STA 311 Statistical Computing & Data Management

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1. Introduction – Access SAS via Citrix

WCU WEST CHESTER UNIVERSITY

Introduction

- Course Objectives
- Course Delivery Method
- Software - SAS
- Access SAS through Citrix Receiver
- Install Citrix Receiver – Detailed Steps
- Launch SAS Application
- A Glance of SAS Windows
- First SAS Program: “Hello World”

Course Objectives

To familiarize you with programming in the SAS language. After completing this course, you should be able to:

1. Create SAS data sets from multiple sources, including direct input, external text files, and dataset generated from other applications.
2. Write SAS data sets out in appropriate format and stored it in certain directory.
3. Use appropriate techniques to combine data sets, subset data sets, extract certain observations from datasets
4. Create basic SAS graphs and generate basic reports using appropriate procedures.
5. Perform basic statistical analyses of data.
6. Prepare for the Base SAS Programming Certification Exam

Course Delivery Method

This course will be delivered asynchronously

My Responsibilities

1. Provide learning materials (notes and videos) every week;
2. Assign weekly HW/Quiz to test your understanding;
3. Hold Zoom office hours to help you with the course materials.

Your Responsibilities and Expectations

1. Study the weekly materials as early as possible;
2. Code as much as possible - Learning by coding!
3. Complete the weekly quiz after finish weekly materials before you do the assignments and meet the deadlines;
4. Ask questions!

SAS - Statistical Analysis System

SAS is a software suite developed by SAS Institute that offers advanced analytics, multivariate analyses, business intelligence, data management and numerous other tasks.

SAS License & Access at WCU

SAS was installed on a remote server that resides in the RamCloud at WCU

https://recap.wcupa.edu/infoServices/ramCloud/default.aspx

You

can access SAS via a client software called

Citrix Receiver

to transfer data between SAS and your local computer.

What is Citrix Receiver

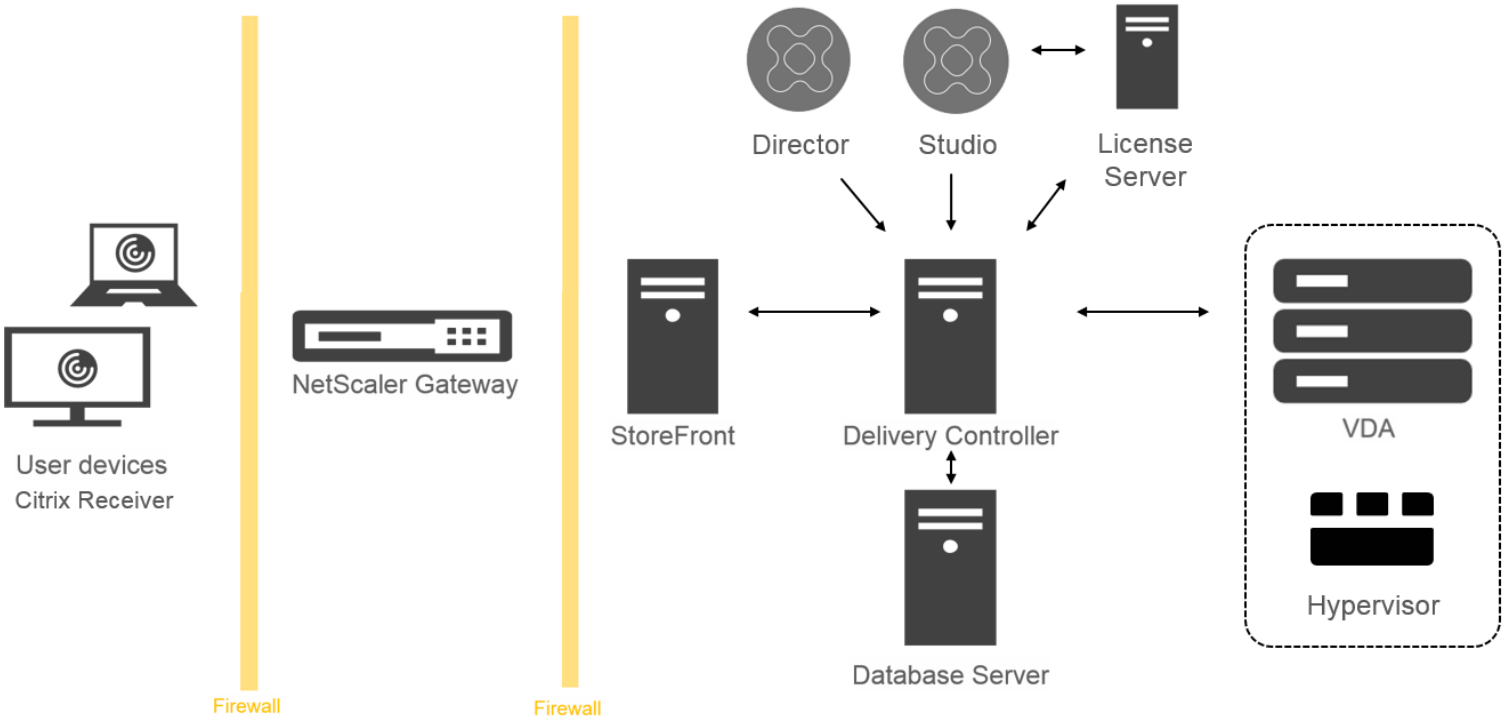
What Citrix Receiver is used for

Citrix Receiver is used primarily for connecting users to XenDesktops and XenApp desktops and applications.

Using Citrix StoreFront in conjunction with Receiver allows organizations to provide users with self-service access to their applications and services -- all with a common user interface, regardless of the endpoint device hardware, OS or form factor.

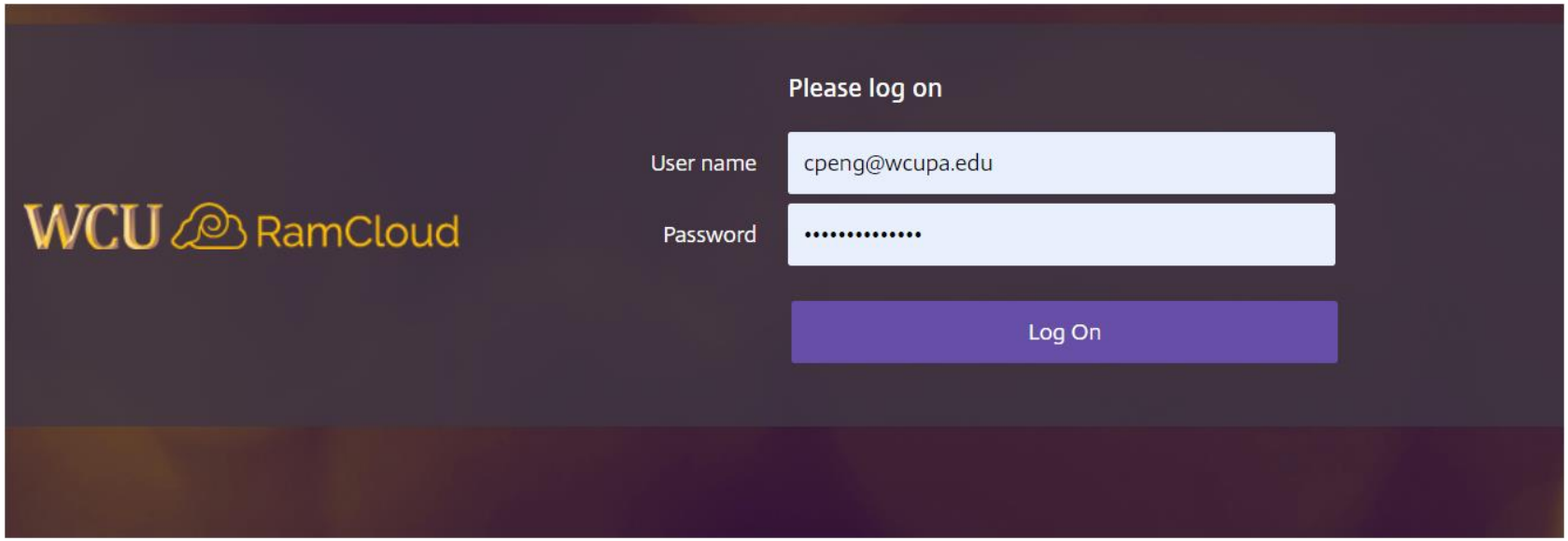
Xen Project (pronounced /ˈzɛn/) is a type-1 hypervisor, providing services that allow multiple computer operating systems to execute on the same computer hardware concurrently.

How Citrix Receiver Works



Install Citrix Receiver on A Local Machine

Go to ramcloud.wcupa.edu with Internet Explorer or Firefox



Install Citrix Receiver on A Local Machine

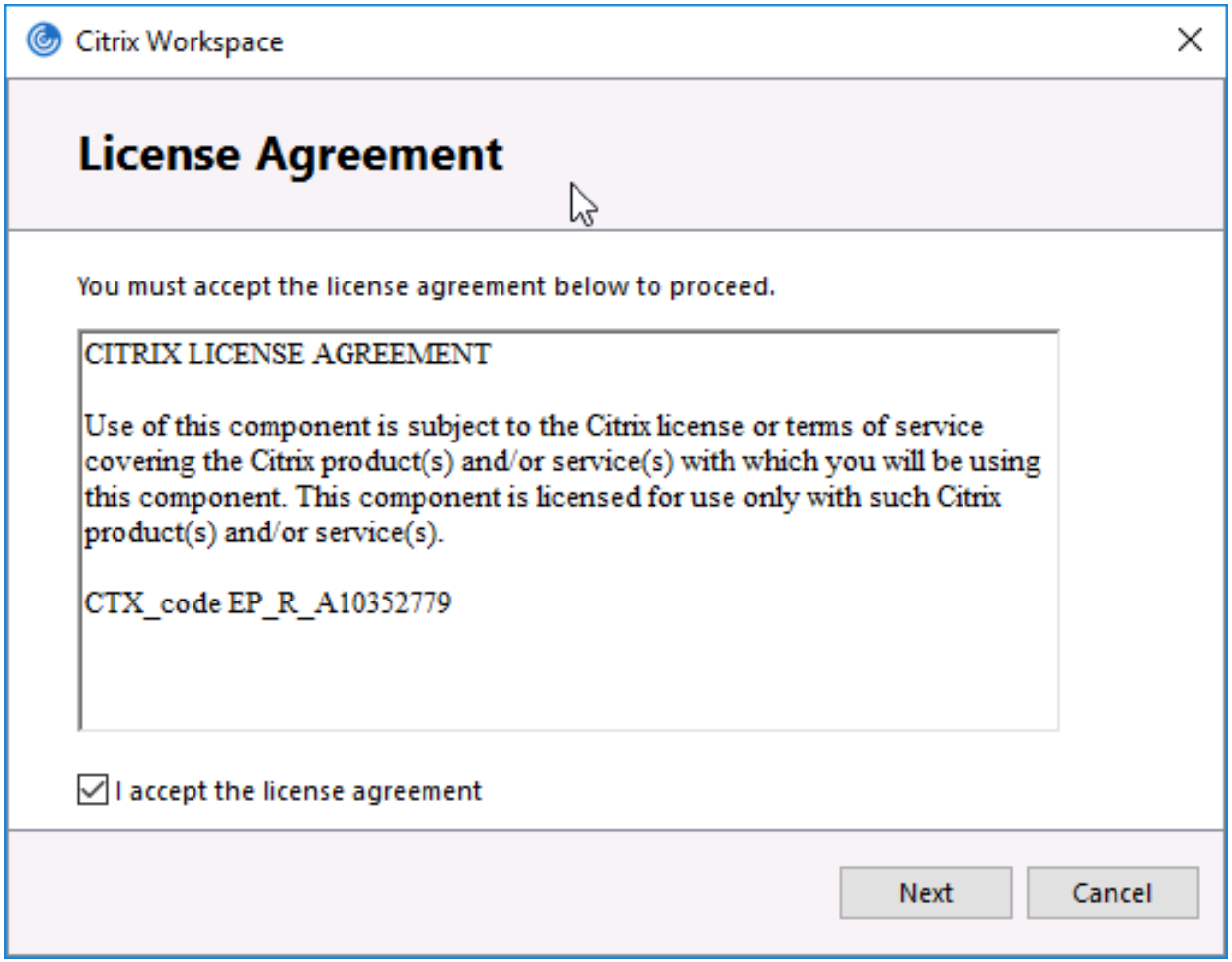
Download and Install Citrix Server

Install Citrix Receiver on A Local Machine

Click Start

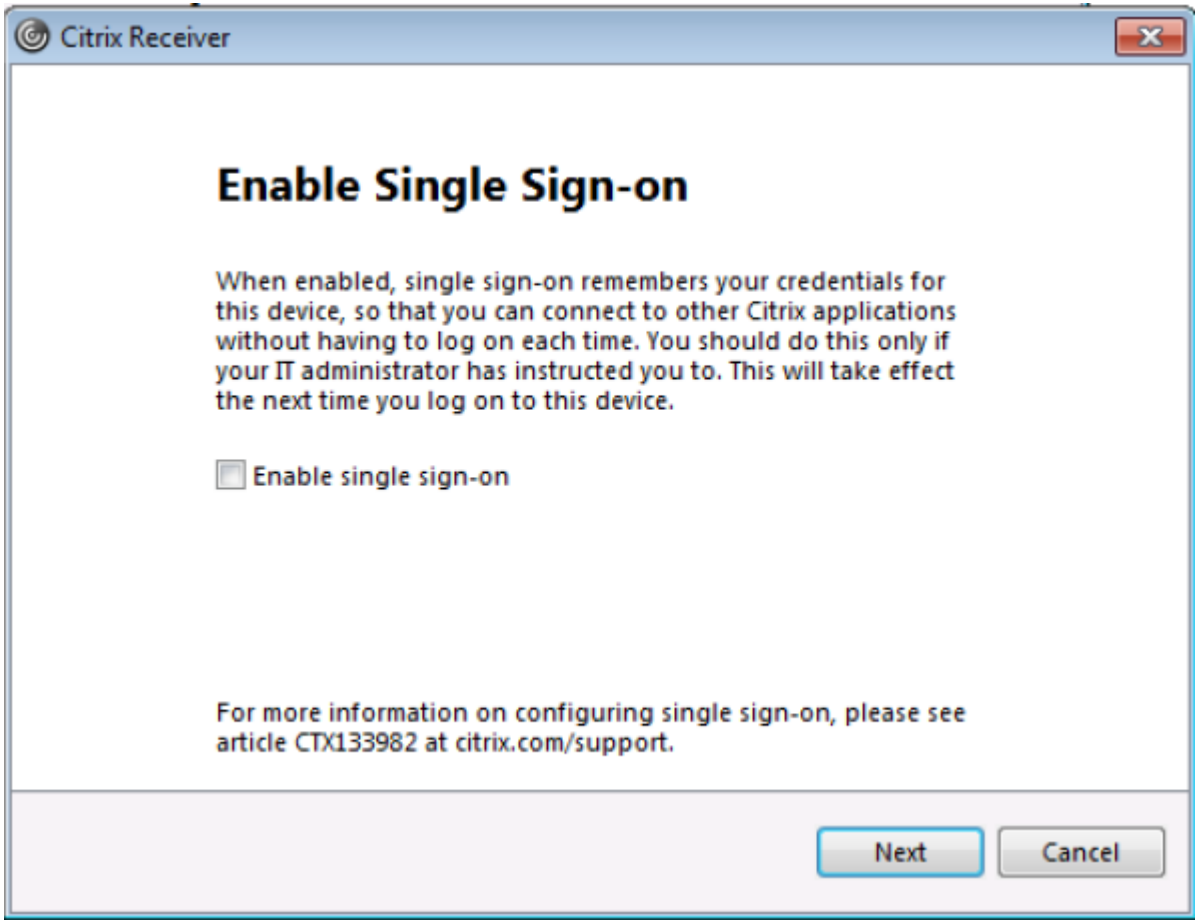
Install Citrix Receiver on A Local Machine

Check “I accept the license agreement” and then Click Start



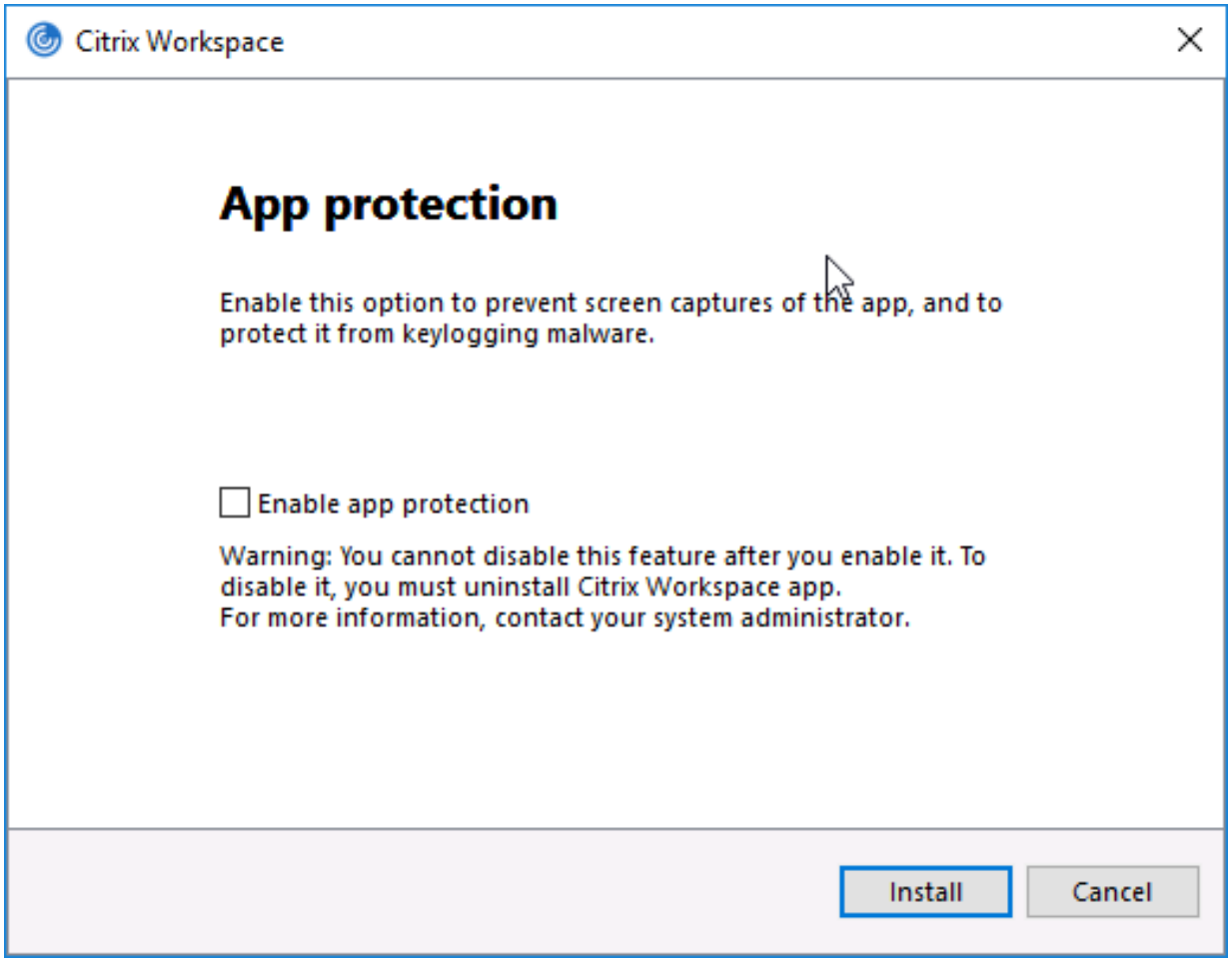
Install Citrix Receiver on A Local Machine

Do not Enable Single Sign-on. Just click Next



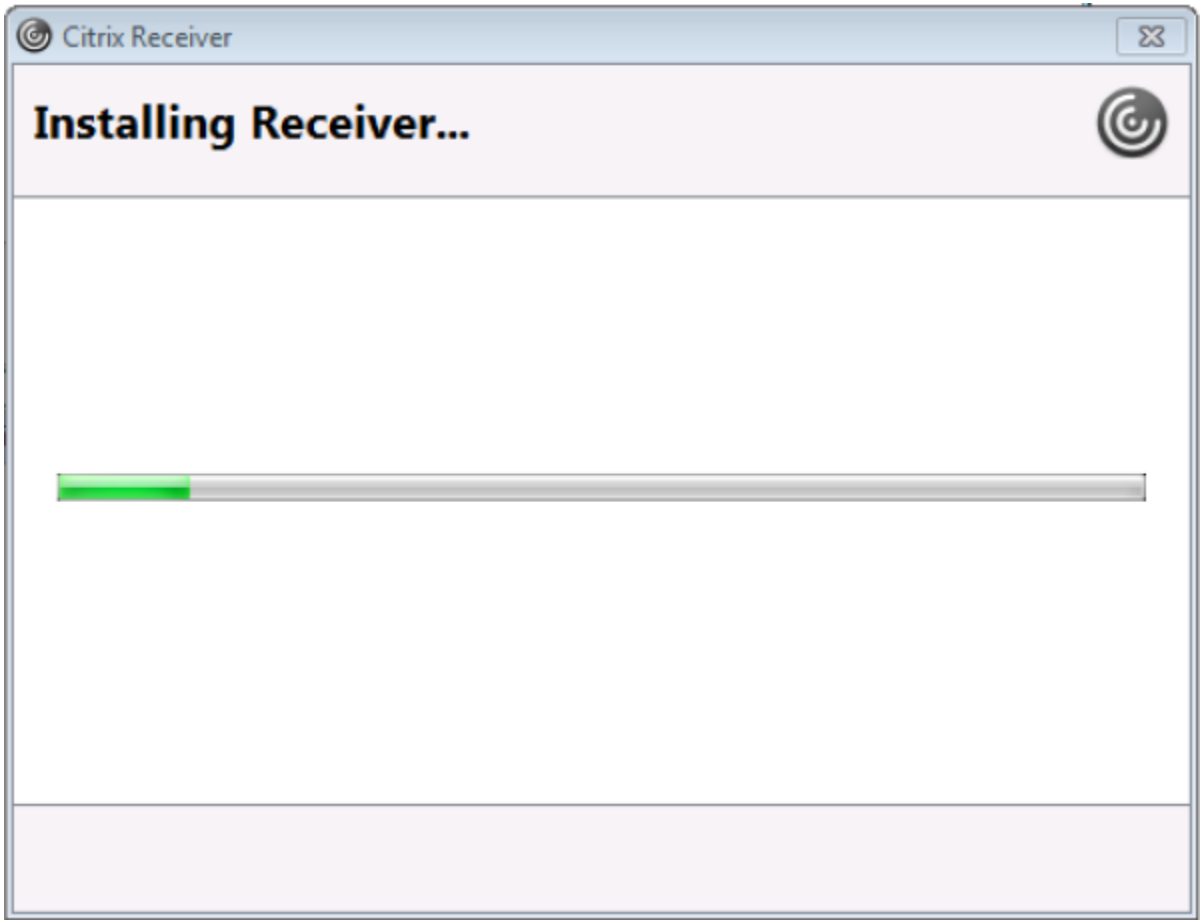
Install Citrix Receiver on A Local Machine

Click Install



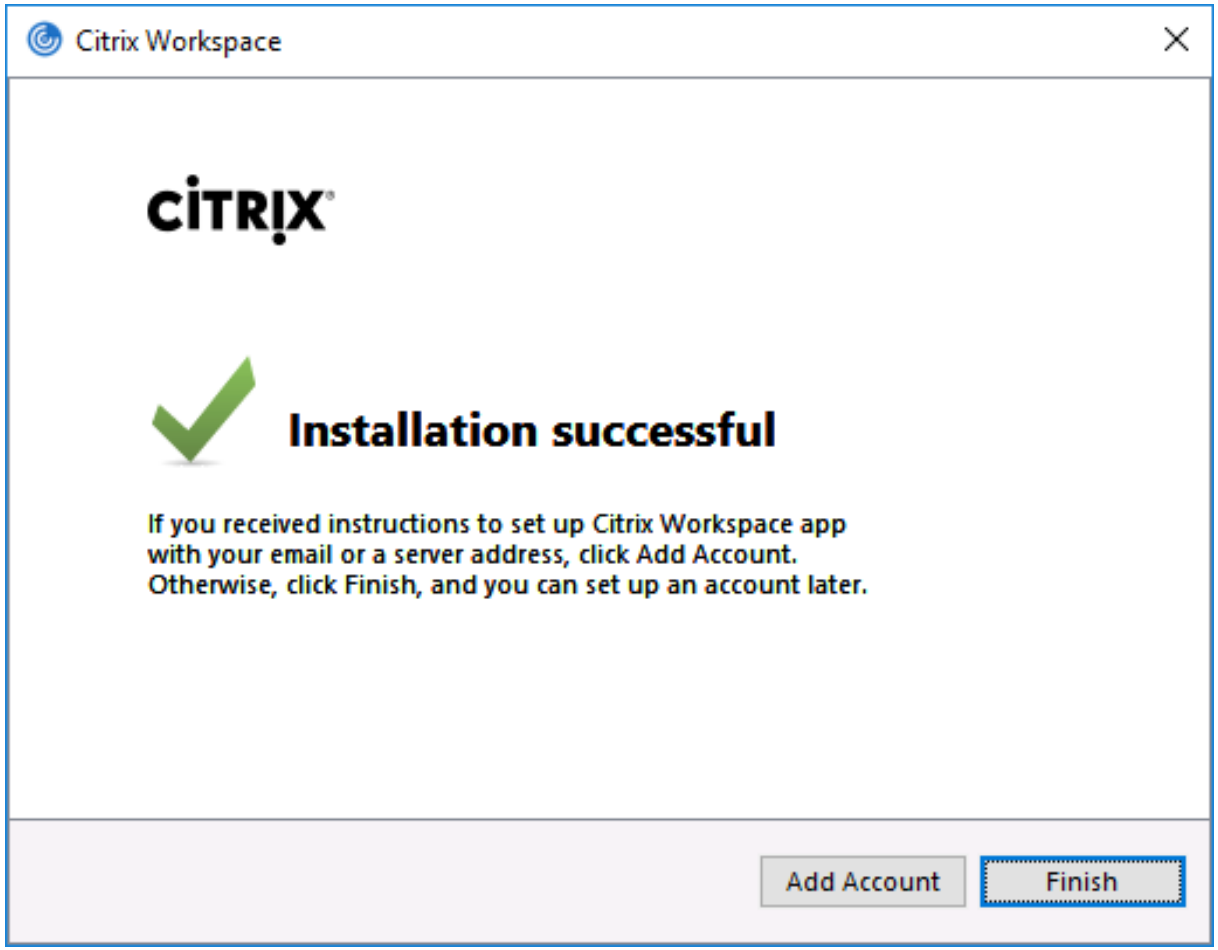
Install Citrix Receiver on A Local Machine

It takes a few seconds to install Citrix Receiver.



Install Citrix Receiver on A Local Machine

Click: Finish



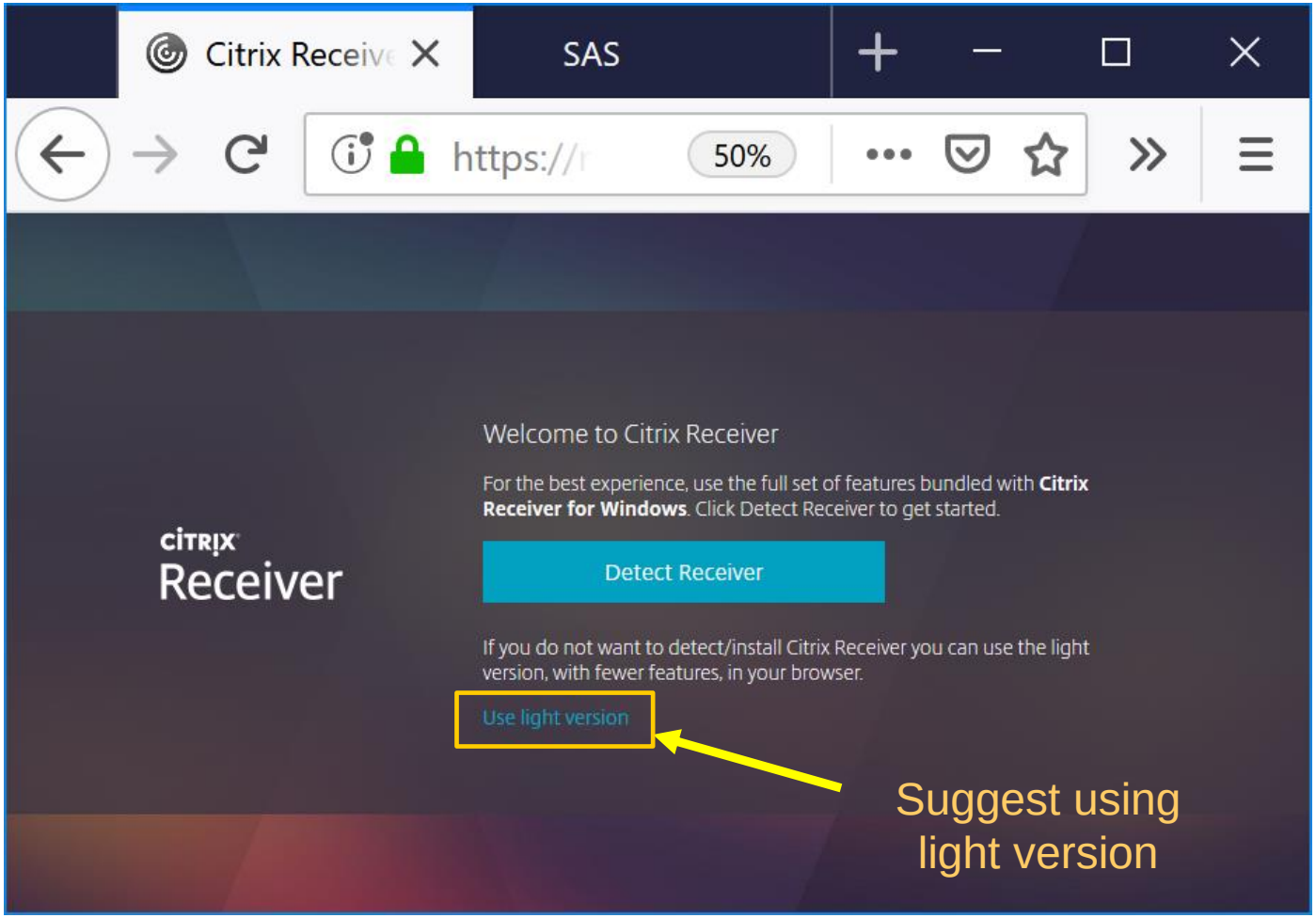
Install Citrix Receiver on A Local Machine

Once the Citrix Receiver is installed on your machine, you will not need to do this step again.

How to access SAS and other Software?

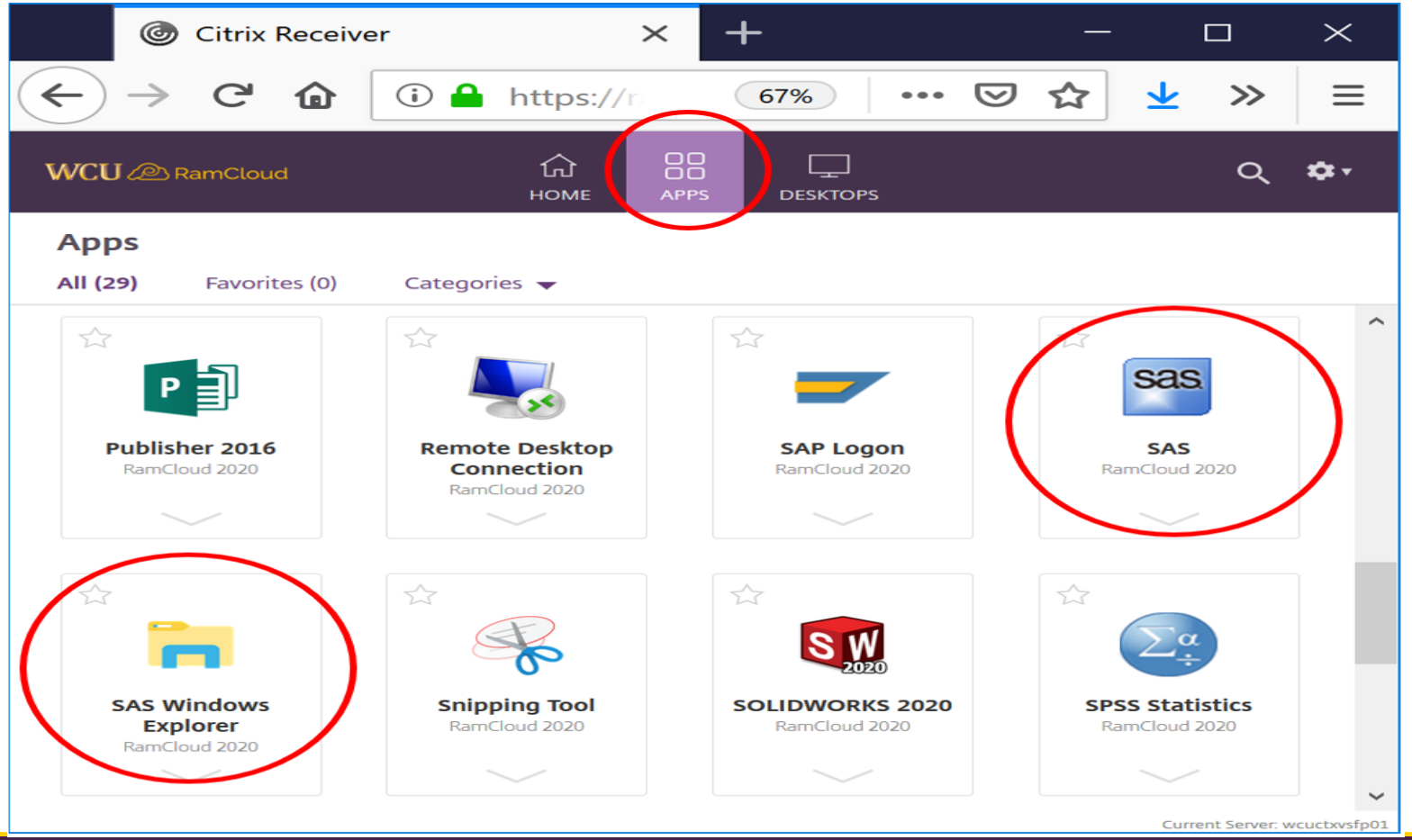
Install Citrix Receiver on A Local Machine

Logon RamCloud as usual



Launch Applications

Login your RamCloud account (same as you MyWCU and WCU email account login credential) to select software you want to use.



Launch Applications & Security

Click **Permit use**

Citrix on Mac

On a Mac, you can use Safari to download the Citrix Receiver dmg. Run it and complete the installation. When the install is complete, go back to Ramcloud in Safari and launch your applications

Downloading and Uploading File via Citrix

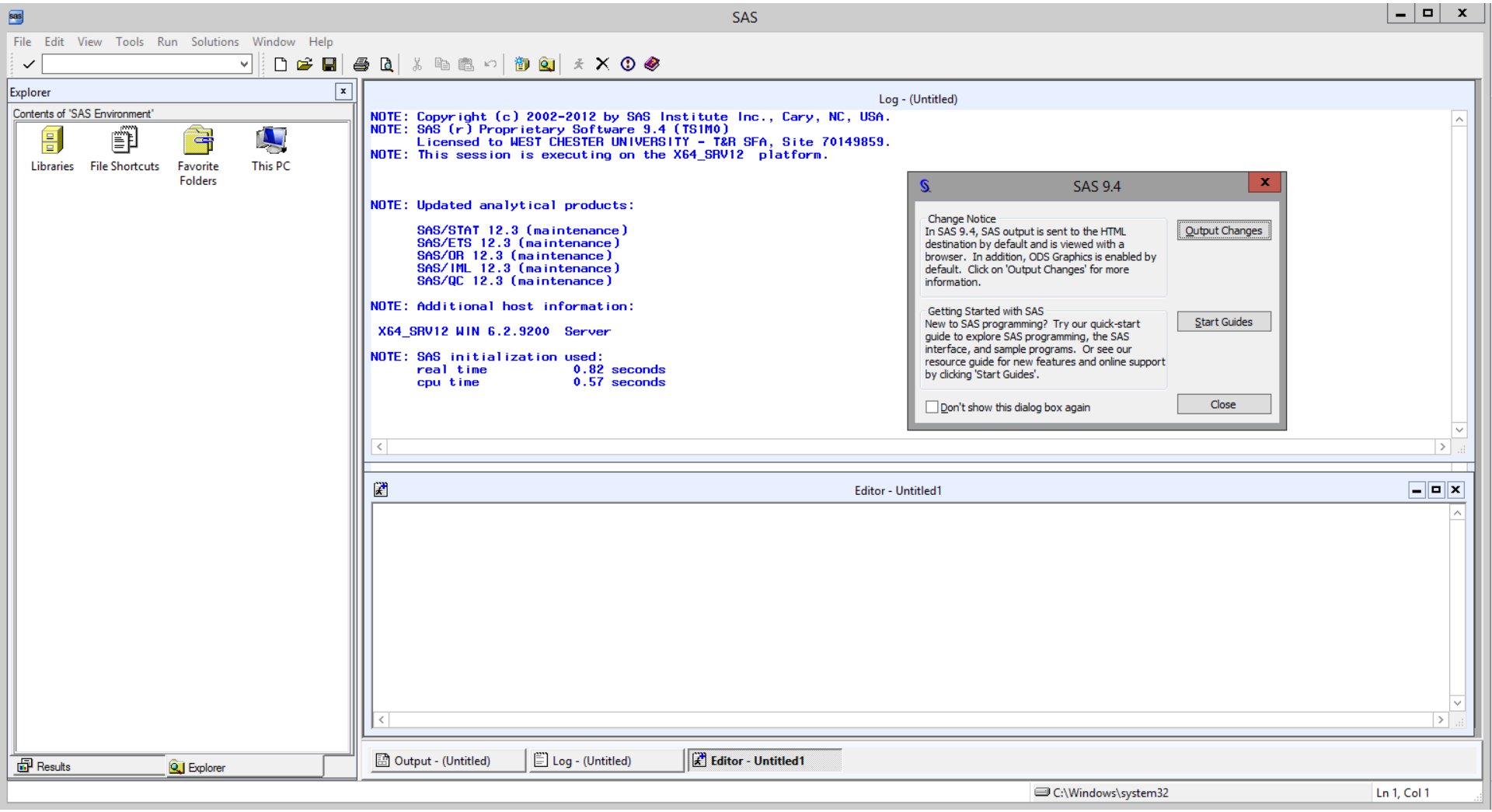
To save files,

select File > Save As from within the application. Browse to “Computer” and select your local drive.

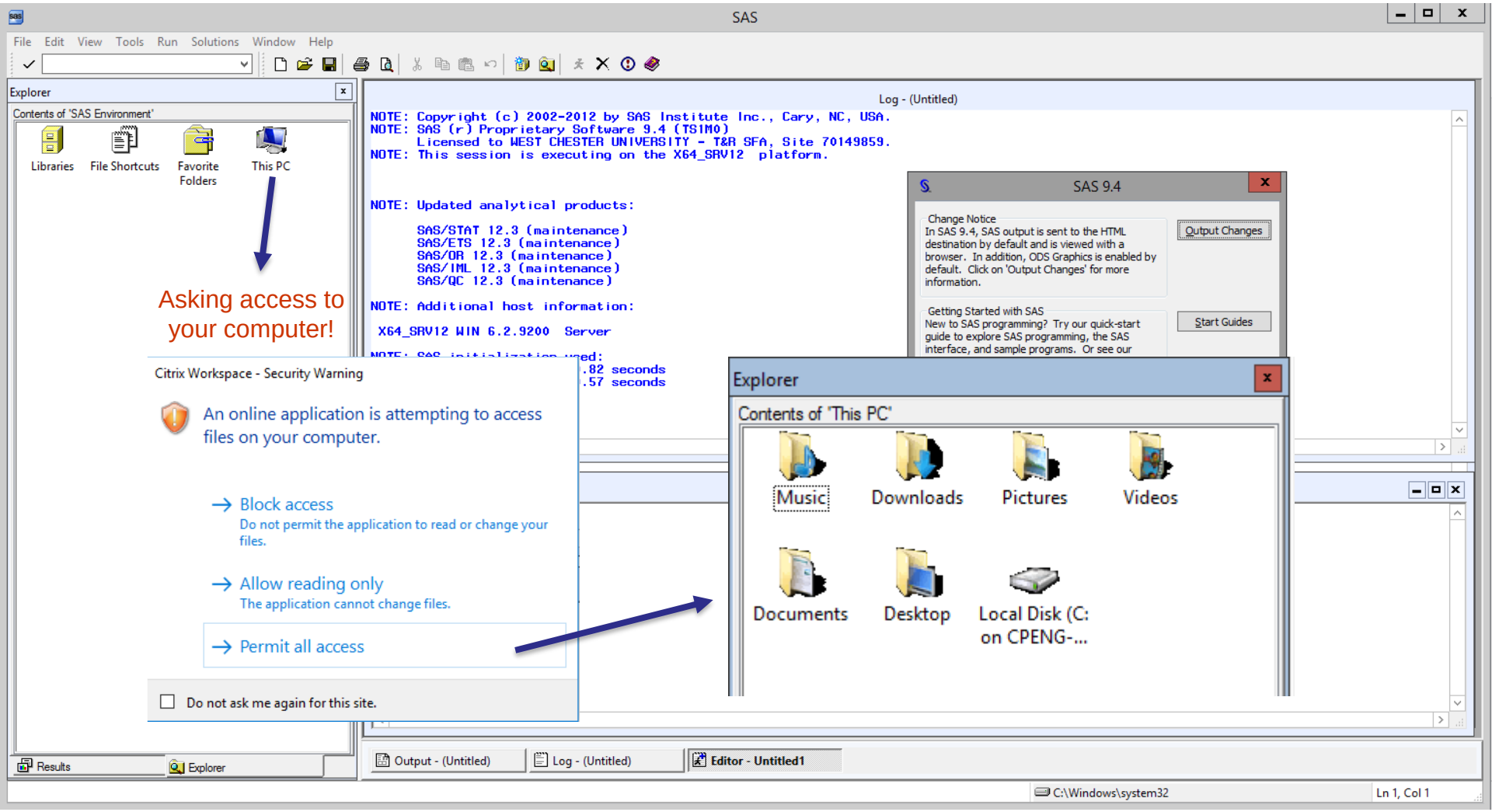
To open files saved locally,

select File > Open from within the application and then browse to your local drives.

Launch SAS



Launch SAS



SAS Windows

- **Log Window**: It is an execution window. Here, you can check the execution of your program. It also displays errors, warnings and notes.
- **Code Window**: This window is also known as editor window. Consider it as a blank paper or a notepad, where you can write your SAS code.
- **Output Window**: As the name suggests, this window displays the output of the program/ code which you write in the editor.
- **Result Window**: It is an index that list all the outputs of programs that are run in one session. Since it holds the results of a particular session, if you close the software and restart it, the result window will be empty.
- **Explore Window**: It holds the list of all the libraries in the system. You can also browse the system supported files here.

SAS Datasets and Variables

SAS Data Sets

SAS data sets are called as data files. Data files constitute of rows and columns. Rows hold observations and columns hold Variable names.

SAS Variables

SAS has two types of variables:

- **Numeric variables**: This is the default variable type. These variables are used in mathematical expressions.
- **Character variables**: Character variables are used for values that are not used in mathematical expressions.

They are treated as text or strings. A variable becomes a character variable by adding a '$' sign at the end of the variable name.

SAS Code Structure

SAS programming is based on two building blocks

- **DATA Step**: The DATA step creates a SAS data set and then passes the data onto a PROC step
- **PROC Step**: The PROC step processes the data

A SAS program should follow below mentioned rules

- Almost every code will begin with either DATA or a PROC Step
- Every SAS statement ends with a semi colon
- A SAS step ends with either RUN or QUIT
- SAS codes are not case sensitive
- You can write a SAS statement across different lines or you can write multiple statements in one line

SAS Datasets and Variables

SAS Libraries

SAS library is a collection of SAS data files that are stored in the same folder or directory on your computer or other storage such as USB drive or a space in the cloud.

- **Temporary Library**: In this library, the data set gets deleted when the SAS session ends.

- **Permanent Library**: Data sets are saved permanently. Hence, they can be accessed in the future SAS sessions.

Users can also create or define a new library known as user defined libraries by using the keyword **LIBNAME**. These are also permanent libraries.

Your First Workable SAS Code "Hello World!"

Editor - Untitled1 *

```
/**********************************
      My First SAS Program
       Author: C. Peng
       Date:  08/22/2020
   Topics: 1. Data Step
           2. Procedure Step
**********************************/

/* Data Step: create a SAS dataset with one variable  */

DATA work.HelloWorld;    /* libname.datasetName */
 mylstSAScode = "Hello World";
RUN;

/* Procedure step: print out the SAS dataset */
PROC PRINT DATA = work.HelloWorld;
RUN;
```

Your First Workable SAS Code "Hello World!"

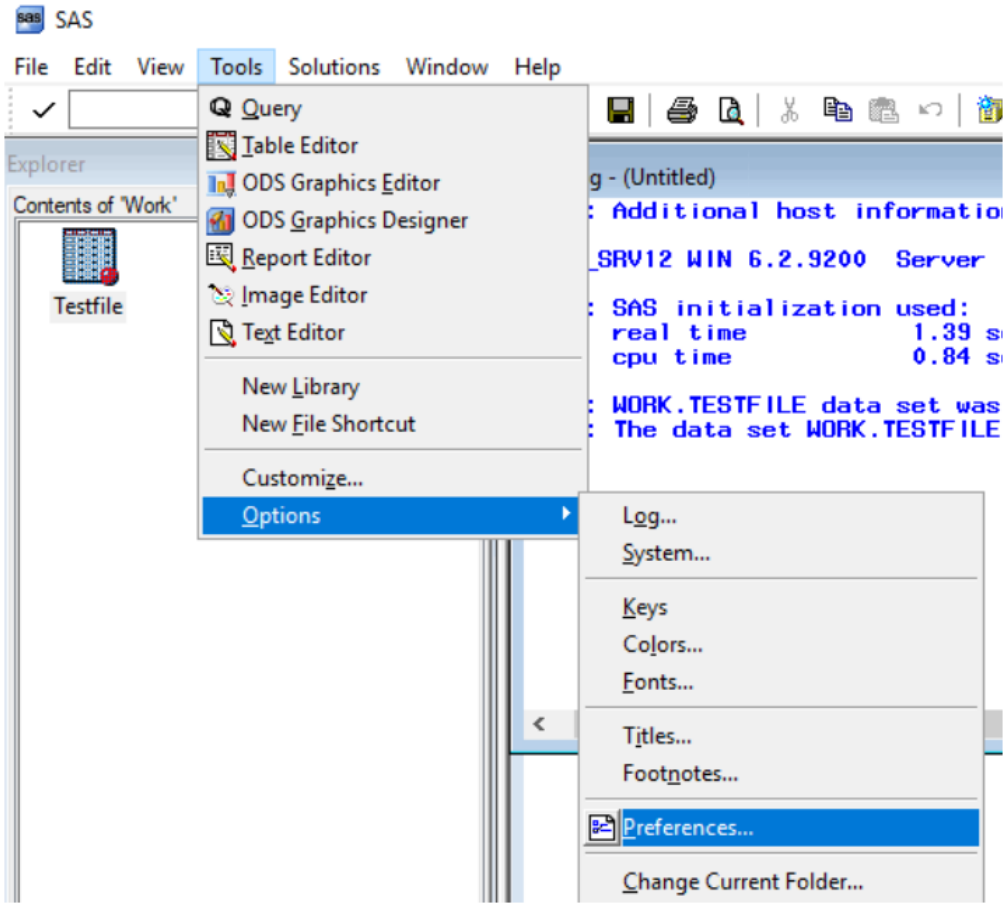
```
/**************************************
      My First SAS Program
       Author:  C. Peng
         Date:  08/22/2020
       Topics:  1. Data Step
                2. Procedure Step
**************************************/

/* Data Step: create a SAS dataset with one variable  */

DATA work.HelloWorld;    /* libname.datasetName */
 my1stSAScode = "Hello World";
RUN;

/* Procedure step: print out the SAS dataset */
PROC PRINT DATA = work.HelloWorld;
RUN;
```

Your First Workable SAS Code "Hello World!"


```
308  /*********************************
309        My First SAS Program
310         Author: C. Peng
311         Date:  08/22/2020
312     Topics: 1. Data Step
313             2. Procedure Step
314  *********************************/
315
316  /* Data Step: create a SAS dataset with one variable  */
317
318  DATA work.HelloWorld;   /* libname.datasetName */
319   my1stSAScode = "Hello World";
320  RUN;

NOTE: The data set WORK.HELLOWORLD has 1 observations and 1 variables.
NOTE: DATA statement used (Total process time):
      real time           0.03 seconds
      cpu time            0.01 seconds


321
322  /* Procedure step: print out the SAS dataset */
323  PROC PRINT DATA = work.HelloWorld;
324  RUN;

NOTE: There were 1 observations read from the data set WORK.HELLOWORLD.
NOTE: PROCEDURE PRINT used (Total process time):
      real time           0.04 seconds
      cpu time            0.00 seconds
```

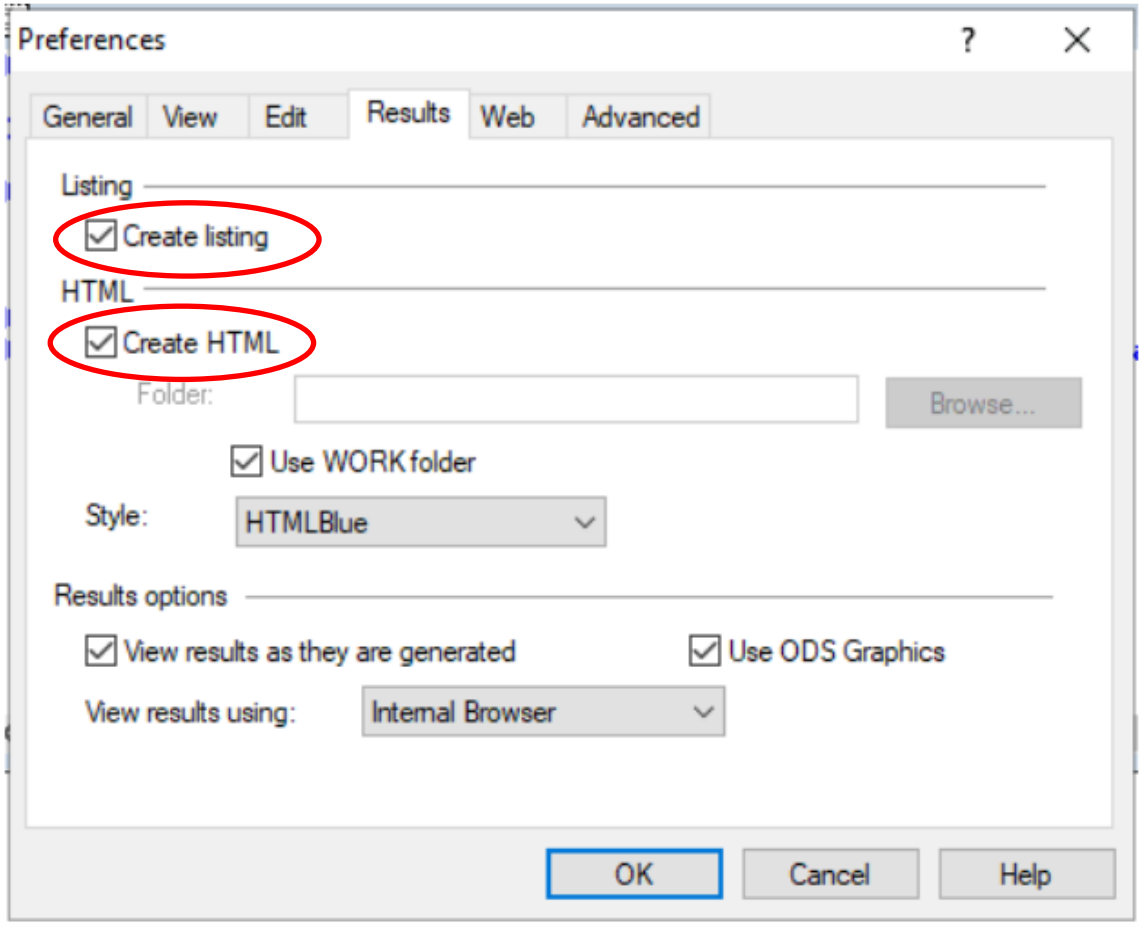
Your First Workable SAS Code "Hello World!"

Select Output Formats: HTML and Listing



Your First Workable SAS Code "Hello World!"

Select Output Formats: HTML and Listing



Your First Workable SAS Code "Hello World!"

Listing Output

Interested in exploring more features of SAS window environment?