Downloading, Configuring, and Using the "Free" SAS® University Edition Software

A Presentation by

Charles Edwin Shipp and Kirk Paul Lafler

Presentation Objectives

Explore SAS University Edition Installation, Configuration, Lessons Learned, and Usage

SAS University Edition

- "Free" Software
- Easy to Use
- Learn by Doing
- Launch Careers

Download, Install and Configure SAS Software

- Alloc Files
- Download
- Configure
- Call

Lessons Learned, Tips and Experiences

- Base SAS
- SAS/STAT
- SAS/IML
- SAS/ACCESS

Essential Programming Techniques

- For students
- For teachers
- Everyone

"Free"
SAS University Edition Software

SAS University Edition

- "Free" – Available to Anyone*
- Under SAS Analytics U
- Includes e-Learning Modules to Learn SAS
- Available for PC, Mac, or Linux Workstations
- Works through Virtualization Software
- Access using a Browser in Standalone Mode
- Not for commercial purposes

For your home, office, classroom, and lab !
Expect ages from 13 to 99 to learn and use.

* (for non-commercial usage)

SAS University Edition Includes

- **Base SAS Software**
- **SAS/STAT**
- **SAS/IML**
- **SAS/ACCESS**
- **SAS Studio**

SAS Studio serves as the front-end interface to SAS University Edition, much like Enterprise Guide serves as the front-end interface to Base SAS software.

Base SAS Capabilities

- **Built-in DATA Step Programming Language**
- **Ability to Access Wide-range of Data Sources**
- **Assortment of "Canned" Procedures**
- **Comprehensive SQL Language**
- **Output Delivery System (ODS) Reporting**
- **ODS Statistical Graphics**
- **Data Management Capabilities**
- **Supports:**
  - ✓ **Functions**
  - ✓ **Formats**
  - ✓ **Informats**
  - ✓ **And Much More . . .**

SAS/STAT® Capabilities

- **Apply the Latest Statistical Techniques**
- **Supports:**
  - ✓ **Analysis of Variance**
  - ✓ **Bayesian Analysis**
  - ✓ **Categorical Data Analysis**
  - ✓ **Cluster Analysis**
  - ✓ **Mixed Models**
  - ✓ **Multivariate Analysis**
  - ✓ **Nonparametric Analysis**
  - ✓ **Regression**
  - ✓ **Survey Sampling and Analysis**
  - ✓ **Statistical Graphics**
  - ✓ **And Much More . . .**

SAS/IML® Capabilities

- **Interactive Matrix Programming**
- **Conduct Exploratory Analysis**
- **Integration with R Programming Language**
- **Dynamically Linked Graphics**
- **And Much More . . .**

IML stood for Interactive Matrix Language, but it has become much more now—it includes programming and exploratory graphical data analysis. IML allows programming easily and efficiently with features for arithmetic and character expressions.

SAS/Access® Capabilities

- **Read, Write and Update Data Sources**
- **Flexible Query Language Support**
- **Access to Various Data Sources:**
  - ✓ **Excel**
  - ✓ **ODBC**
  - ✓ **DB2**
  - ✓ **Oracle**
  - ✓ **Hadoop**
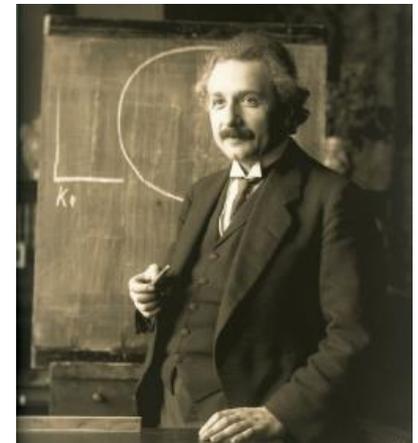 - ✓ **And Much More . . .**

SAS Studio® Capabilities

- **Web Application**
- **Access Data Files, Libraries and Programs**
- **Recover Files**
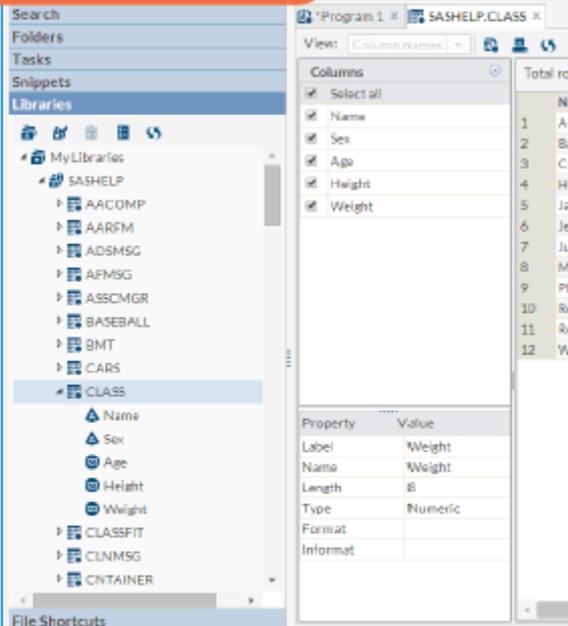- **Dynamically Link Graphics**
- **And Much More . . .**

SAS Studio serves as the user interface to Base SAS, SAS/STAT, SAS/IML, and SAS/Access.

THINK ABOUT IT

"Free" SAS University Edition

What does SAS® University Edition do?

SAS University Edition is a free version of select SAS products for teaching and learning statistics and quantitative methods. It also provides easy access to statistical software for research and other courses like economics, social sciences, computer science, business, medical/health and engineering.

Why is SAS® University Edition important?

Throughout the world both public and private sectors are experiencing a technical analytic skills gap. SAS is helping academia build the statistical knowledge and skills needed to fill this gap so that students can start their careers understanding how to solve problems with analytics – and employers can hire them.
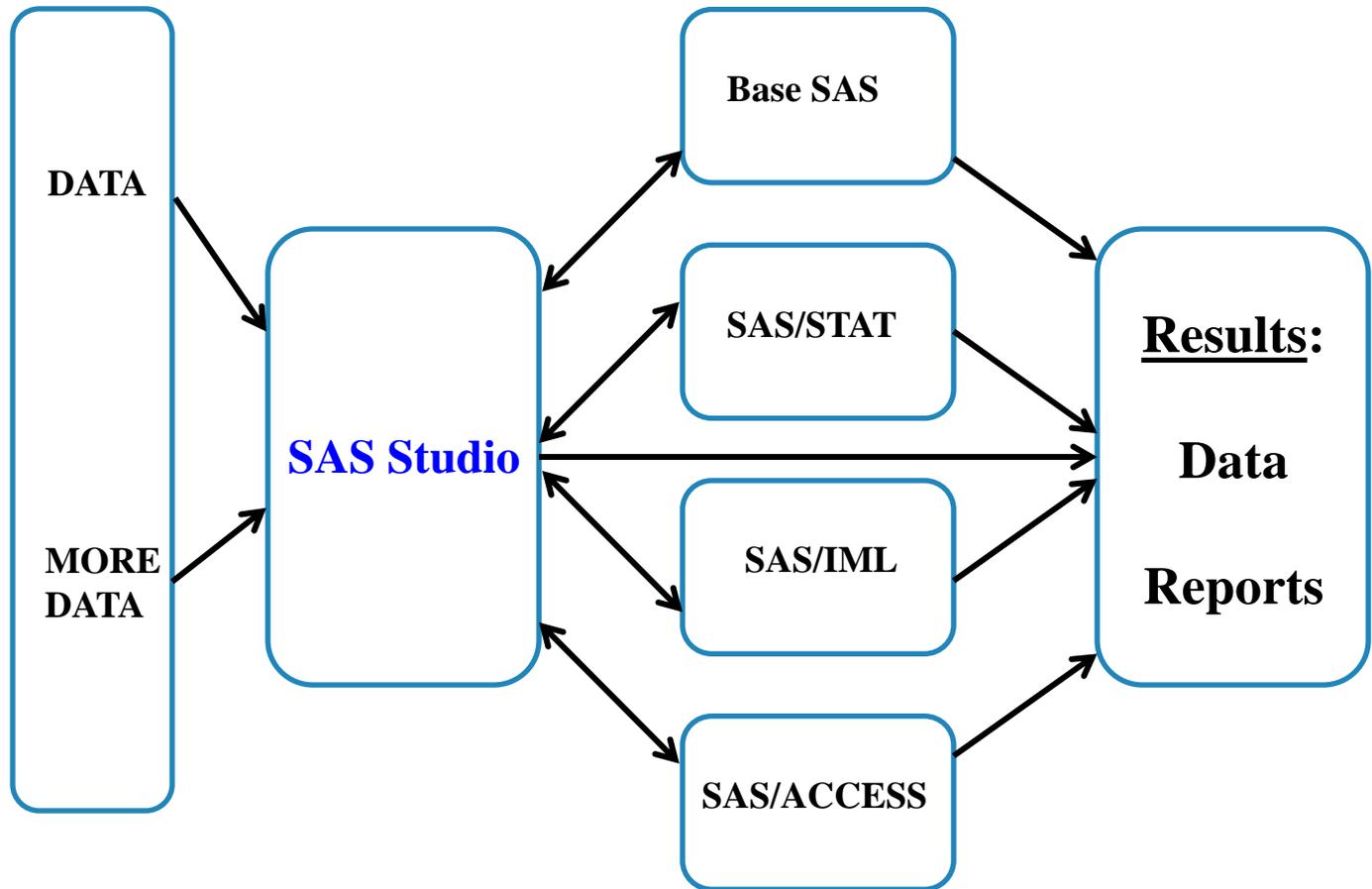
For whom is SAS® University Edition designed?

SAS University Edition is designed for anyone wanting easy access to statistical software to perform quantitative analysis in an academic setting. This includes undergraduate and graduate students, professors, adult learners, high school students, researchers and postdocs.

SAS® University Edition

Free statistical software to improve research and launch careers

For more information, visit sas.com/universityedition

University Edition Processing

SAS Studio controls the flow

"Free" SAS/ACCESS Software

> **›** Fact Sheet

| SAS Data Integration Studio | SAS® Enterprise Guide® | SAS Web Report Studio | Any SAS Client | SA... |

What does SAS/ACCESS® software do?
SAS/ACCESS is an out-of-the-box solution for integrating SAS and third-party databases. You can read, write and update data regardless of the database or platform. Because the data appears native to SAS, there is no need to learn Structured Query Language (SQL) or any other database-specific query languages.

Why is SAS/ACCESS® software important?
With integration at its source, business decisions are supported by complete, consistent, up-to-date and accurate data. Any source of data can be made available when you need it, plus you can add access modules without replicating or moving the source data.

For whom is SAS/ACCESS® software designed?
SAS/ACCESS is designed for organizations that need to bring different source system data together into a cohesive and unified environment. It's used by data management professionals and business analysts who are responsible for accessing data in support of applications and business objectives.

Relational Database   Data Warehouse Appliance   Non-Relati...

SAS/ACCESS® Software

Read, write and update data regardless of its native database or platform

**For more information, visit
sas.com/universityedition**

Steps to Download, Configure, and Use the SAS University Edition Software

Visualize Computer Preparation

Follow the steps carefully, and you will be successful.

Start/Run SAS Studio

Create a BUILD

Run Wizard to configure

Allocate two files

Download virtualization software

The first two steps need to match on Oracle VM or VMware.

Download SAS vApp

Follow steps

Understand the Steps

1. Download 3rd-party 'virtualization' software
2. Download the 1.4 GB SAS University Edition
3. Set the options and run for the first time.

Clicking Download on the SAS.com page starts your path. Watch the 5min video on the steps.

Right-panel has requirements

System Requirements

Windows   OS X

Linux

- Microsoft Windows 7 or later
- 64-bit hardware with a minimum of 1GB of RAM
- One of the following virtualization software packages:
  - VMware Player 6.0 or later
  - Oracle VM VirtualBox
- One of the following web browsers:
  - Microsoft Internet Explorer 9, 10 or 11
  - Mozilla Firefox 21 or later
  - Google Chrome 27 or later

Requirements for the Windows Environment

Right-panel has requirements

System Requirements

Windows	OS X
Linux	

- Mac OS X 10.8 or later

- 64-bit hardware with a minimum of 1GB of RAM

- One of the following virtualization software packages:
  - VMware Fusion for OS X 6.0
  - Oracle VM VirtualBox

- One of the following web browsers:
  - Apple Safari 6.0 or later
  - Mozilla Firefox 21 or later
  - Google Chrome 27 or later

Requirements for the Macintosh Environment

Right-panel has requirements

System Requirements

Windows   OS X

[Linux]

- Linux operating environment

- x86-64 hardware with a minimum of 1GB of RAM

- One of the following virtualization software packages:

  - VMware Player for Linux 6.0 or later
  - Oracle VM VirtualBox

- One of the following web browsers:

  - Mozilla Firefox 21 or later
  - Google Chrome 27 or later

Requirements for the
Linux Environment

Right-panel has requirements

How to Download SAS® University Edition

Step 1: Verify that you have a compatible virtualization software package.

Because SAS University Edition is a virtual application (or vApp), you need virtualization software to run it. Compatible virtualization software packages are listed in the table below. If you don't already have compatible virtualization software, you can download a package using the links below.

Windows	VMware Player 6.0 or later	Oracle VM VirtualBox
OS X	VMware Fusion for OS X 6.0	Oracle VM VirtualBox
Linux	VMware Player for Linux 6.0 or later	Oracle VM VirtualBox

Choose an appropriate 3rd-party package

Familiarize yourself with steps!

Step 2: Get the Quick Start Guide (PDF or video) for your virtualization software package.

Don't just download the PDF – actually read it. Or watch the video if that's more your thing. Or do both! You'll find a lot of useful info in the Quick Start Guides, including step-by-step instructions. Seriously. You won't regret it.

- **VMware Player Quick Start Guide**
  Download the PDF
  Watch the video

- **VMware Fusion Quick Start Guide**
  Download the PDF
  Watch the video

- **Oracle VirtualBox Quick Start Guide**
  Download the PDF
  Watch the video

Click on the two links for the VM player you chose.

Be very wise and watch the
short video and read the PDF.

Sign in, download the SAS vApp

Step 3: Download SAS® University Edition.

Choose the appropriate download file for your virtualization sofware package. You will then be prompted to:

a. Create or sign in to your SAS profile.
b. Accept the user licensing agreement.
c. Begin the download.

SAS® University Edition for VMware Player or VMware Fusion

Get download 🔗

SAS® University Edition for VirtualBox

Get download 🔗

There are advantages to having a SAS profile ID/pw.

Creating your SAS Profile

Accept the terms and conditions

You are ready to download

Thank you for your order.

Order Details

Order Status	In Progress
Order Number	105145
Order Date	October 14, 2014 1:08:04 AM EDT
Terms & Conditions	UE_LGL3535_15JUL2014

🖨 Print a copy of this order confirmation
You will be emailed a copy of this order confirmation.

Reminder From SAS:

Note: The file is over 1.4GB. Depending on your Internet connection, it might take awhile to download. Grab a snack, call a friend, read a book – it will be done before you know it. And remember – you're getting the world's most powerful analytics software. It's worth the wait!

Shipment 105145-1

Description	Unit Price	Qty.	Total
SAS University Edition VirtualBox, ESD • Single user • Non-commercial use [Download]	0.00 USD	1	0.00 USD

Item Subtotal	0.00 USD
Item Taxes	0.00 USD
Total for This Shipment	0.00 USD

Click on DOWNLOAD, read about next steps.

You are almost there ...

Follow the next steps very carefully.

Configure VirtualBox and the SAS vApp Software

The Configuring Check-List

The SAS manual has configuration details:
SAS vApp and Oracle VM VirtualBox software

SAS® University Edition: Installation
Guide for Windows

The Configuring Check-List

To configure VirtualBox to work with SAS University Edition:

1) On your local computer (in a location that you will remember), create a folder called SASUniversityEdition and a subfolder called myfolders. You will save all of your SAS University Edition files to this location.

2) Launch VirtualBox.

3) Select **File > Import Appliance**.

4) In the **Import virtual appliance** window, click the folder icon to the right of the field. A file browser window appears.

5) Select the SAS University Edition .ova file.

6) Click **Open**.

7) Click **Next**.

8) (Optional) In the **Appliance settings** window, edit the CPU and RAM settings.
   Note: The SAS University Edition virtual image is configured to use 1GB of RAM and two processors. You can increase the RAM that is assigned to the SAS University Edition virtual image, but you should assign half (50%) or less of the available physical RAM. You cannot increase the number of processors that are assigned to the SAS University Edition virtual image.

2. You can double-click on the VirtualBox icon which the installation put on your desktop.

The Configuring Check-List

5. In step 5, 'ova' stands for Oracle VirtualBox Application — SAS file begins 'unvBASICvApp'.

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   Note: The SAS University Edition virtual image is configured to use 1GB of RAM and two processors. You can increase the RAM that is assigned to the SAS University Edition virtual image, but you should assign half (50%) or less of the available physical RAM. You cannot increase the number of processors that are assigned to the SAS University Edition virtual image.

The Configuring Check-List

Name	Type	Size
unvbasicvapp__9411003__ova__en__sp0__1	OVA File	1,754,460 KB
VirtualBox-4.3.18-96516-Win	Application	108,010 KB

This PC ▸ Windows (C:) ▸ SAS AnalyticsU ▸ …

… ▸ SASUniverstityEdition ▸ myfolders

Remember: 'ova' stands for Oracle VirtualBox Application — file begins 'unvBASICvApp'.

The Configuring Check-List (cont)

**9-18. We found it useful to either print the instructions or have the PDF open to read.**

9) In the Appliance settings window, click **Import**.

The imported virtual machine is displayed in the Oracle VM VirtualBox Manager window.

Note: If the message `drives in use` is displayed, click **Ignore**.

10) Select **Machine > Settings**.

11) In the navigation pane, click **Shared Folders**.

12) In the upper right of the **Settings** window, click **+**. The **Add Share** window appears.

13) In the **Folder Path** field, click the arrow and select **Other**.

A file browser window appears.

14) Select the `myfolders` folder that you created, and then click **OK**. This folder is mapped to the **My Folders** folder in SAS Studio

Note: The shared folder name is case sensitive.

Note: You can add network folders that you have access permissions to. Do not include a backslash (\) in the network folder name.

15) In the **Add Share** window, confirm that **Read-only** is NOT selected.

16) In the **Add Share** window, click **Auto-mount**. Then click **OK**.

17) (Optional) Create additional shared folders. Additional shared folders are displayed in SAS Studio under **Folder Shortcuts**.

18) In the **Settings** window, click **OK**.

Open and Launch VirtualBox

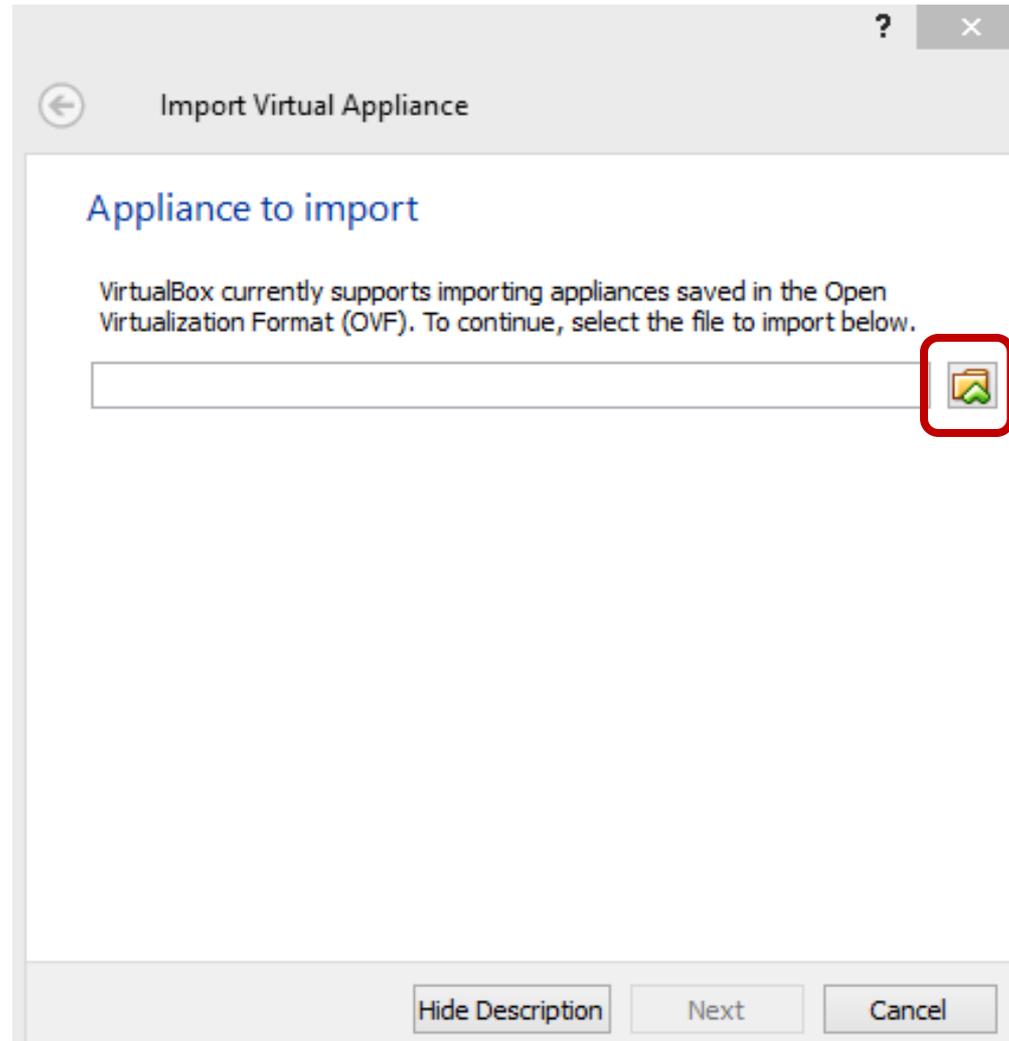## ... from your Download area or your desktop

Oracle VM VirtualBox starts up
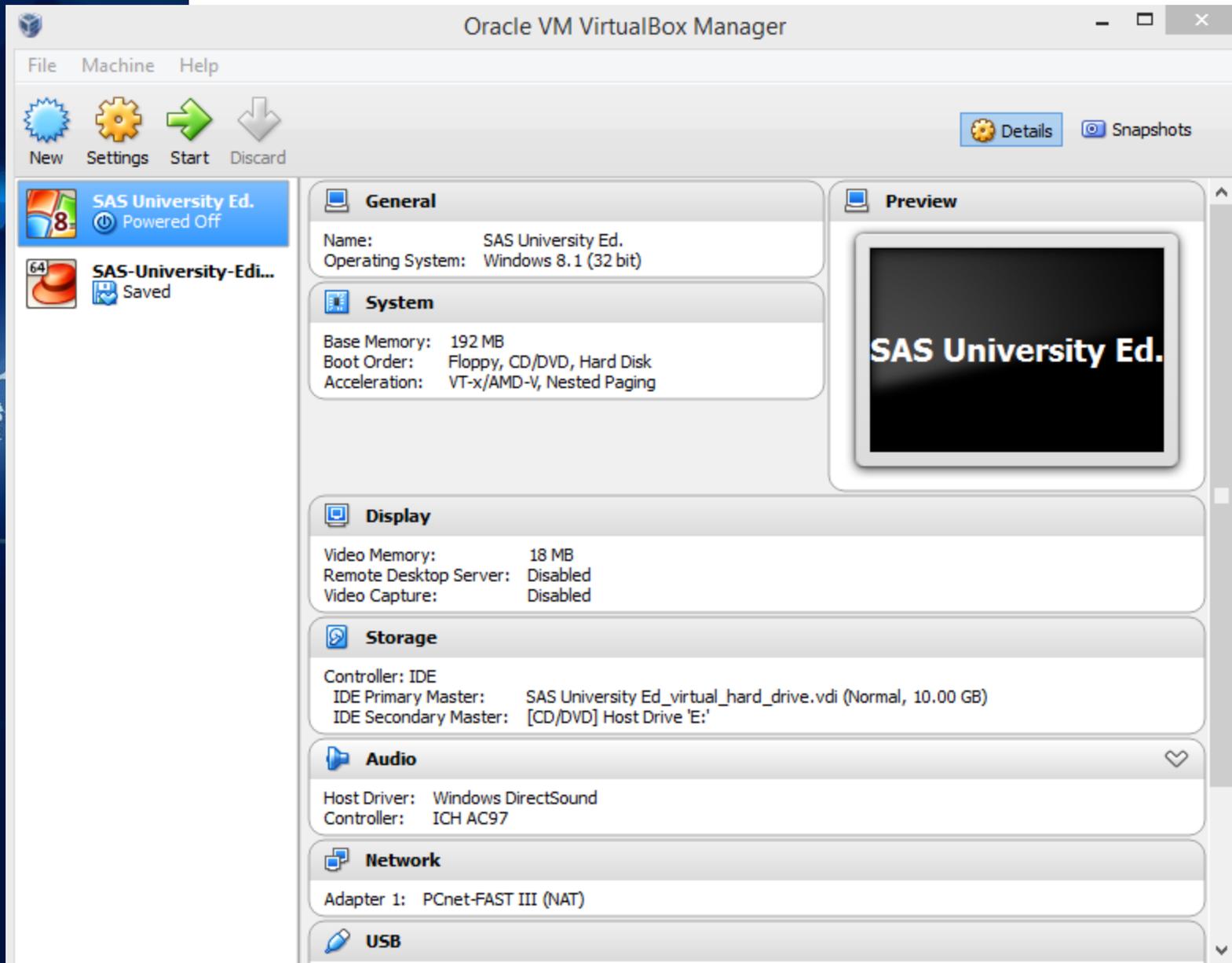
Select File > Import Appliance

Click the folder icon to the right of the field.

Choose unvBASIC...ova ... (not mvx)
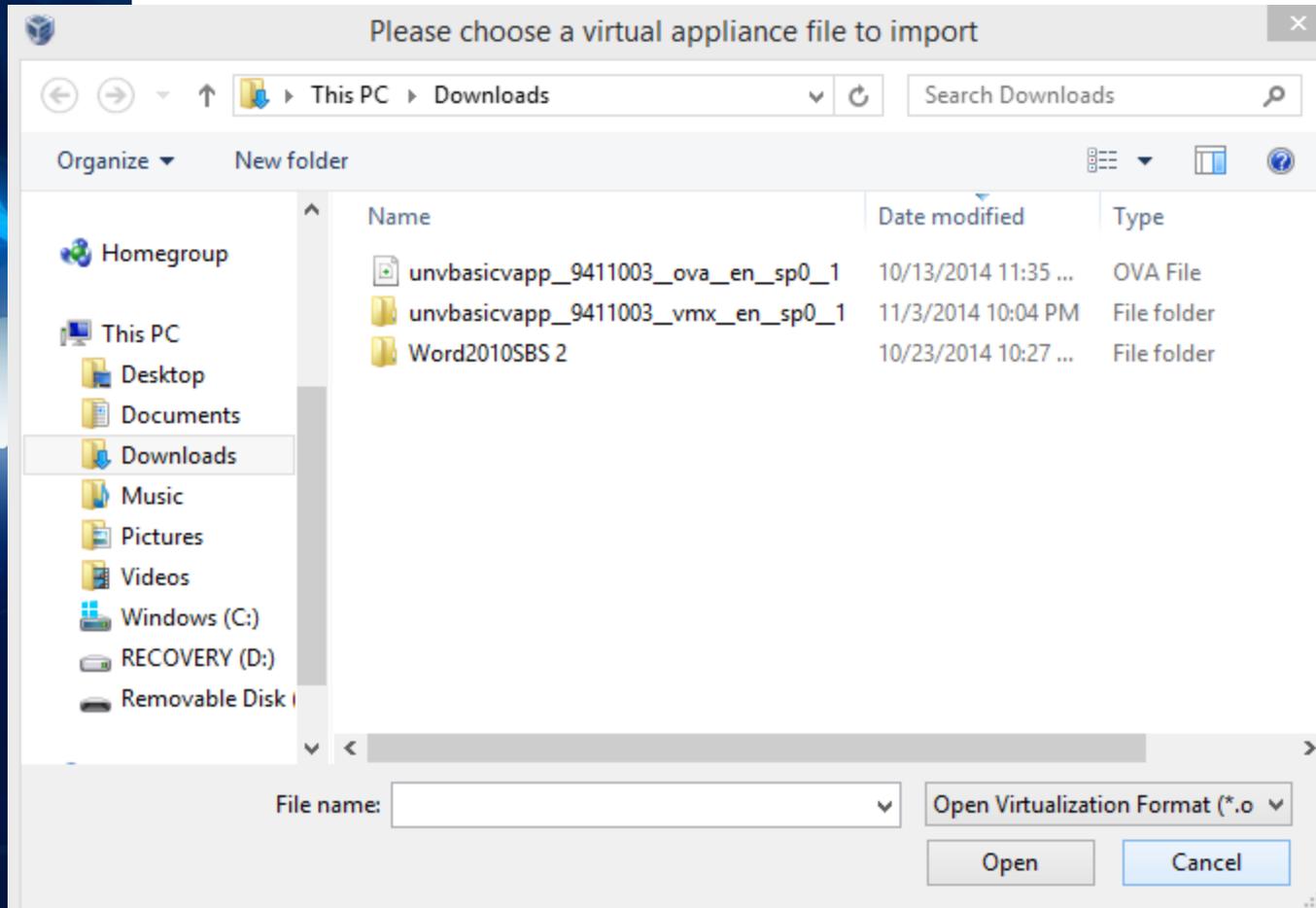
The SAS University vApp fills in
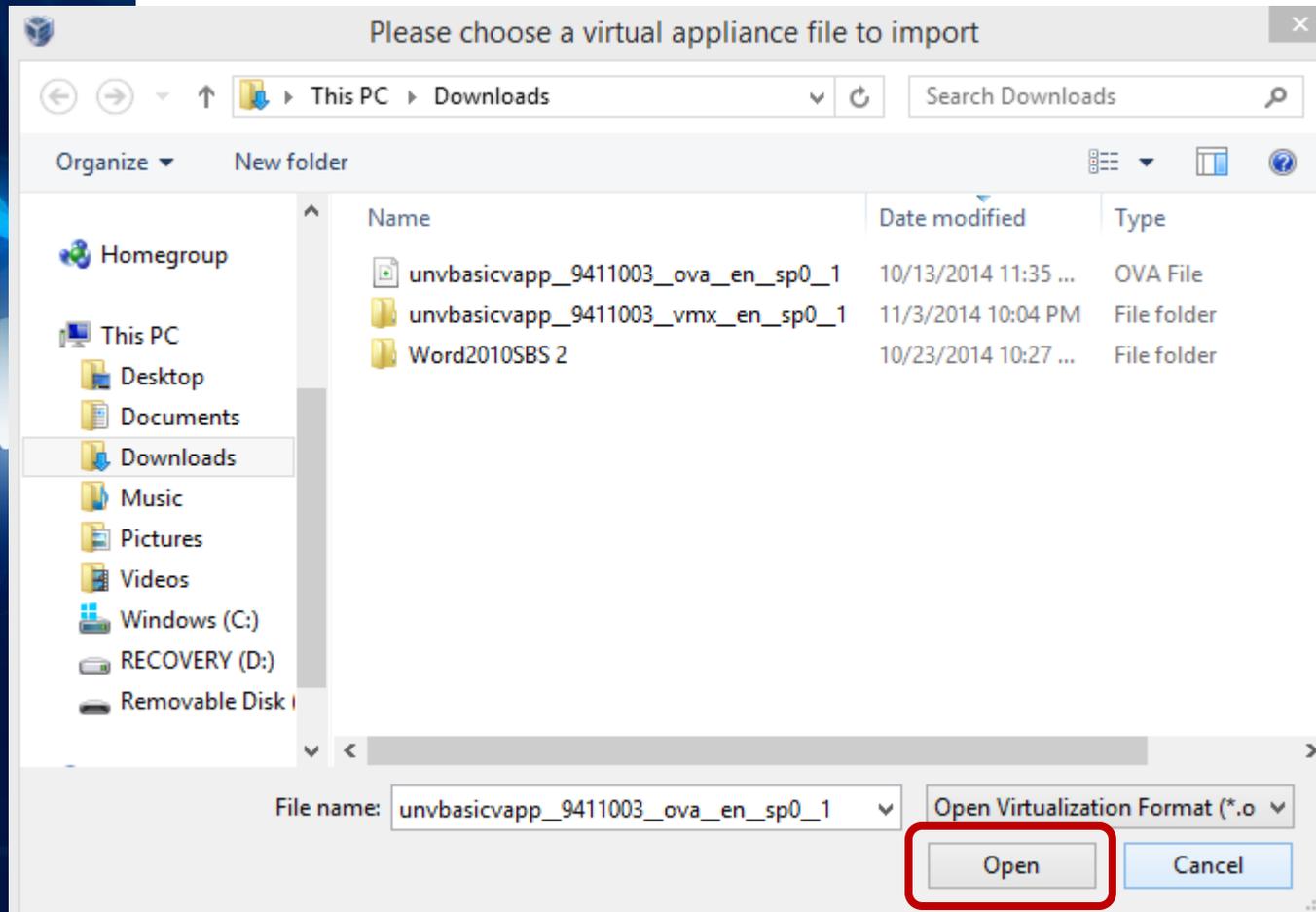
Click Open

VirtualBox will import SAS vApp
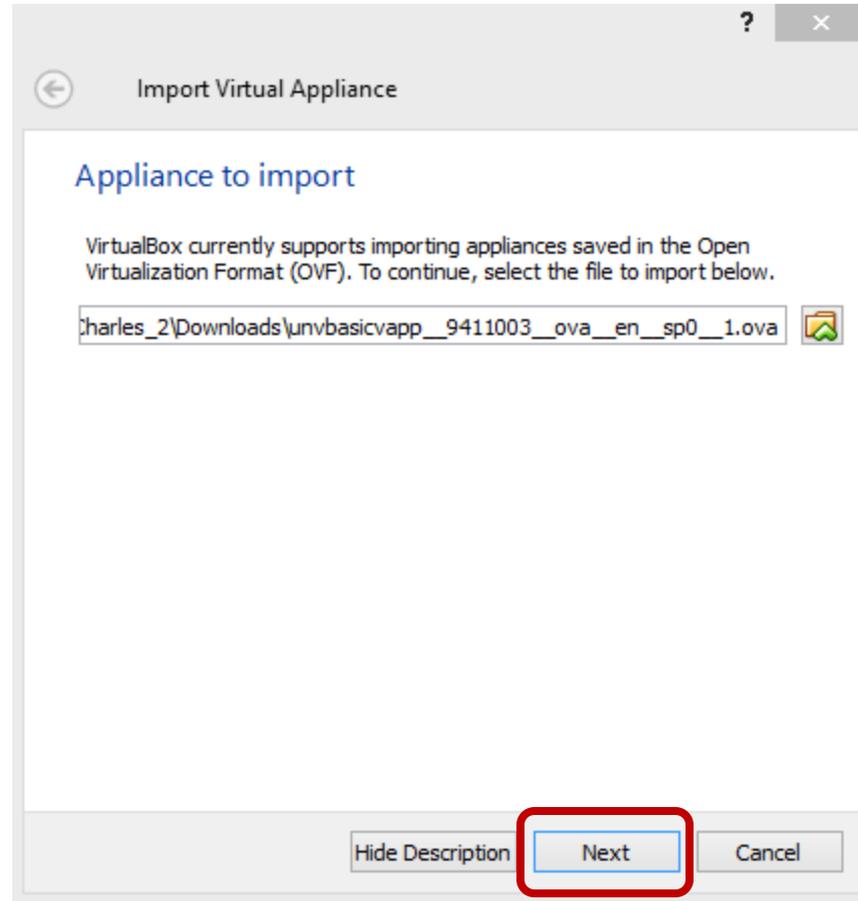
Click Next

Resetting is optional
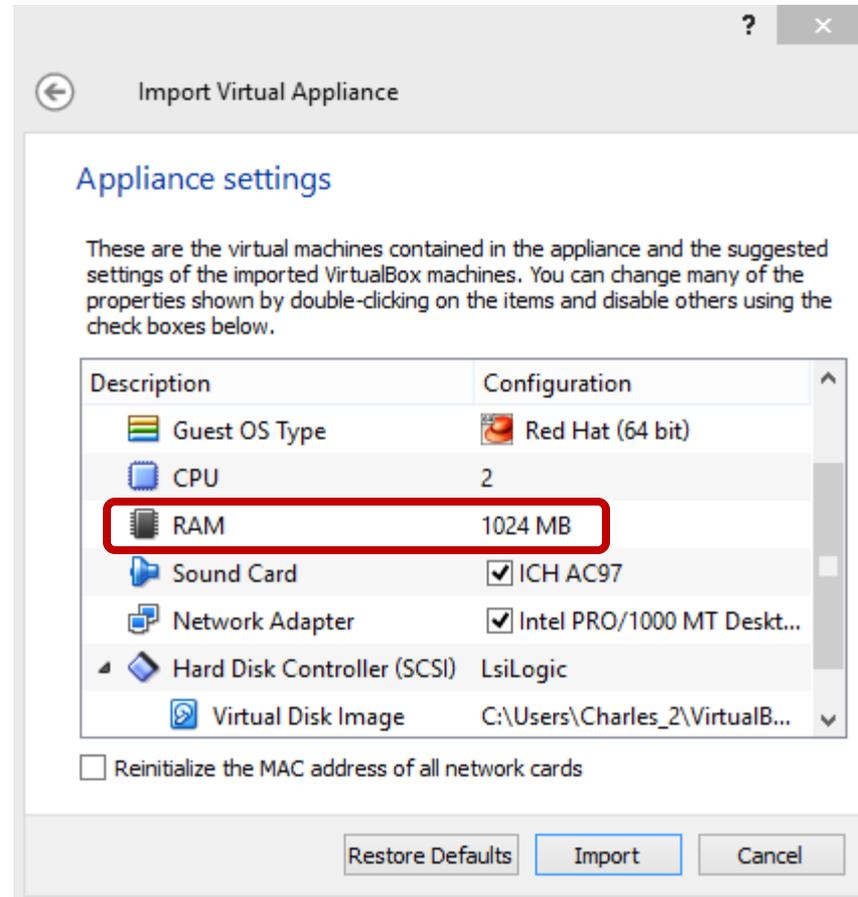
Consider changing 1024 MB <u>RAM</u> to 2048 MB
… then click IMPORT.

Import takes about 3 minutes
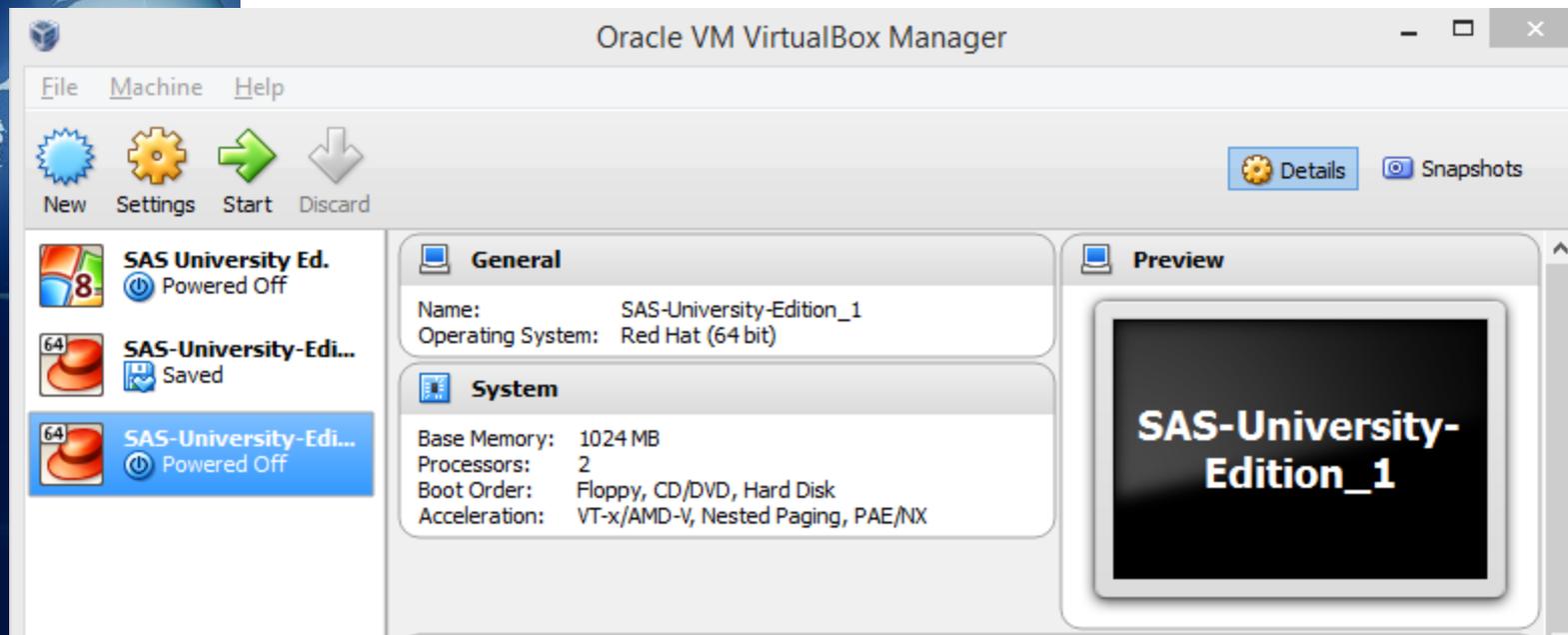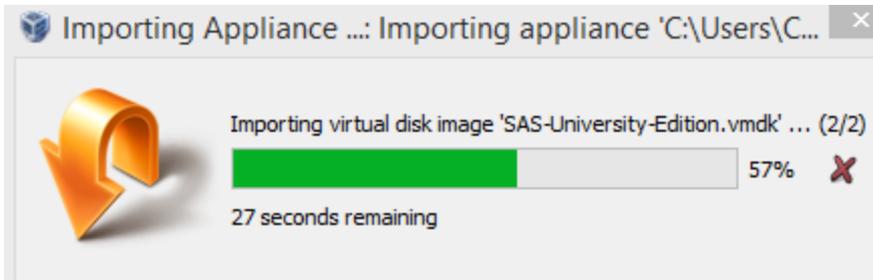
Now select Machine > Settings

Here is the Settings window
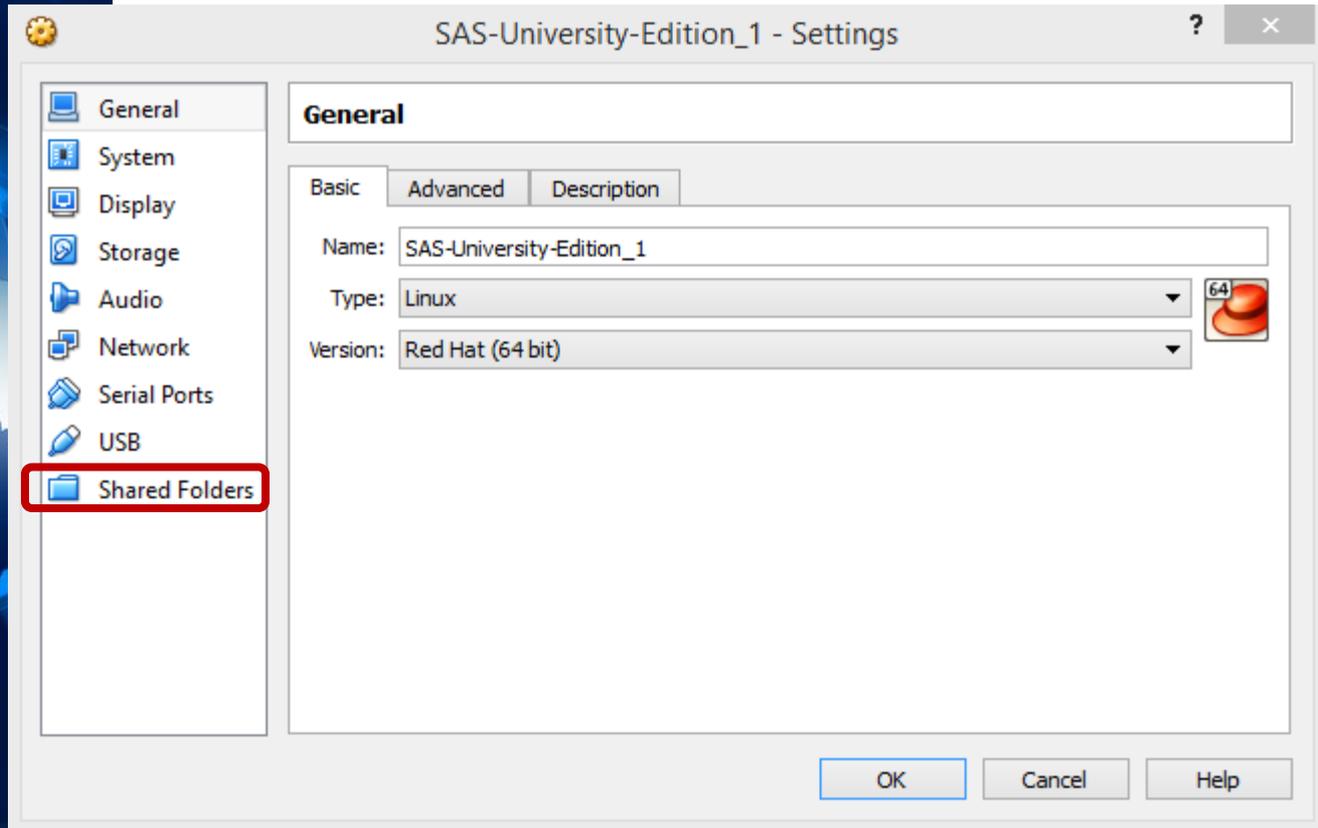
Click on Shared Folders

Here is the Settings window
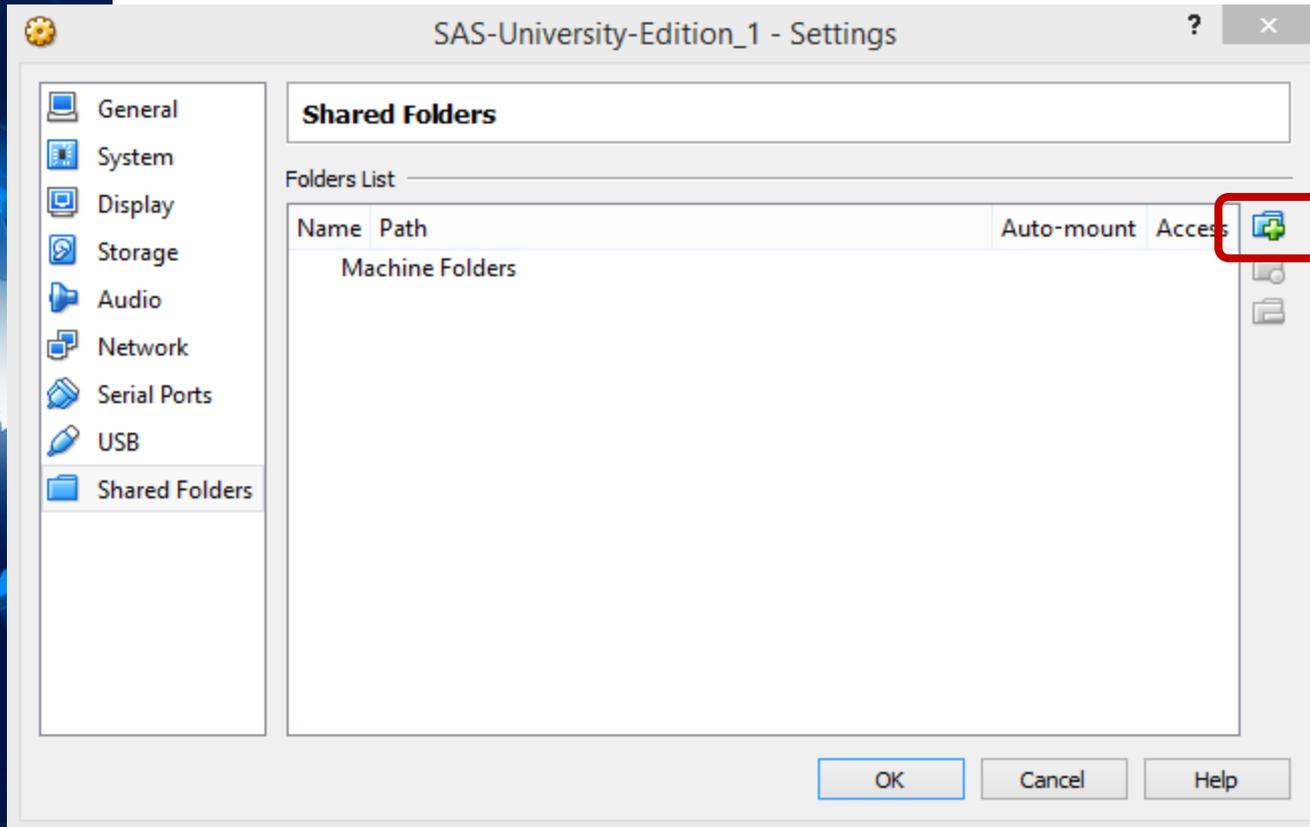
On the right, click on the '+' folder icon.

The 'Add Share' window appears
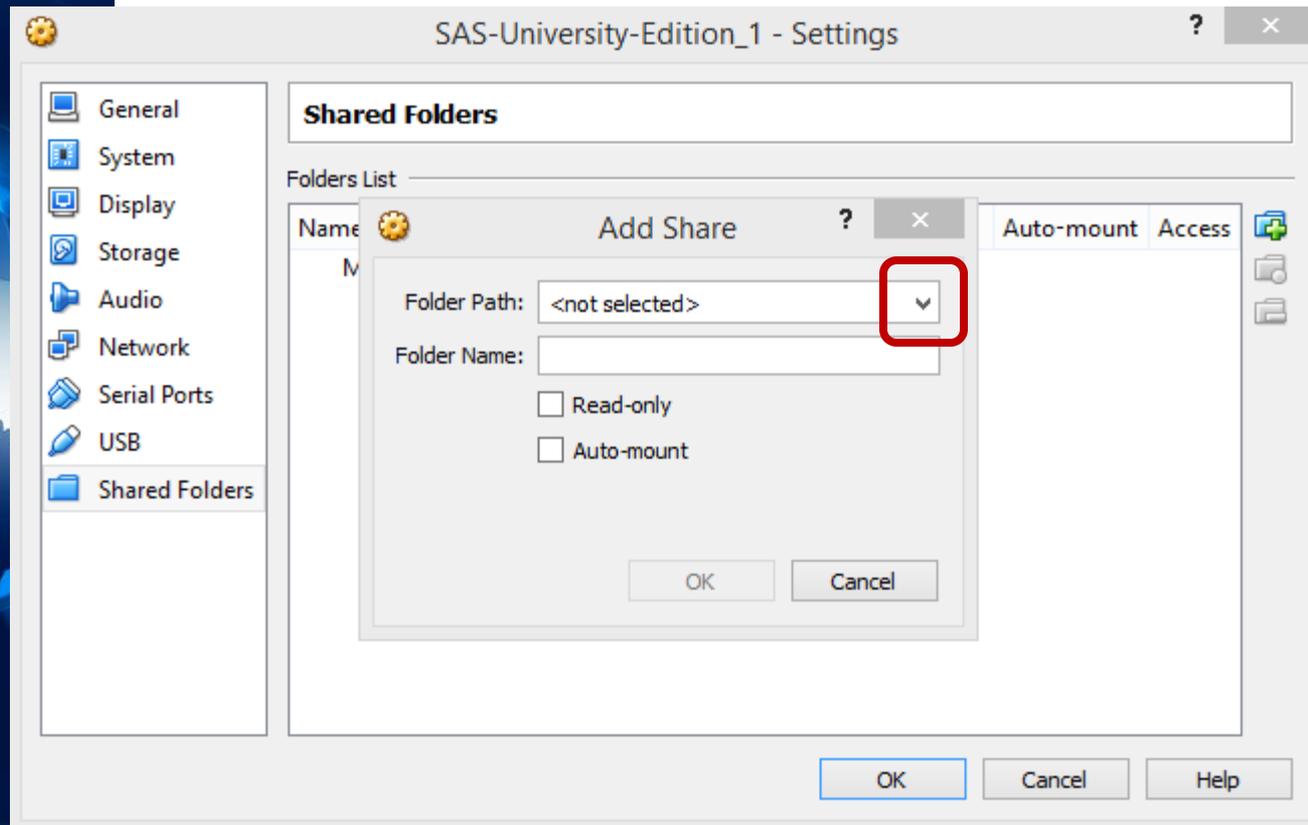
Click the 'down arrow' and choose 'other'.
We also click the 'Auto-mount' box.

The 'Add Share' window appears

Navigate to 'myfolders' and then click 'OK'.
We will also illustrate creating project folders.
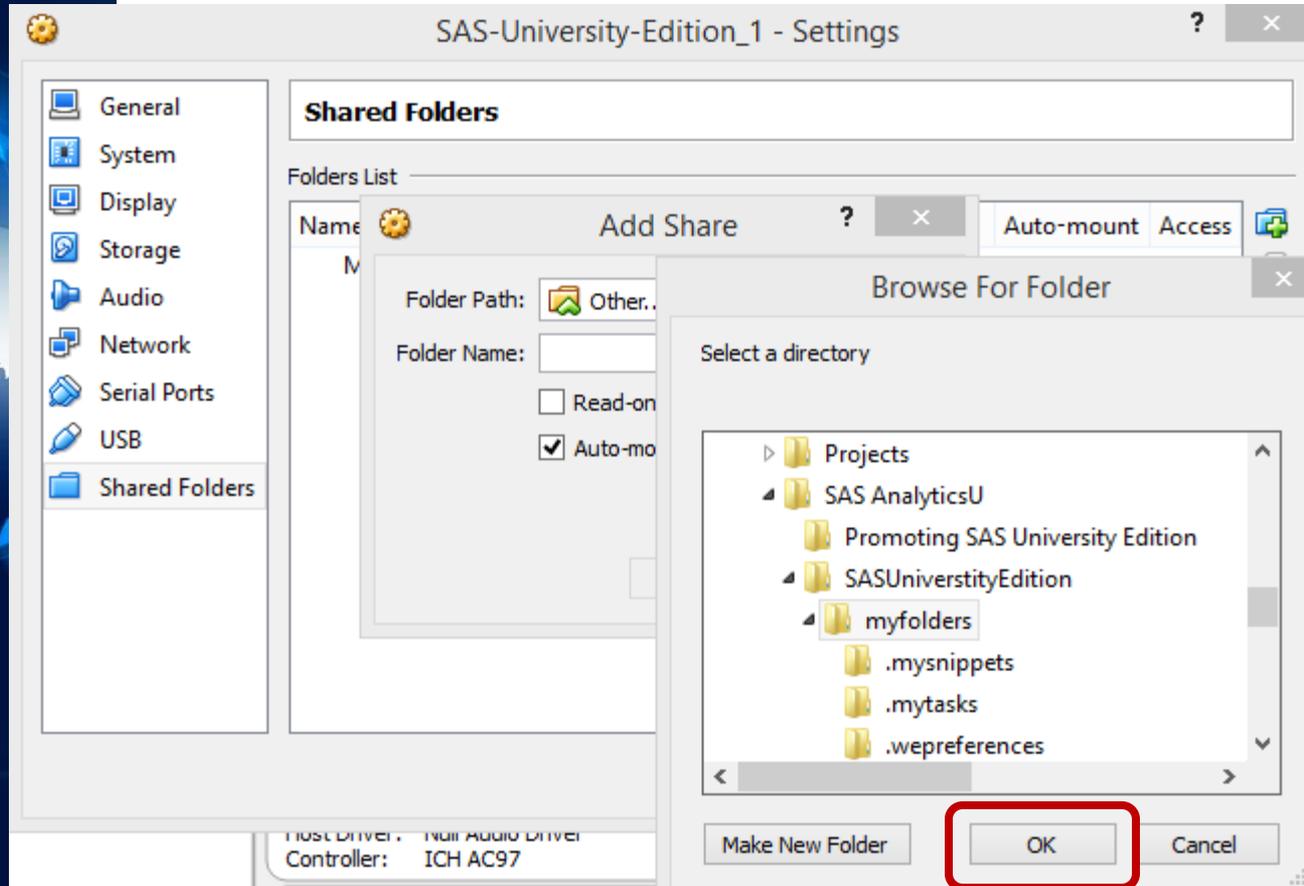
Note that we checked the 'Auto-mount' box.

This completes the Configuring
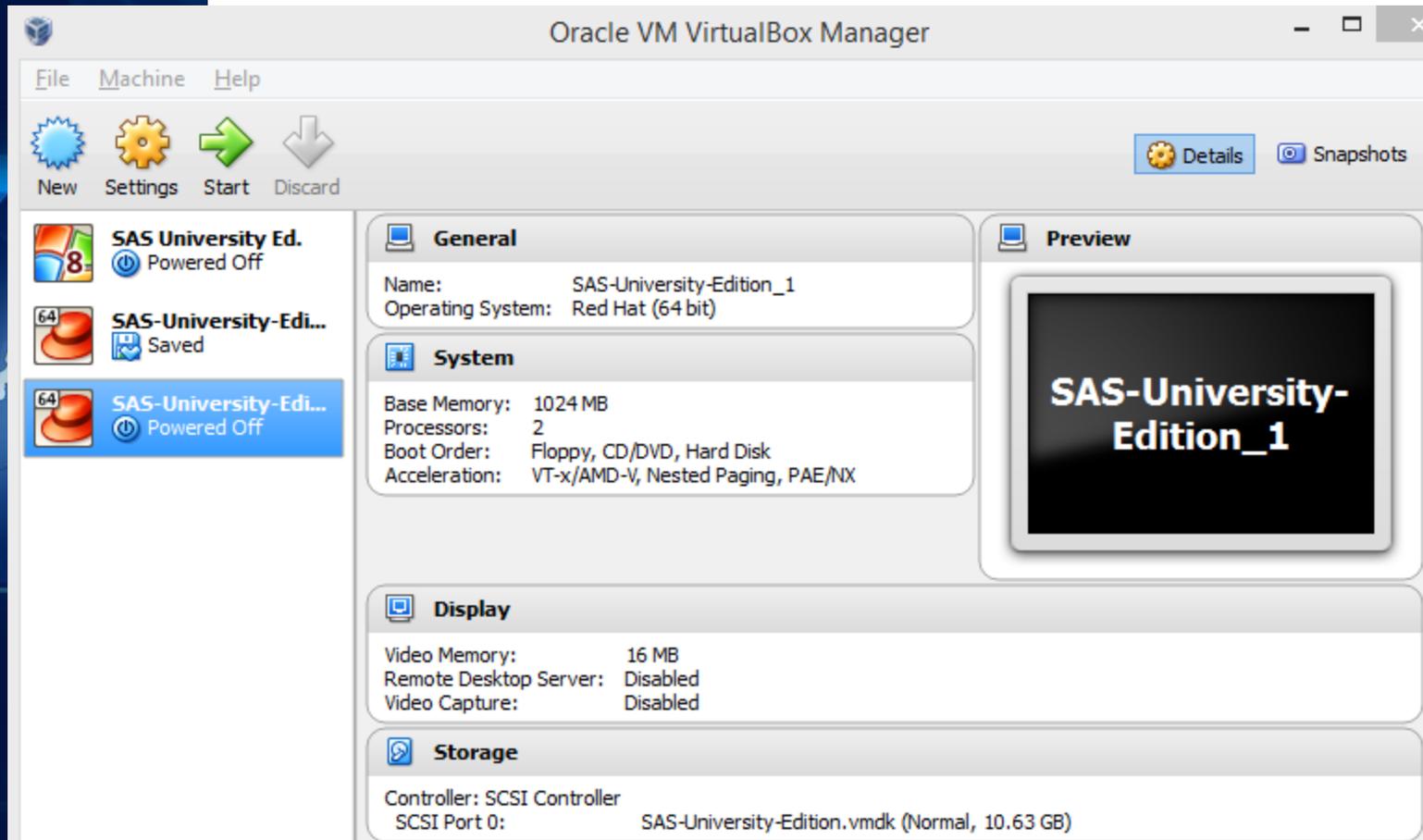
**You are now ready to run SAS Studio
in your SAS vApp virtualization session.**

Lessons Learned, Tips, and Techniques

Things to Learn and Remember

- **When done correctly, the steps will work!**
- **Tips include:**
  - ✓ Watch the first short videos for an overview.
  - ✓ You may want to print the page of step instructions.
  - ✓ Watch that the SAS vApp matches 3rd-party player such that 'ova' or 'vmx' are in the two file names.
  - ✓ During the downloads, read about the next steps.
  - ✓ Watch tutorials and read the manuals, a lot to learn.
  - ✓ Plan a small project and test drive SAS Studio.
  - ✓ Be productive as you produce major efforts.
  - ✓ When ready, present your work in user groups.

After Download, Configure

- **Allocate two folders with specific names**
  - ✓ **'SASUniversityEdition' (organizing folder)**
  - ✓ **'myfolders' (subfolder to contain shared data)**
- **Shared Data Folder (myfolders)**
  - ✓ **LIBNAME libref '/folders/myfolders/'**

- **Combine files and downloads with a wizard**
  - ✓ **Use the Oracle VM VirtualBox wizard**
  - ✓ **Or use the Vmware Player wizard**

Visualize Computer Preparation

Follow the steps carefully, and you will be successful.

Start/Run
SAS Studio

Create a
BUILD

Run Wizard
to configure

Allocate
two files

Download
virtualization
software

The first two steps need to match on <u>Oracle VM</u> or <u>VMware</u>.

Download
SAS vApp

Follow steps

Essential Programming Techniques Using SAS Studio

Displaying Table Attributes

```
libname mydata '/folders/myfolders/' ;

proc contents lib=mydata.movies ;
 title ;
run ;
```

Displaying Table Attributes

The CONTENTS Procedure

Data Set Name	MYDATA.MOVIES	Observations	22
Member Type	DATA	Variables	6
Engine	V9	Indexes	0
Created	08/13/2007 04:49:44	Observation Length	88
Last Modified	10/11/2009 14:41:53	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label			
Data Representation	WINDOWS_32		
Encoding	wlatin1 Western (Windows)		

Displaying Table Attributes

Engine/Host Dependent Information	
Data Set Page Size	8192
Number of Data Set Pages	2
First Data Page	1
Max Obs per Page	92
Obs in First Data Page	22
Number of Data Set Repairs	0
Filename	/folders/myfolders/movies.sas7bdat
Release Created	9.0101M0
Host Created	XP_PRO
Inode Number	31
Access Permission	rwxrwxrwx
Owner Name	root
File Size (bytes)	17408

Displaying Table Attributes

Alphabetic List of Variables and Attributes			
#	Variable	Type	Len
3	Category	Char	20
2	Length	Num	3
6	Rating	Char	5
5	Studio	Char	25
1	Title	Char	30
4	Year	Num	4

Sorting Data

```
libname mydata '/folders/myfolders/' ;

proc sort data=mydata.movies
          out=sorted_movies ;
 by rating title ;
run ;
```

Sorting Data — Results

Title	Length	Category	Year	Studio	Rating
The Wizard of Oz	101	Adventure	1939	MGM / UA	G
Casablanca	103	Drama	1942	MGM / UA	PG
Jaws	125	Action Adventure	1975	Universal Studios	PG
Poltergeist	115	Horror	1982	MGM / UA	PG
Rocky	120	Action Adventure	1976	MGM / UA	PG
Star Wars	124	Action Sci-Fi	1977	Lucas Film Ltd	PG
The Hunt for Red October	135	Action Adventure	1989	Paramount Pictures	PG
Christmas Vacation	97	Comedy	1989	Warner Brothers	PG-13
Forrest Gump	142	Drama	1994	Paramount Pictures	PG-13
Ghost	127	Drama Romance	1990	Paramount Pictures	PG-13
Jurassic Park	127	Action	1993	Universal Pictures	PG-13
Michael	106	Drama	1997	Warner Brothers	PG-13
National Lampoon's Vacation	98	Comedy	1983	Warner Brothers	PG-13
Titanic	194	Drama Romance	1997	Paramount Pictures	PG-13
Brave Heart	177	Action Adventure	1995	Paramount Pictures	R
Coming to America	116	Comedy	1988	Paramount Pictures	R
Dracula	130	Horror	1993	Columbia TriStar	R
Dressed to Kill	105	Drama Mysteries	1980	Filmways Pictures	R
Lethal Weapon	110	Action Cops & Robber	1987	Warner Brothers	R
Scarface	170	Action Cops & Robber	1983	Universal Studios	R
Silence of the Lambs	118	Drama Suspense	1991	Orion	R
The Terminator	108	Action Sci-Fi	1984	Live Entertainment	R

Printing Data

```
libname mydata '/folders/myfolders/' ;

proc print data=sorted_movies ;
 var title category length ;
 by rating ;
run ;
```

Printing Data — Results

Rating=G

Obs	Title	Category	Length
1	The Wizard of Oz	Adventure	101

Rating=PG

Obs	Title	Category	Length
2	Casablanca	Drama	103
3	Jaws	Action Adventure	125
4	Poltergeist	Horror	115
5	Rocky	Action Adventure	120
6	Star Wars	Action Sci-Fi	124
7	The Hunt for Red October	Action Adventure	135

Rating=PG-13

Obs	Title	Category	Length
8	Christmas Vacation	Comedy	97
9	Forrest Gump	Drama	142
10	Ghost	Drama Romance	127
11	Jurassic Park	Action	127
12	Michael	Drama	106
13	National Lampoon's Vacation	Comedy	98
14	Titanic	Drama Romance	194

Rating=R

Obs	Title	Category	Length
15	Brave Heart	Action Adventure	177
16	Coming to America	Comedy	116
17	Dracula	Horror	130
18	Dressed to Kill	Drama Mysteries	105
19	Lethal Weapon	Action Cops & Robber	110
20	Scarface	Action Cops & Robber	170
21	Silence of the Lambs	Drama Suspense	118
22	The Terminator	Action Sci-Fi	108

Transposing Data

```
libname mydata '/folders/myfolders/' ;


proc transpose data=mydata.movies
                out=transposed_movies ;
 var title ;
 by rating ;
run ;
```

Transposing Data — Results

Rating	Source	COL1	COL2	COL3	COL4
G	Title	The Wizard of Oz			
PG	Title	Casablanca	Jaws	Poltergeist	Rocky
PG-13	Title	Christmas Vacation	Forrest Gump	Ghost	Jurassic Park
R	Title	Brave Heart	Coming to America	Dracula	Dressed to Kill

COL5	COL6	COL7	COL8
Star Wars	The Hunt for Red October		
Michael	National Lampoon's Vacation	Titanic	
Lethal Weapon	Scarface	Silence of the Lambs	The Terminator

Match-Merge

```
libname mydata '/folders/myfolders/' ;

data match_merge ;
 merge mydata.movies(in=m)
       mydata.actors(in=a) ;
 if m and a ;
run ;
```

Match-Merge — Results

Title	Length	Category	Year	Studio	Rating	Actor_Leading	Actor_Supporting
Brave Heart	177	Action Adventure	1995	Paramount Pictures	R	Mel Gibson	Sophie Marceau
Christmas Vacation	103	Drama	1942	MGM / UA	PG	Chevy Chase	Beverly D'Angelo
Coming to America	97	Comedy	1989	Warner Brothers	PG-13	Eddie Murphy	Arsenio Hall
Forrest Gump	116	Comedy	1988	Paramount Pictures	R	Tom Hanks	Sally Field
Ghost	130	Horror	1993	Columbia TriStar	R	Patrick Swayze	Demi Moore
Lethal Weapon	105	Drama Mysteries	1980	Filmways Pictures	R	Mel Gibson	Danny Glover
Michael	142	Drama	1994	Paramount Pictures	PG-13	John Travolta	Andie MacDowell
National Lampoon's Vacation	127	Drama Romance	1990	Paramount Pictures	PG-13	Chevy Chase	Beverly D'Angelo
Rocky	125	Action Adventure	1975	Universal Studios	PG	Sylvester Stallone	Talia Shire
Silence of the Lambs	127	Action	1993	Universal Pictures	PG-13	Anthony Hopkins	Jodie Foster
The Hunt for Red October	110	Action Cops & Robber	1987	Warner Brothers	R	Sean Connery	Alec Baldwin
The Terminator	106	Drama	1997	Warner Brothers	PG-13	Arnold Schwarzenegge	Michael Biehn
Titanic	98	Comedy	1983	Warner Brothers	PG-13	Leonardo DiCaprio	Kate Winslet

N = 13

Inner Join with SQL

```
libname mydata '/folders/myfolders/' ;


proc sql ;
 select m.title, rating, length,
        actor_leading
  from mydata.movies  m,
       mydata.actors a
    where m.title = a.title ;
quit ;
```

Inner Join with SQL — Results

Title	Rating	Length	Actor_Leading
Brave Heart	R	177	Mel Gibson
Christmas Vacation	PG-13	97	Chevy Chase
Coming to America	R	116	Eddie Murphy
Forrest Gump	PG-13	142	Tom Hanks
Ghost	PG-13	127	Patrick Swayze
Lethal Weapon	R	110	Mel Gibson
Michael	PG-13	106	John Travolta
National Lampoon's Vacation	PG-13	98	Chevy Chase
Rocky	PG	120	Sylvester Stallone
Silence of the Lambs	R	118	Anthony Hopkins
The Hunt for Red October	PG	135	Sean Connery
The Terminator	R	108	Arnold Schwarzenegge
Titanic	PG-13	194	Leonardo DiCaprio

Conclusion

Explored Download, Configuration, and Usage of SAS University Edition Software

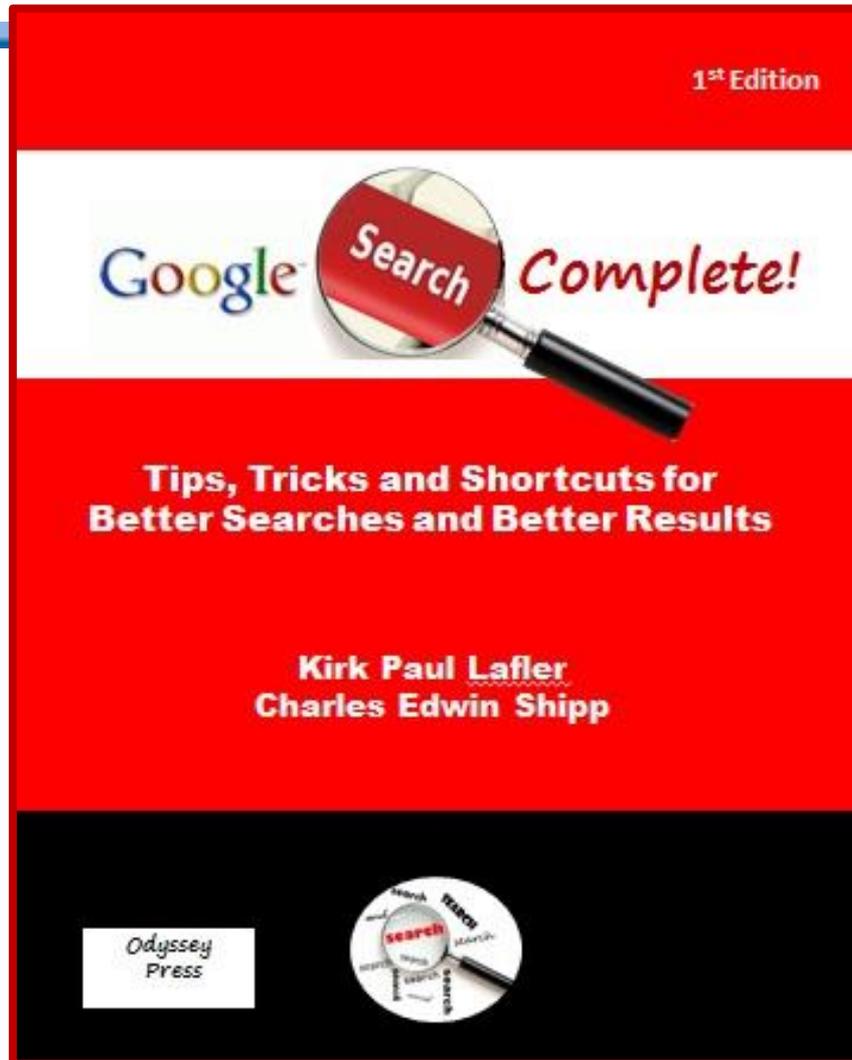|	
SAS University	• **Explore SAS University Edition Software**
VirtualBox and SAS Install	• **Oracle VirtualBox and SAS University Edition Installation**
Lessons Learned	• **Lessons Learned, Tips, and Experiences**
Using SAS Studio	• **Essential Programming Techniques Using SAS Studio**

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SAS Analytics U scores a "10" !

Kirk Paul Lafler at (SGF) SAS Global Forum

Thank you for attending!

Questions?

Charles Edwin Shipp
http://LinkedIn.com/in/CharlieShipp
CharlieShipp@AOL.com

Kirk Paul Lafler
http://LinkedIn.com/in/KirkPaulLafler
KirkLafler@cs.com