal is minimized, the desktop should appear as in Figure 5. Note the message Change Notice can be closed as it is not important.

Figure 5: SAS Start-up 1 GNOME



Once the Change Notice window is closed, the desktop should appear as in Figure 6 below:

Figure 6: SAS Start-up 2 GNOME

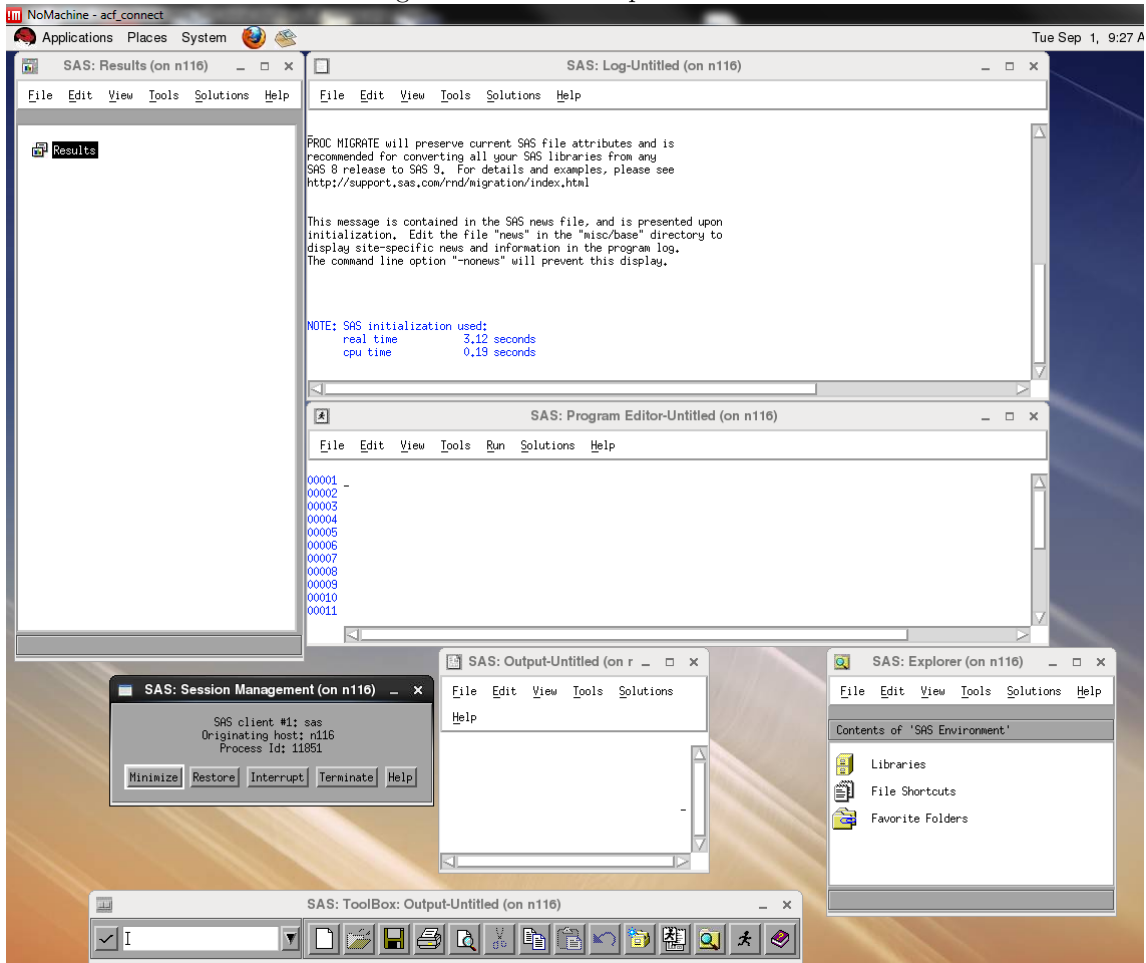


The windows in Figure 6 only show part of the picture as some windows are covered up. In Figure 7 below I moved the windows so you can see what they all look like.

Just a quick note on the SAS session manager that is present on SAS for Linux:

Look at the bottom of Figure 7 and note the SAS session manager box. To terminate the session, click terminate this will do the trick. Note that if “terminate SAS” is clicked, it will kill the current session and will not save your work so use this with care. Only click terminate once all work is saved otherwise the work will be lost.

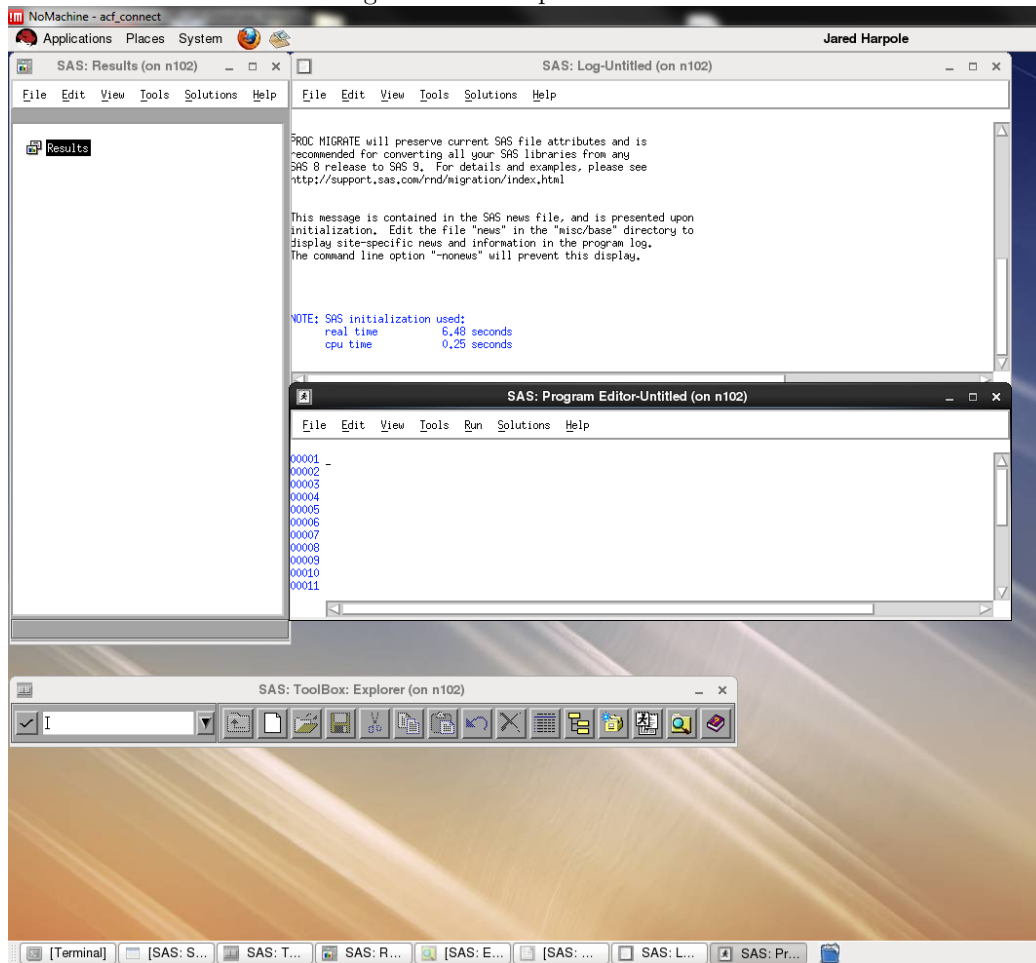
Figure 7: SAS Start-up 3 GNOME



Here is the window setup that I will be using when I demonstrate how to customize the program editor and keyboard shortcuts in the remaining sections (see Figure 8 below). I minimized the explorer, output window, and session management window.



Figure 8: Start-up Use GNOME



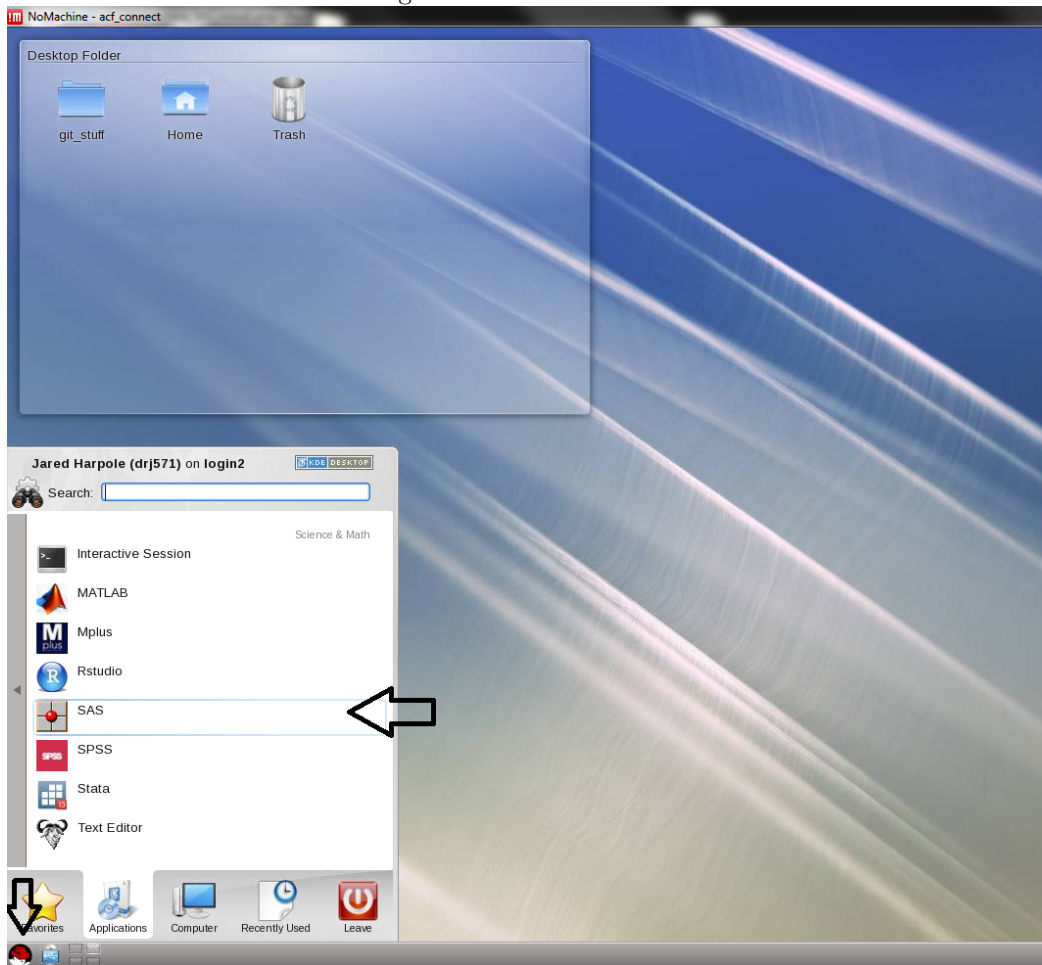
## 4 Starting Up SAS on NoMachine (KDE Desktop Example)

Here I will demonstrate how to launch SAS on Linux when you select the KDE desktop on NoMachine. Once SAS is launched on Linux, everything else in the above sections (i.e. Sections 3.1.3-3.1.6) is generally the same with differences only in aesthetics.

### 4.1 How to Find and Start SAS (KDE Desktop Example)

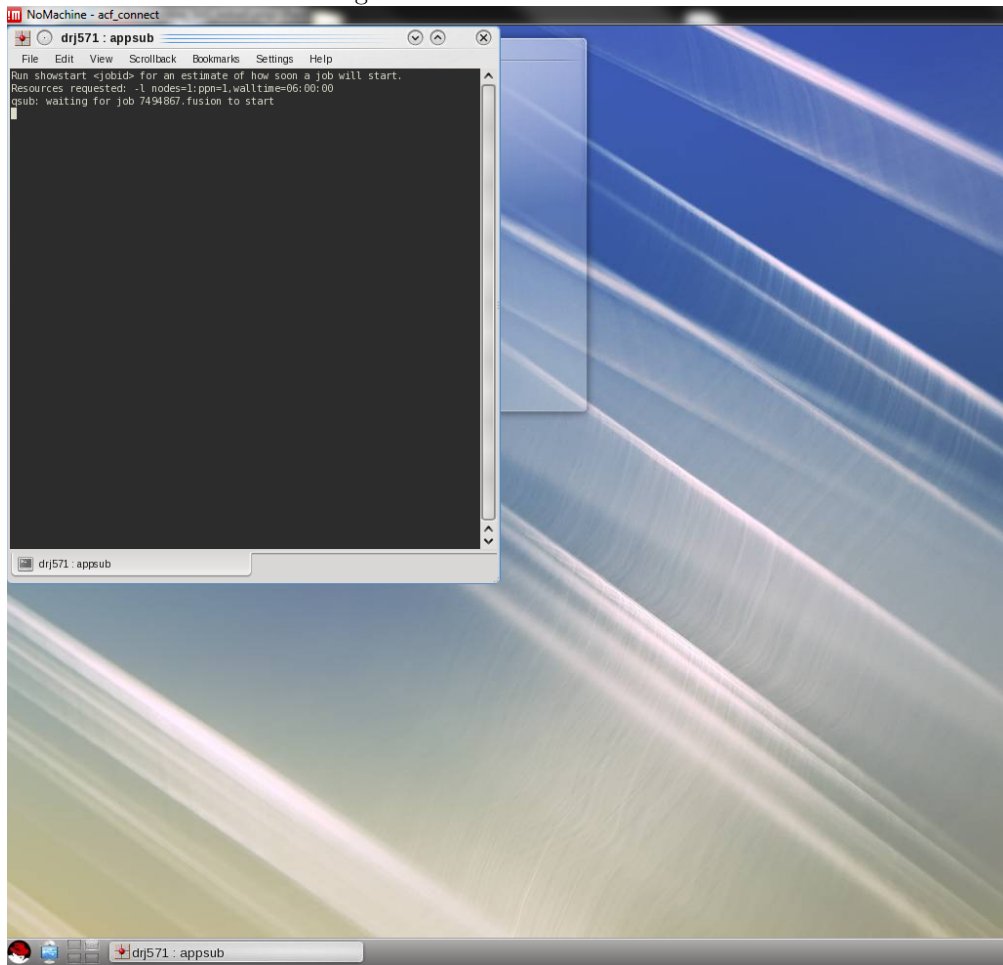
Click on the RedHat man, then Applications, then Science & Math, then Select SAS. See Figure 9 below for details. Note I don't have an arrow selecting Science & Math.

Figure 9: SAS Initial KDE



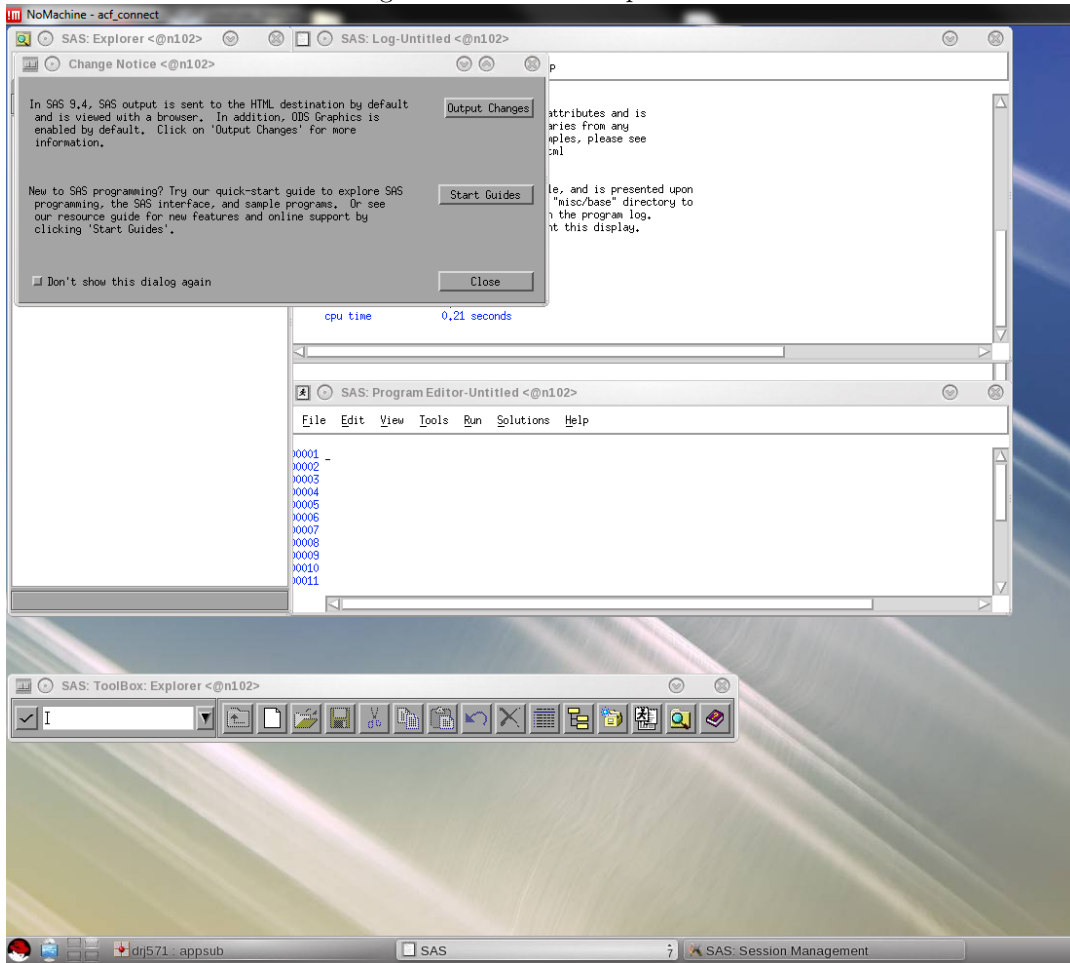
A terminal window will pop-up as in Figure 10 below. Do not close this. It is necessary for properly starting and configuring SAS.

Figure 10: SAS Terminal KDE



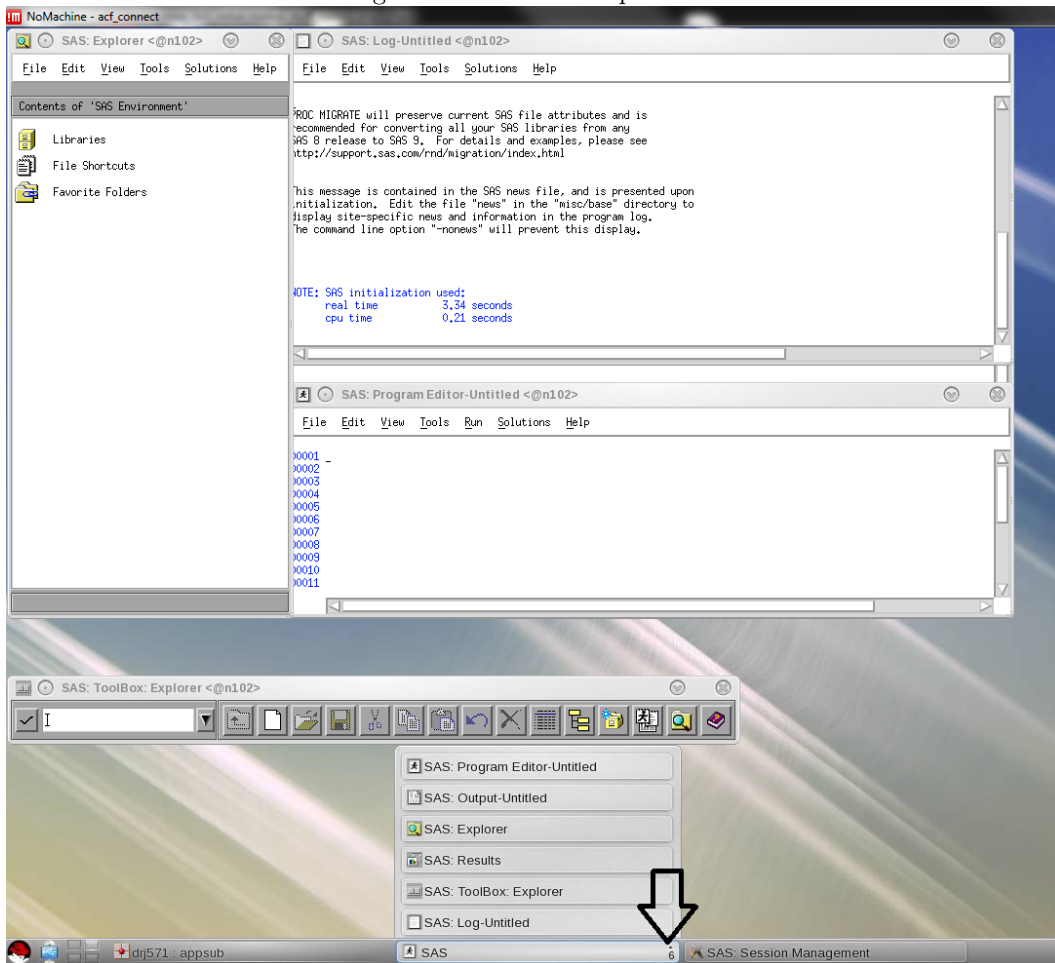
Now minimize the terminal and the desktop should appear similar to Figure 11 below. Note the message “Change Notice” can be closed as it is not important.

Figure 11: SAS Start-up 1 KDE



Once the “Change Notice” window is closed the following image as in Figure 12 should appear. Note that the difference between Figure 6 (GNOME) and Figure 12 (KDE) is apparent from looking at the black arrow below. Click on the SAS bar on the task bar, and it populates 6 windows and the session manager to the right. Other than these differences everything, else should work the same.

Figure 12: SAS Start-up 2 KDE

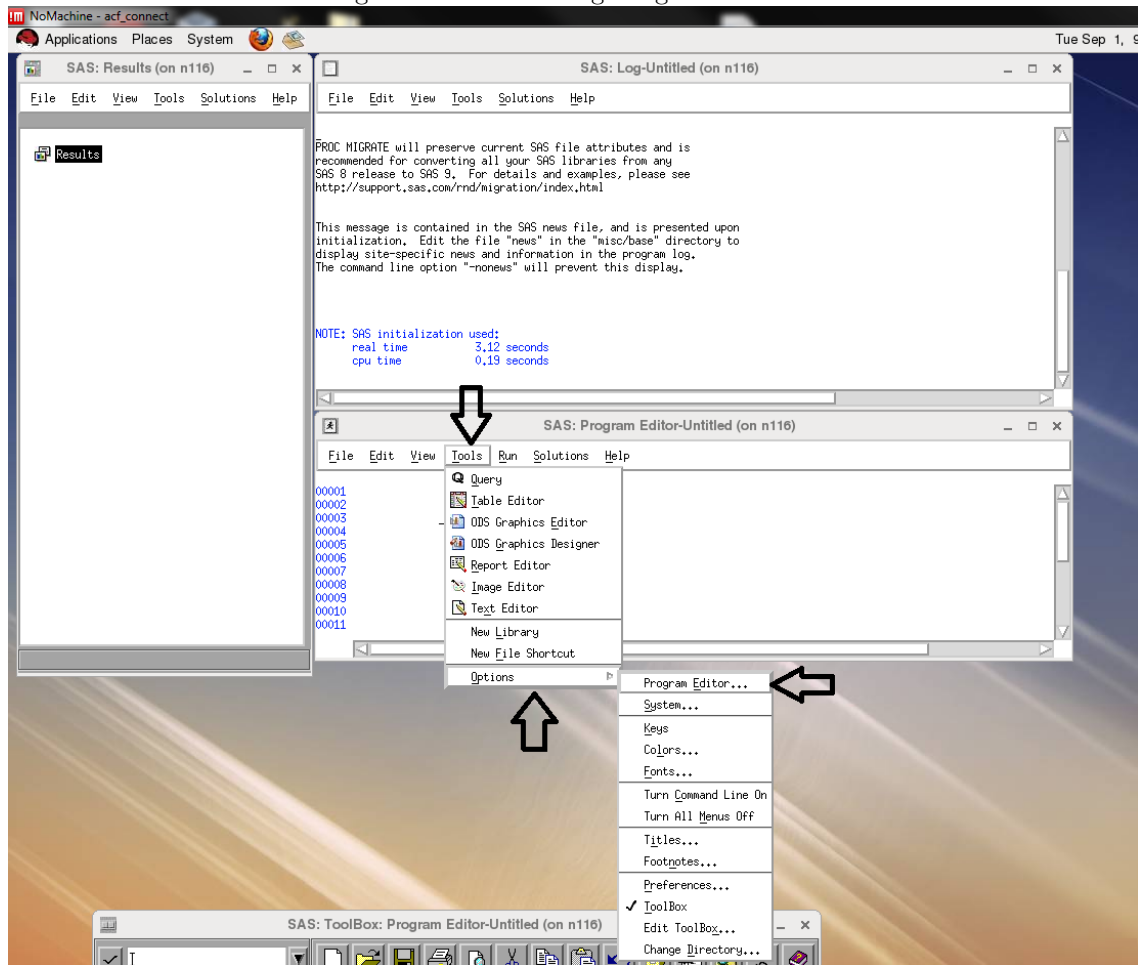


## 5 Customizing the Program Editor

### 5.1 Removing the Line Numbers and Splitting Lines on Carriage Return

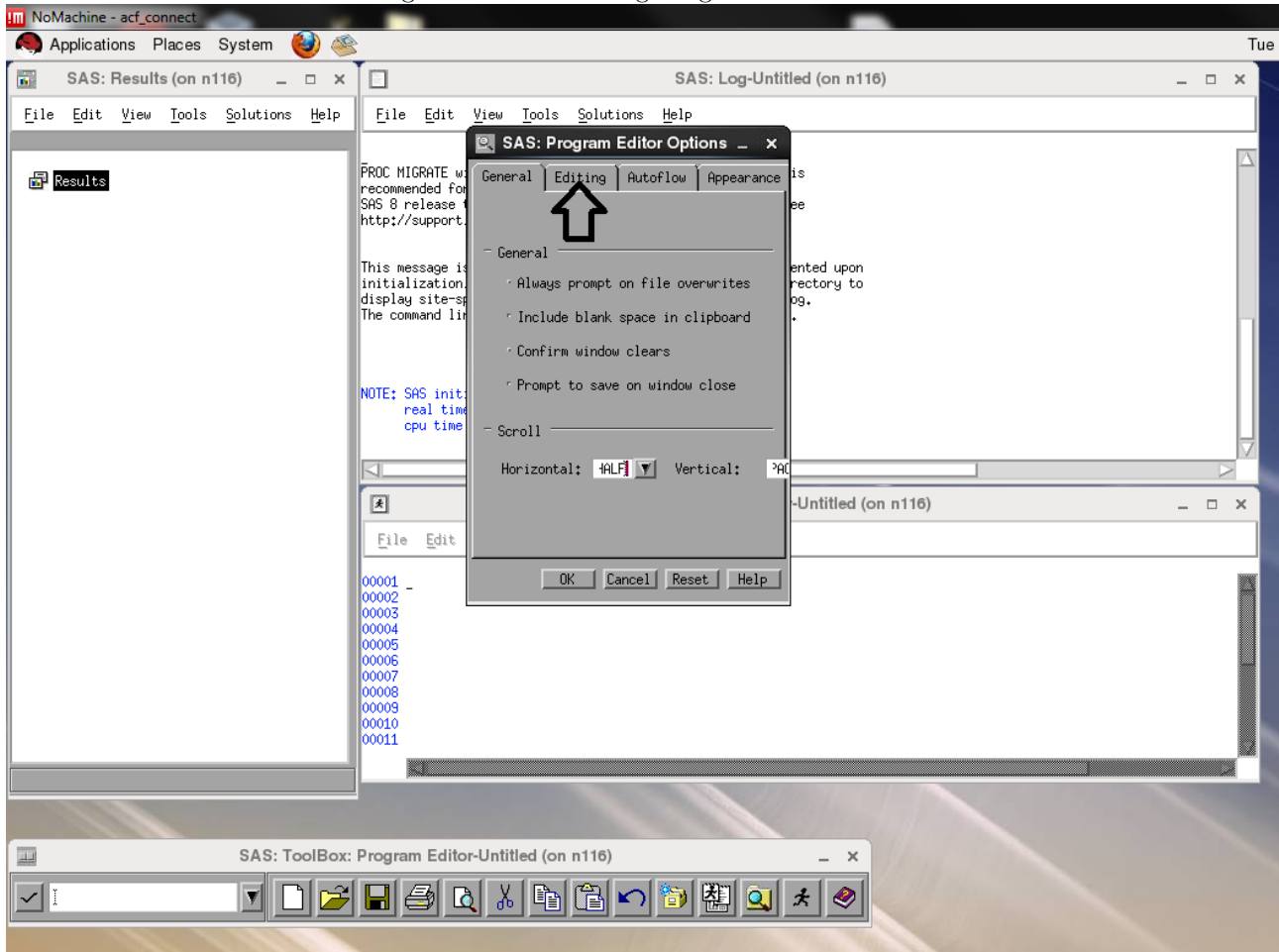
First click Tools, then click Options, and click Program Editor. See the following as in Figure 13 below.

Figure 13: Customizing Program Editor 1



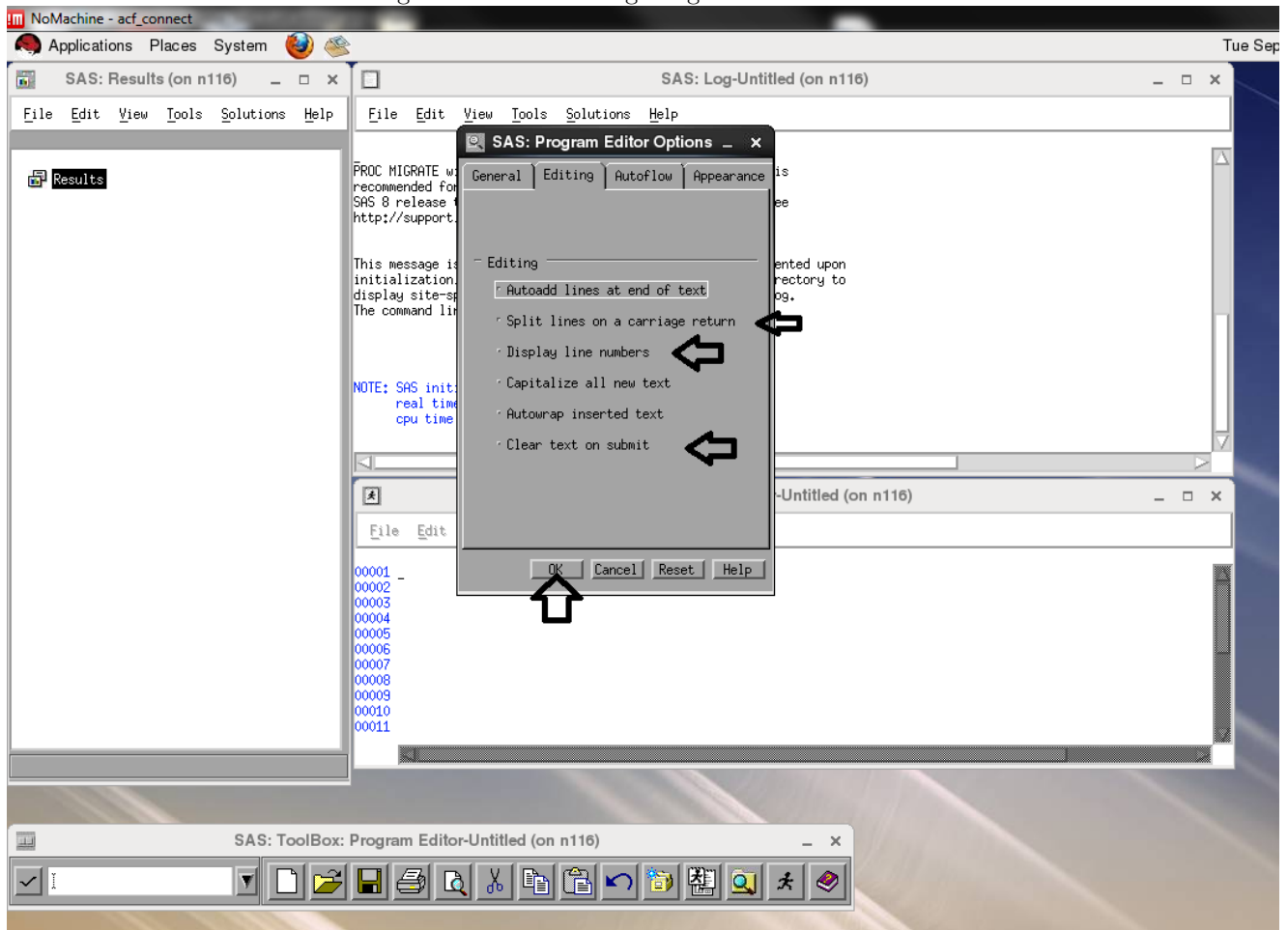
This will bring up the program editor options box below. Click on the Editing tab (see Figure 14 below for details).

Figure 14: Customizing Program Editor 2



Make sure to select "Split lines on a carriage return". Unselect "Display line numbers", and I would unselect "Clear text on submit". Then click "OK". See Figure 15 below for details.

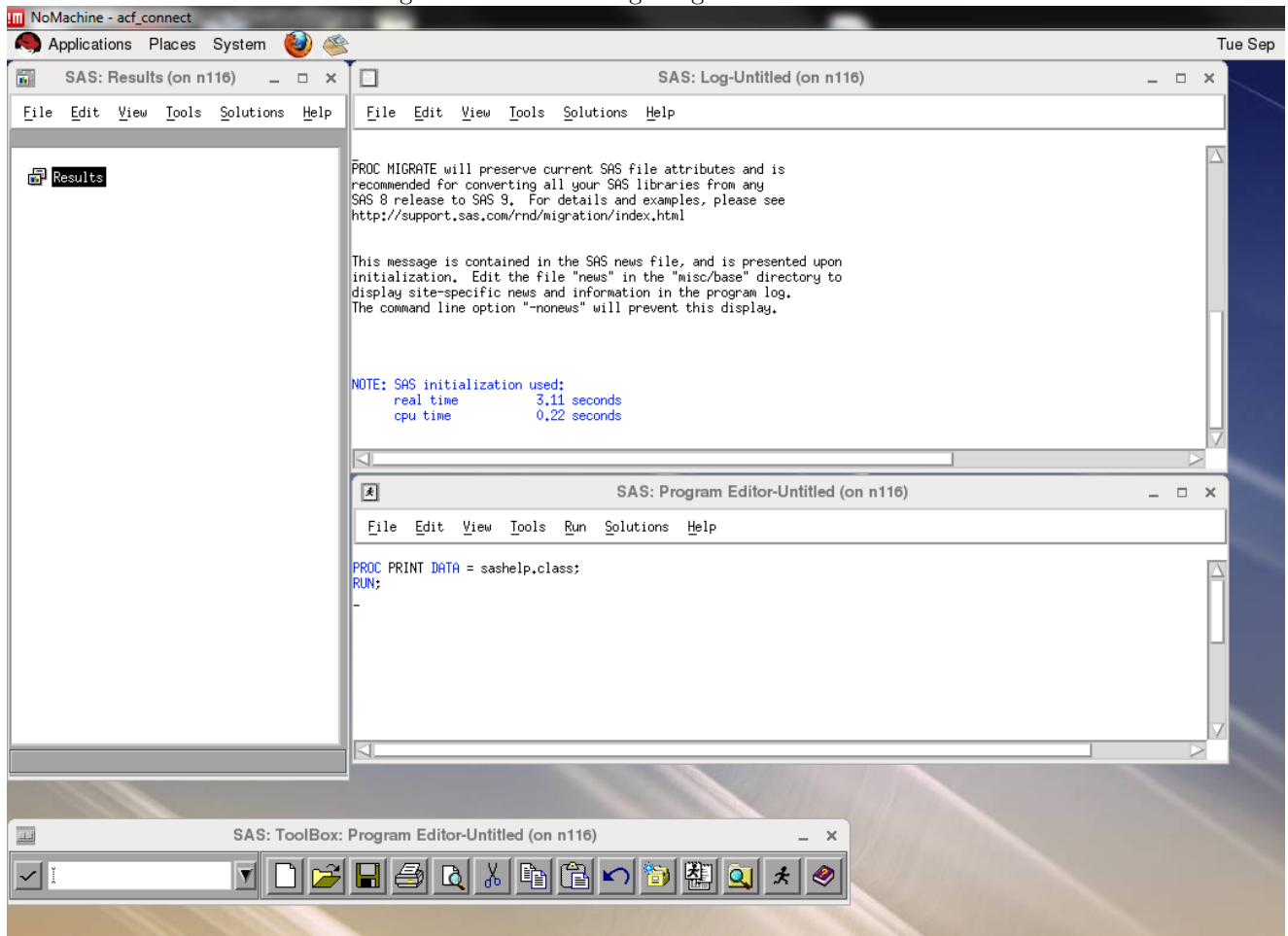
Figure 15: Customizing Program Editor 3



Once that is done, type something like in Figure 16 below with no line numbers:



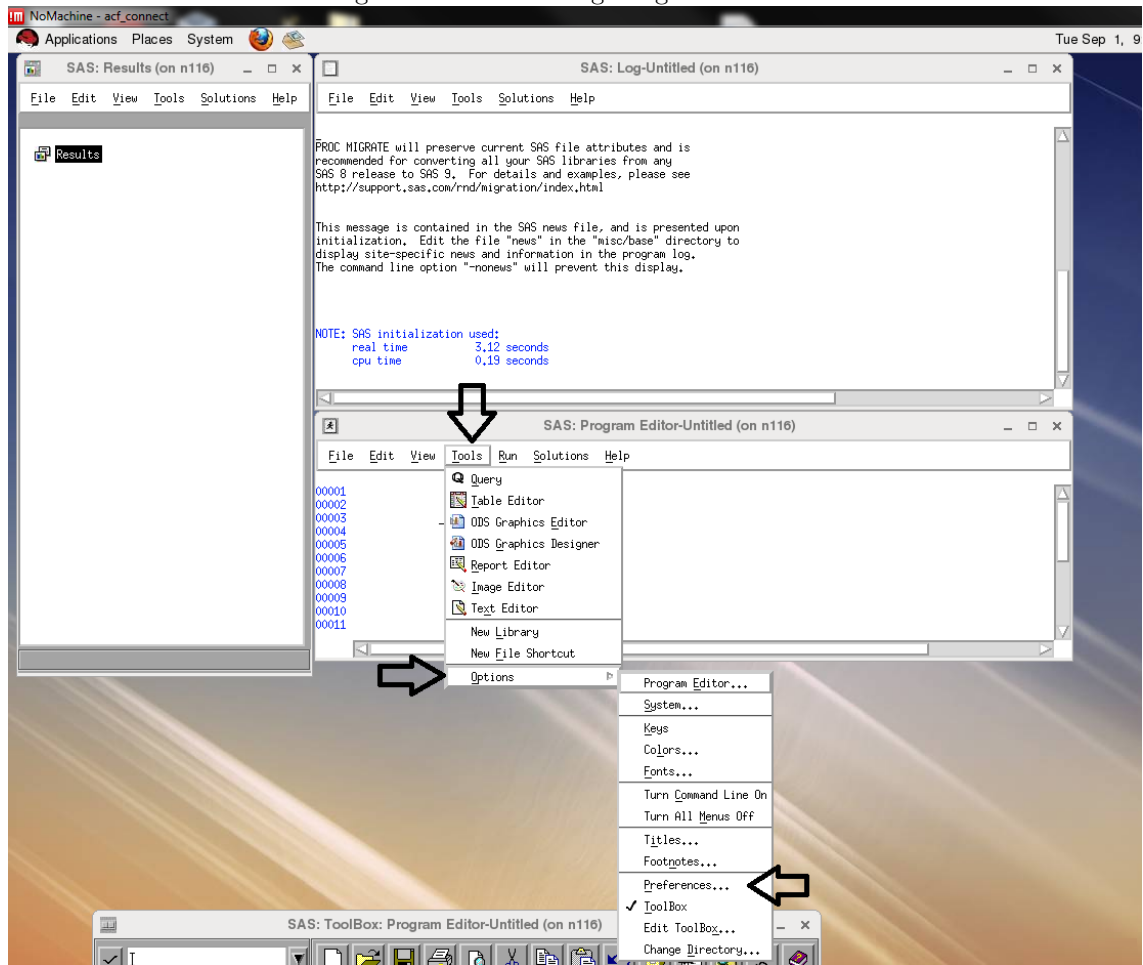
Figure 16: Customizing Program Editor 4



## 5.2 Changing the Cursor

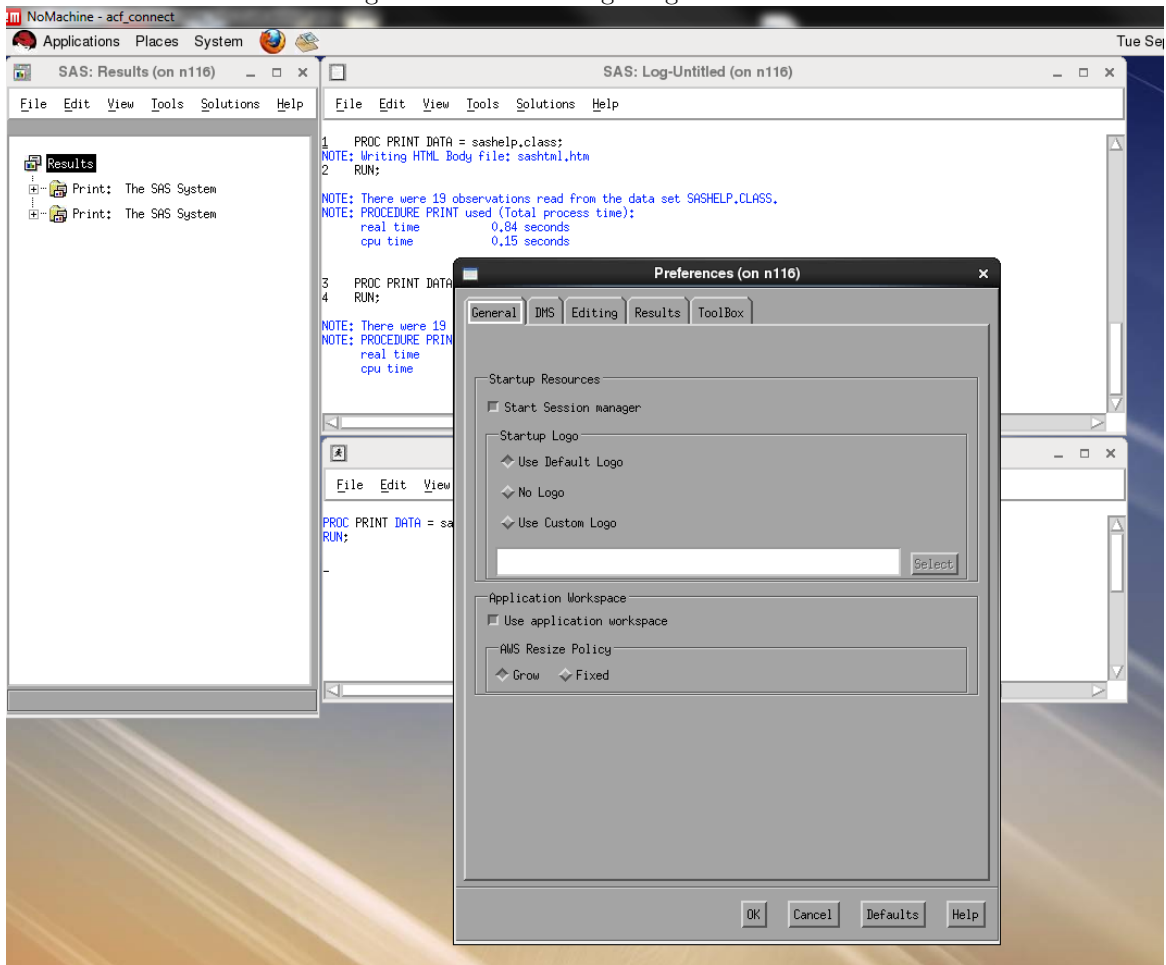
By default the cursor is a black box. To change this read on, otherwise, skip to the next section. First click Tools, then Options, then Preferences. See Figure 17 below for details.

Figure 17: Customizing Program Editor 5



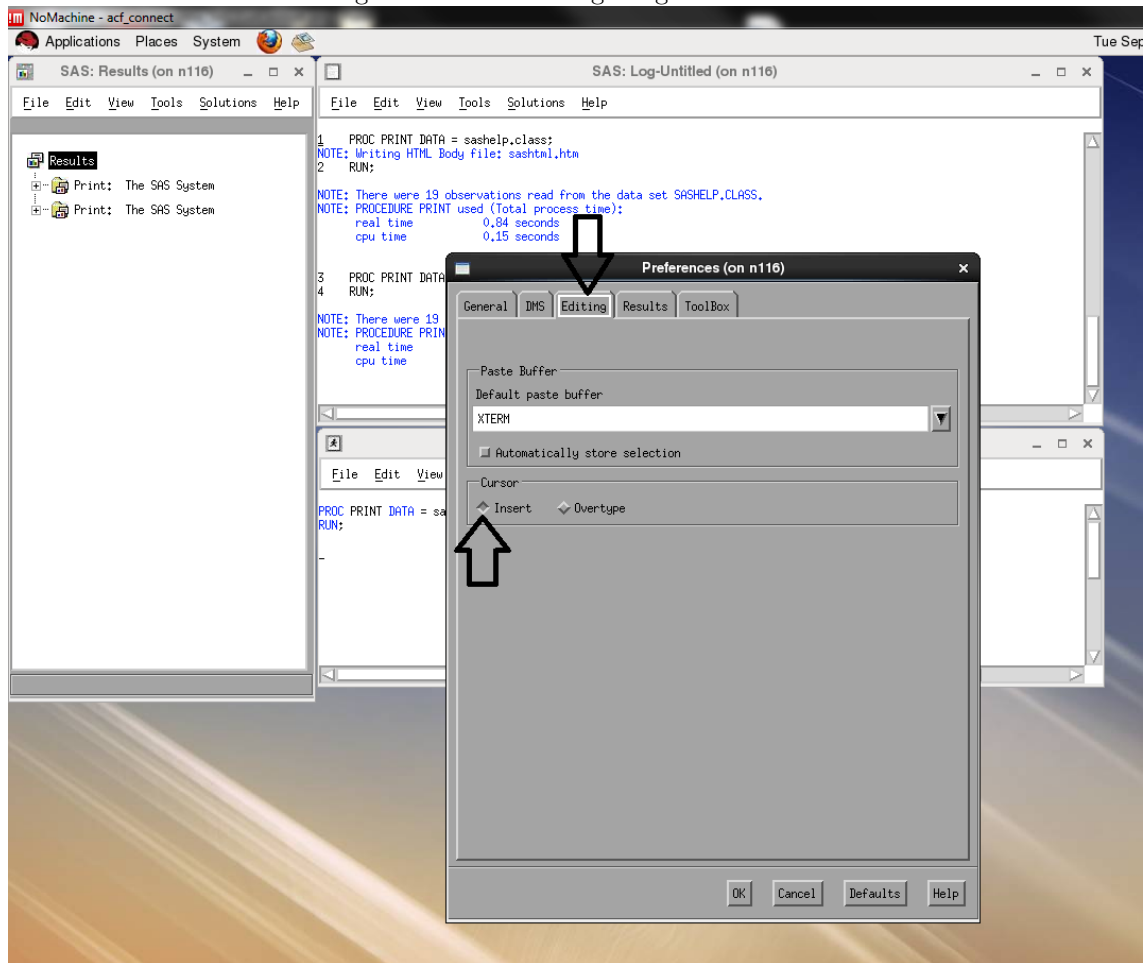
A box should appear, as in Figure 18 below.

Figure 18: Customizing Program Editor 6



Click the Editing tab, and then make sure that Insert is selected under the Cursor box. To keep the black box (Overtyping), make sure Overtyping is selected. See Figure 19 below for details.

Figure 19: Customizing Program Editor 7



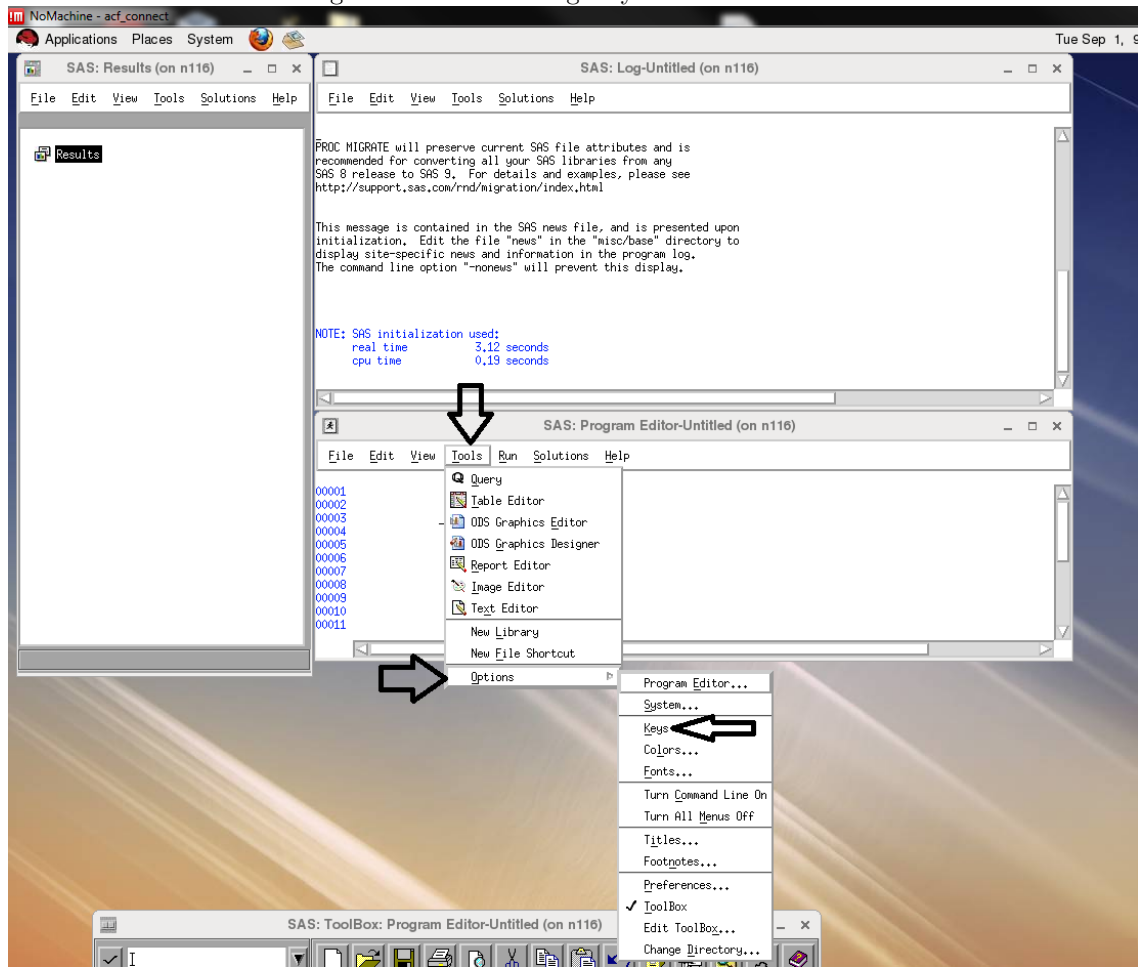
## 6 Customizing Keyboard Shortcuts

I am now going to discuss how to change several keyboard shortcuts that most users utilize in Windows SAS so they work on Linux SAS. The keyboard shortcuts are submit (on Windows F8), copy and paste, and redo and undo.

### 6.1 Submit

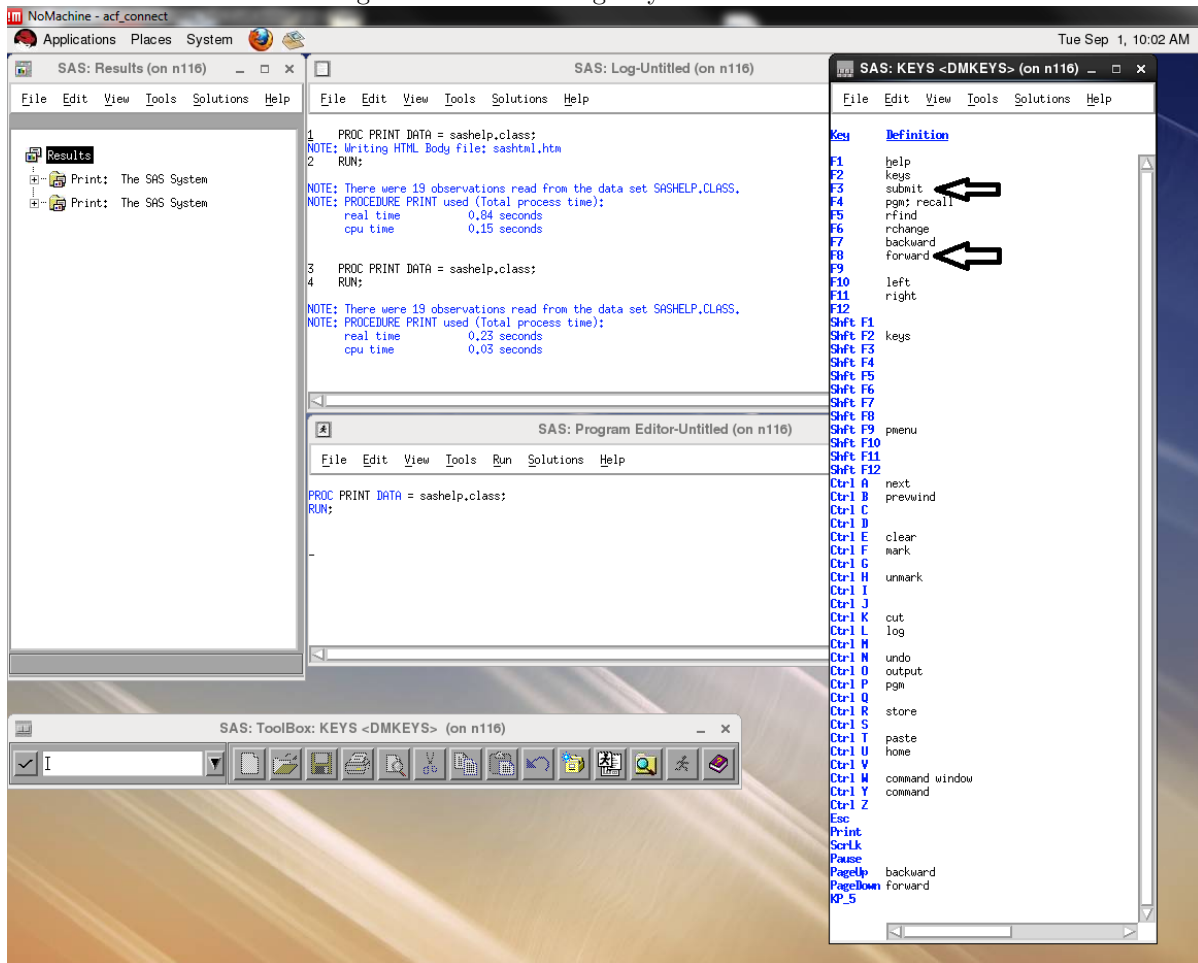
First, click Tools and Keys. See Figure 20 below for details.

Figure 20: Customizing Keyboard Shortcuts 1



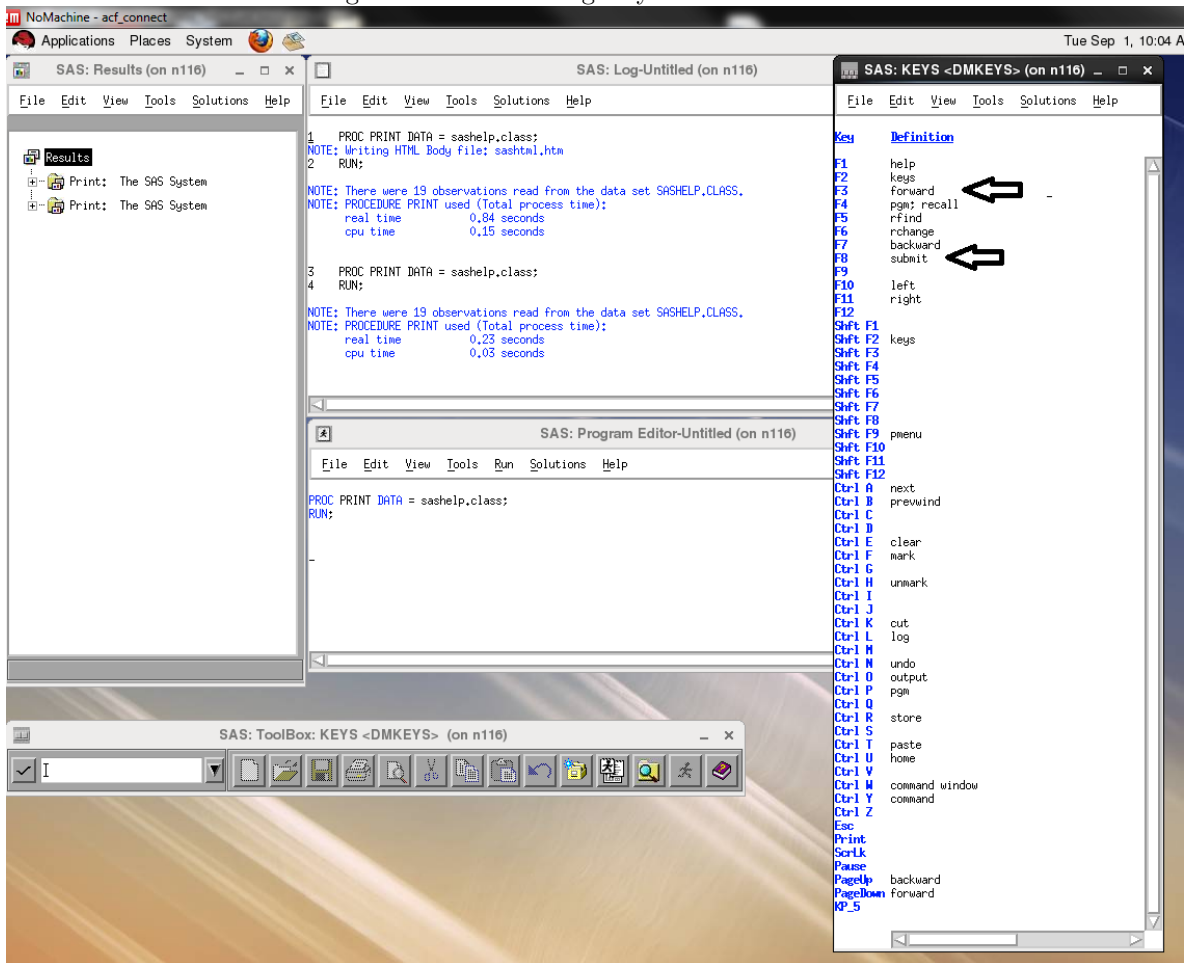
The following box should appear as in Figure 21 below. Notice that under the Key Column the definition of F3 is submit and the definition of F8 is forward. Switch these by typing in forward for F3 and submit for F8 under the Definition column.

Figure 21: Customizing Keyboard Shortcuts 2



Then it should look like this as in Figure 22 below:

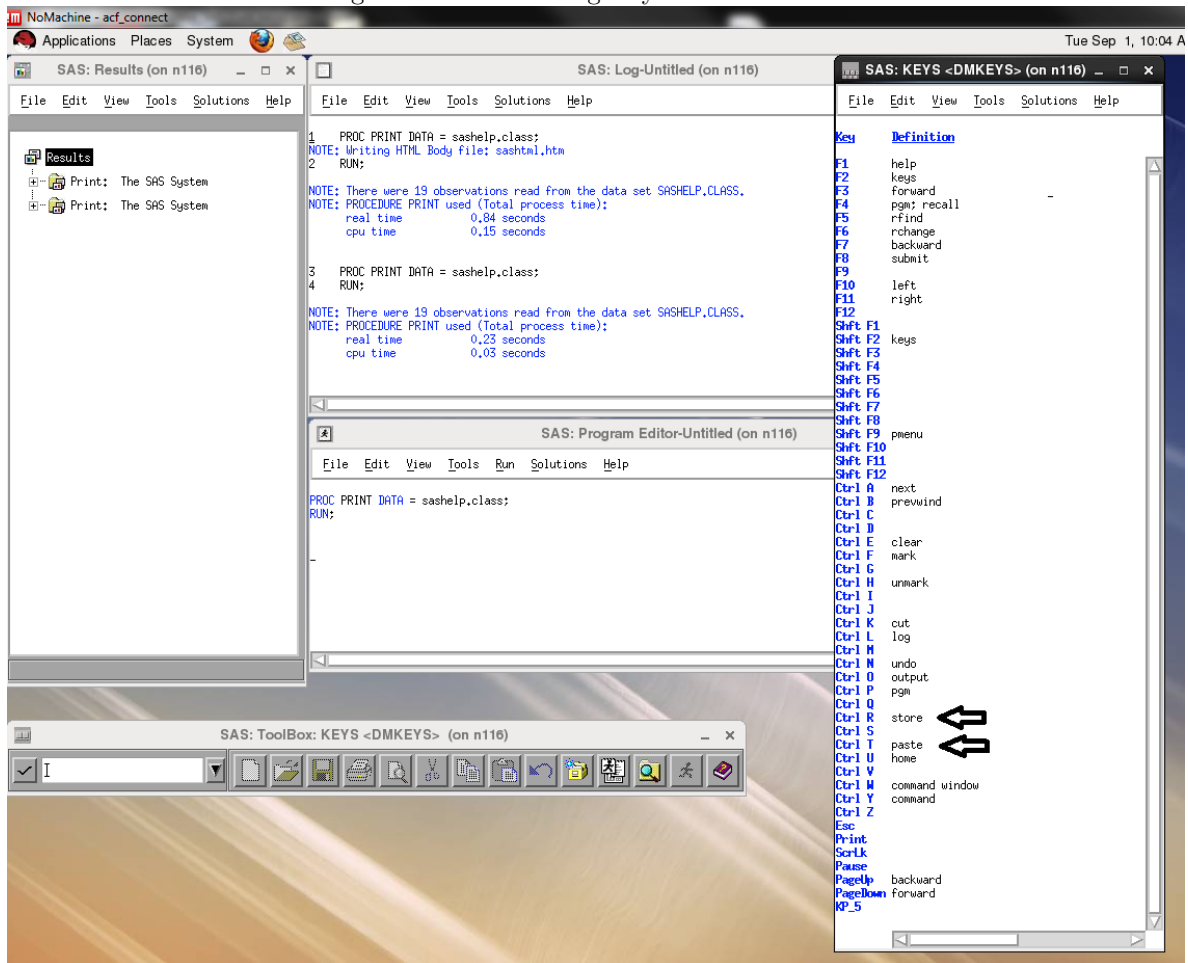
Figure 22: Customizing Keyboard Shortcuts 3



## 6.2 Copy and Paste

Now we are going to repeat this process for copy and paste. One key piece is that “copy” is not “copy” in Linux. The “copy” command from Windows is called “store”. Looking at Figure 23 below notice that “paste” and “store” correspond to CTRL R and CTRL T respectively.

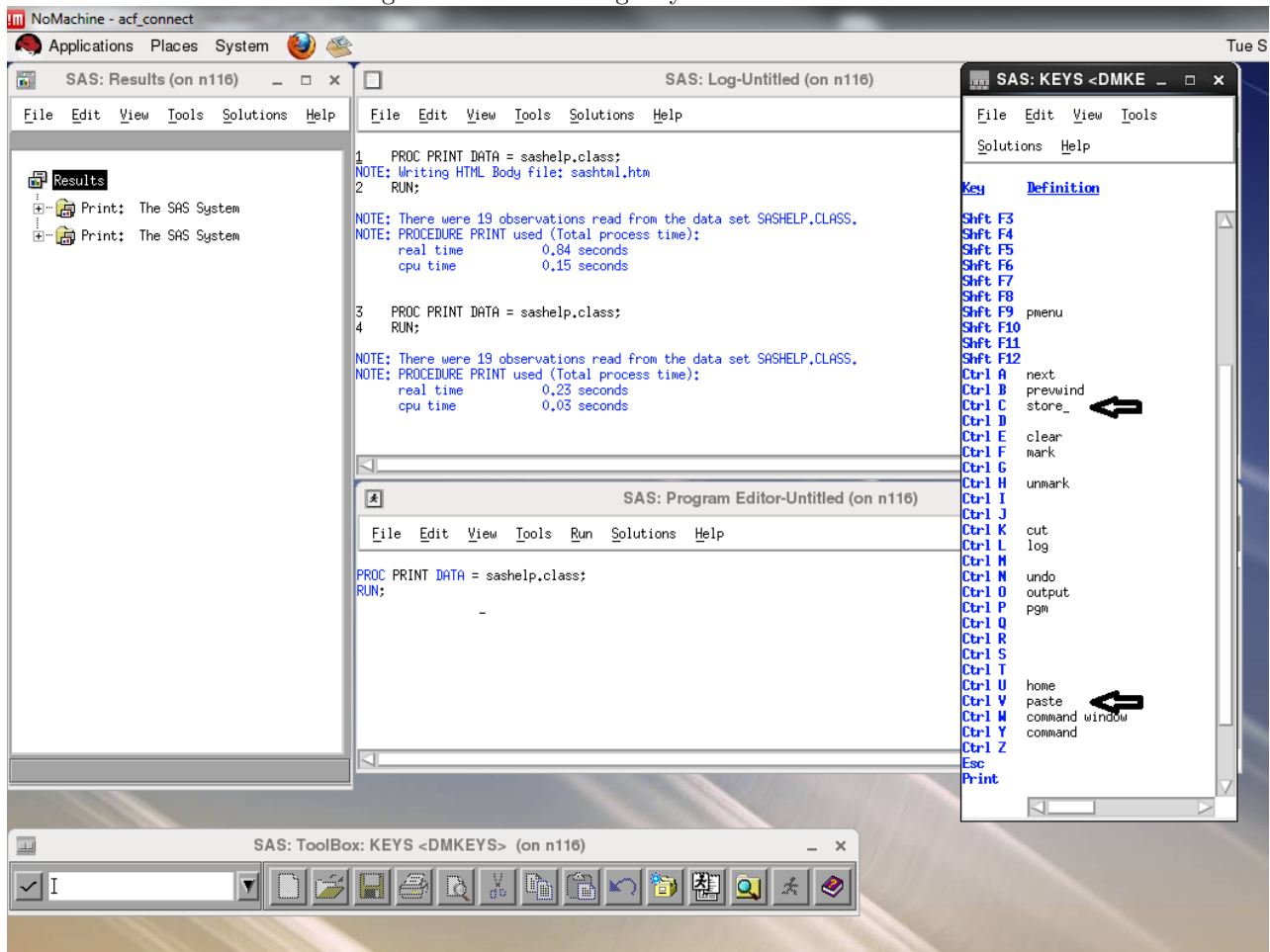
Figure 23: Customizing Keyboard Shortcuts 4



Now delete store from the CTRL R row and delete paste from the CTRL T row. Then on the CTRL C row type in store and on the CTRL V row type in paste. It should look similar to the example in Figure 24 below.



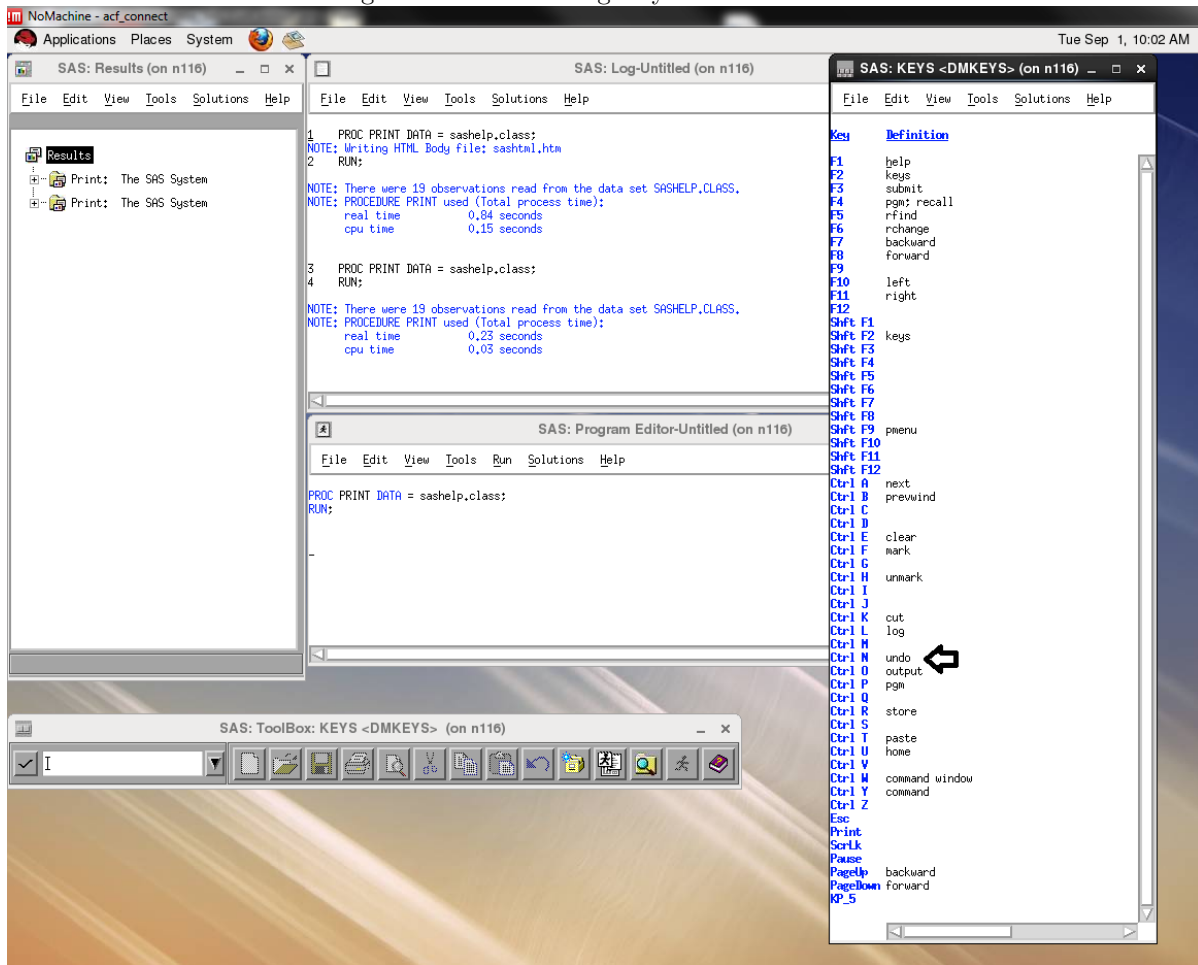
Figure 24: Customizing Keyboard Shortcuts 5



### 6.3 Redo and Undo

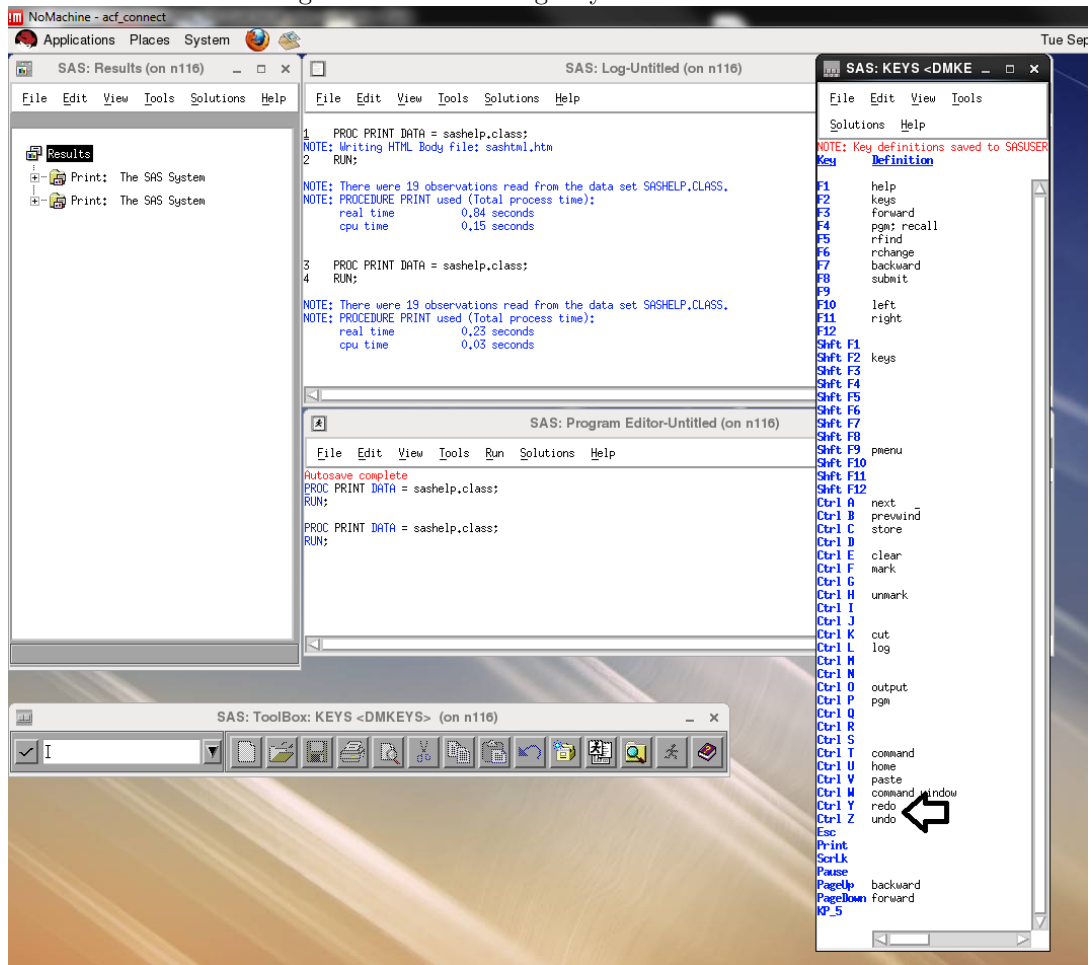
We are going to repeat this same process for “redo” and “undo”. Note that the “redo” command is not currently a definition for a specific command but we can make it become one. Currently the undo command is defined as CTRL N. We want undo to be CTRL Z and redo to be CTRL Y, like in Windows. See Figure 25 below for details.

Figure 25: Customizing Keyboard Shortcuts 6



After these changes are made, the desktop should appear as in Figure 26 below.

Figure 26: Customizing Keyboard Shortcuts 7



Lastly, save the settings. Click File and the Click Save. See Figure 27 below for details.

Figure 27: Customizing Keyboard Shortcuts 8

