Udacity Cybersecurity Course #1 Project

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Learning Objectives:

- Explain security fundamentals including core security principles, critical security controls, and cybersecurity best practices.
- Evaluate specific security techniques used to administer a system that meets industry standards and core controls
- Assess high-level risks, vulnerabilities and attack vectors of a sample system
- Explain methods for establishing and maintaining the security of a network, computing environment, and application.

Student Information

Student Name: Anas Rummani

Date of completion: 13 – Oct - 2022

Scenario

Congratulations!

You have been hired to secure the PC used at your friend's business: Joe's Auto Body. Joe provides car repair services throughout the tri-state area. He's had previous employees use it for activities un-related to work (e.g., web browsing, personal email, social media, games, etc.) and he now uses it to store his critical business information. He suspects that others may have broken into it and may be using it to transfer files across the internet. He has asked that you secure it for him according to industry best practices, so it can be once again used as a standard PC.

You will be given access to a virtual image of Joe's Auto Body's PC. It's a copy of the actual computer operating system in use that will be transferred to Joe's computer once you are done.

This template provides you with the high-level steps you'll need to take as part of securing a typical computer system. For each step, use the virtual Windows 10 PC to answer the questions and challenges listed in this project. You'll also need to explain how you got the answers and provide screenshots showing your work.

It's important that you read through the entire document before securing the system and completing this report.

To start, you need to login to the virtual PC. You can use Joe's account using the user-id and password below. You may also use any other account on the PC.

Account Name: JoesAuto
Password: @UdacityLearning#1

1. Reconnaissance

The first step in securing any system is to know what it is, what's on it, what it's used for and who uses it. That's the concept of systems reconnaissance and asset inventory. In this step, you'll document the hardware, software, user access, system and security services on the PC.

Complete each section below.

Hardware

1. *Fill in the following table with system information for Joe's PC.*

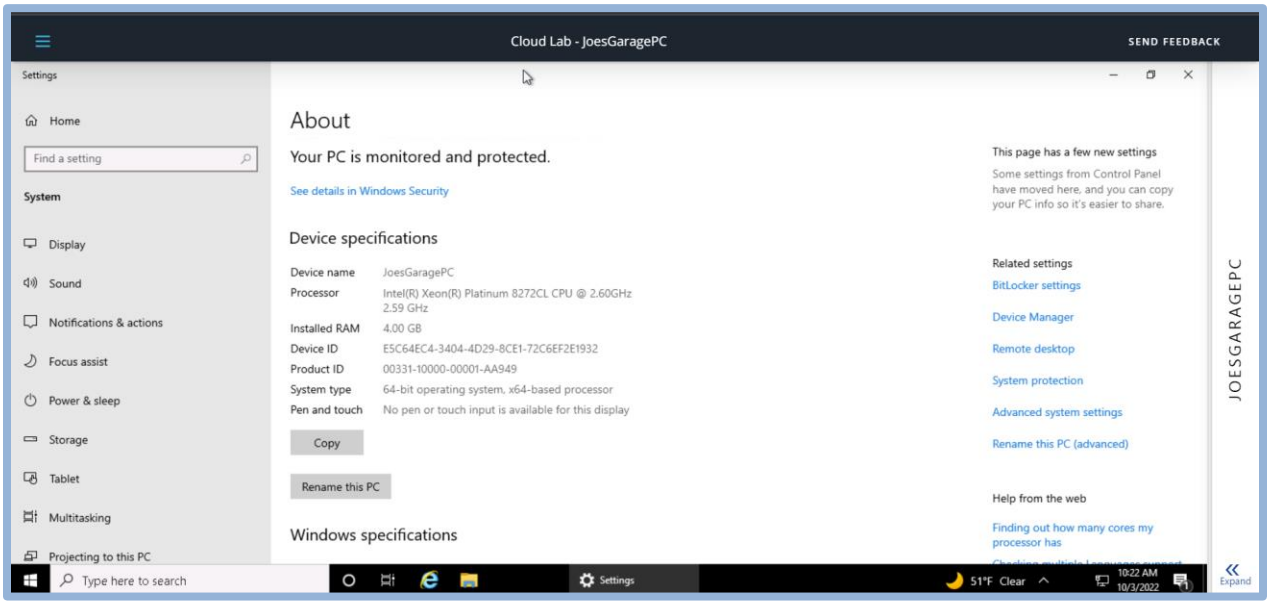
Device Name	JoesGaragePC
Processor	Intel(R) Xeon(R) Platinum 8272CL CPU @ 2.60 GHz 2.59GHz
Install RAM	4GB
System Type	64-bit operating system, x64-based processor
Windows Edition	Windows 10 Pro
Version	20H2
Installed on	11/23/2021
OS build	19042.1387

2. *Explain how you found this information:*

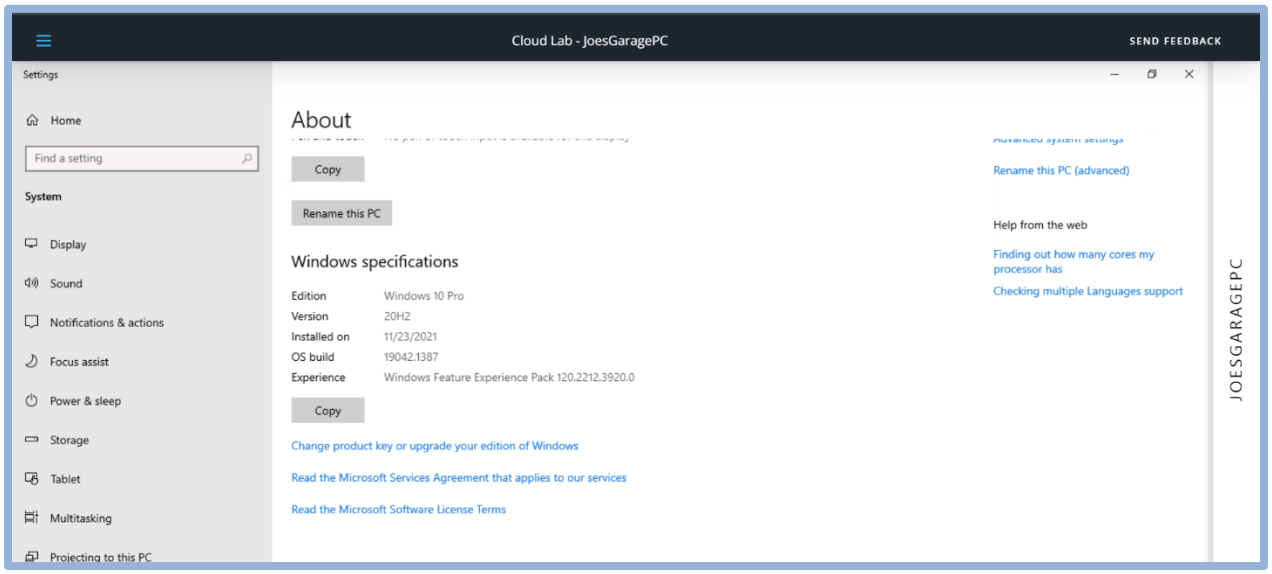
   A. Type "This PC" in the **search** bar.
   B. Select **properties** From the menu appears as a result of the search.
   C. Then "About" window opens, and it displays: **Device specifications + Windows specification**.

3. *Provide a screenshot showing this information about Joe's PC:*

Device Specifications:



Windows Specifications:



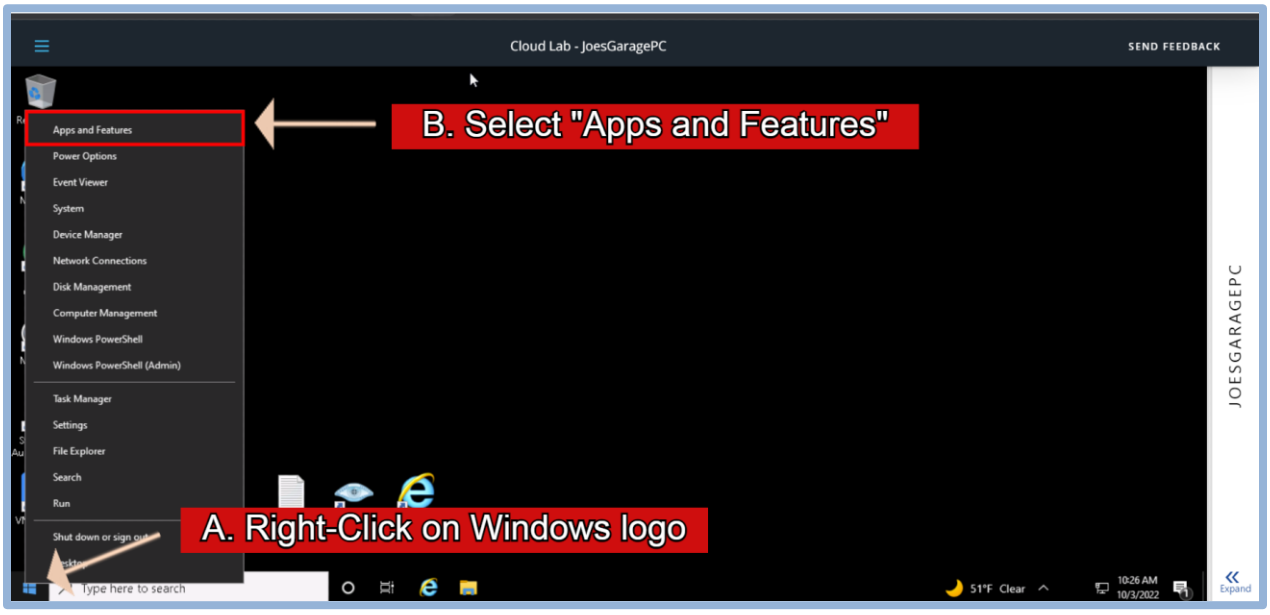
Software

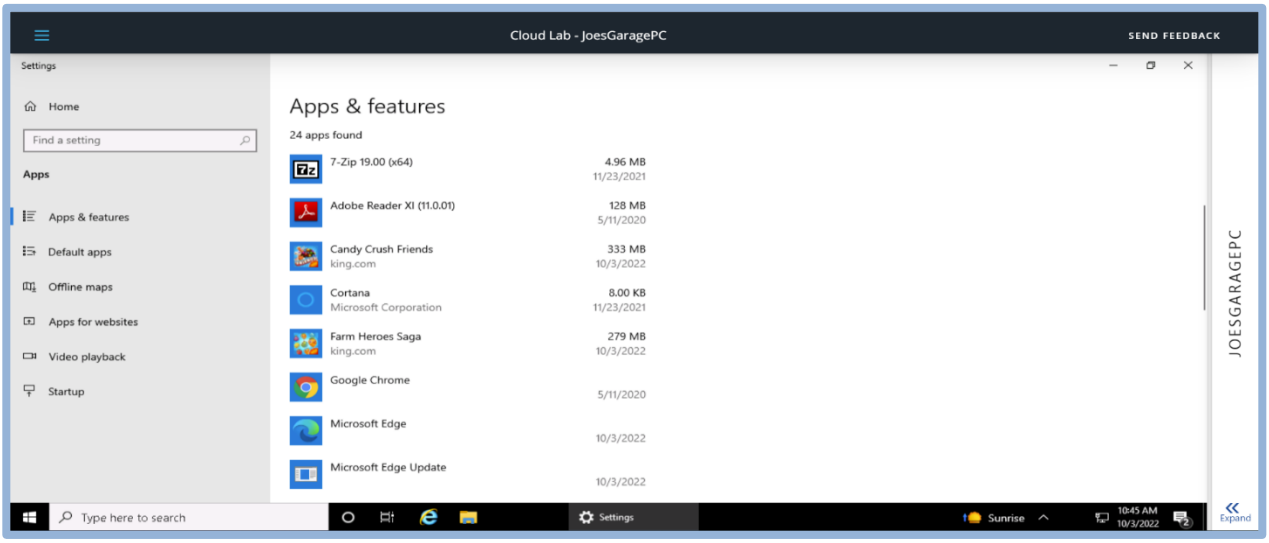
Another common early step in securing is taking an inventory of software or applications installed on a computer system. These are programs outside of the standard operating system.

1. *List at least 5 installed applications on Joe's computer:*

- Z-Zip 19.00 (x64)
- Adobe Reader XI (11.0.01)
- Candy Crush Friends
- Cortana
- Farm Heroes Saga

2. *Explain how you found this information. Provide screenshots showing this information.*
   A. Right-Click on Windows logo.
   B. Select "Apps and Features" From the list.





3. *The Center for Internet Security Controls lists this as one of their steps for security. Which step does this fulfill?*

   CIS Critical Security Control 2: Inventory and Control of Software Assets.

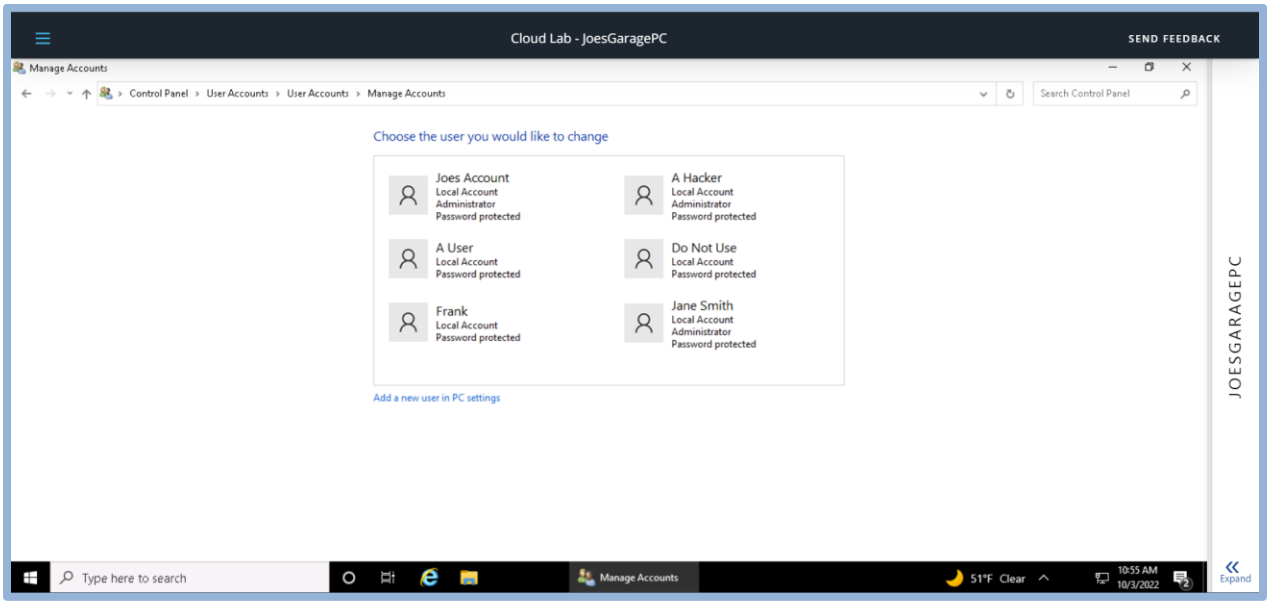
Accounts

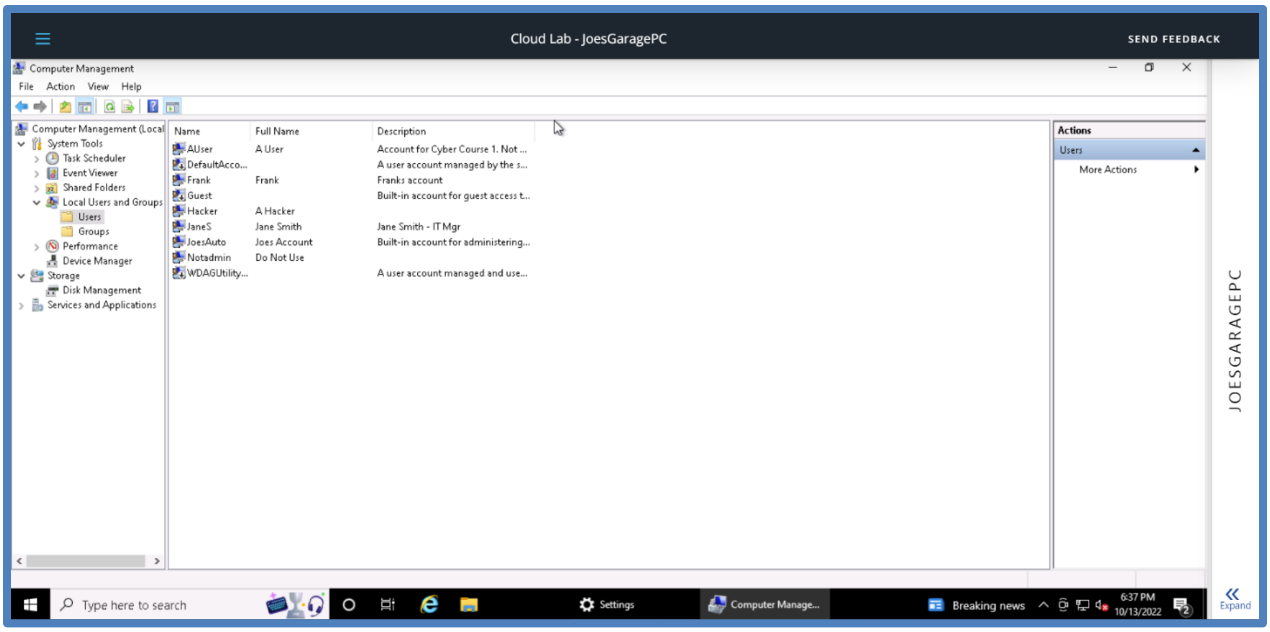
As part of your security assessment, you should know the user accounts that may access the PC.

1. *List the names of the accounts found on Joe's PC and their access level.*

Account Name	Full Name	Access Level
JoesAuto	Joes Account	Administrator
Hacker	A Hacker	Administrator
AUser	A User	Standard
Notadmin	So Not Use	Standard
Frank	Frank	Standard
JaneS	Jane Smith	Administrator

2. *Provide a screenshot of the Local Users.*

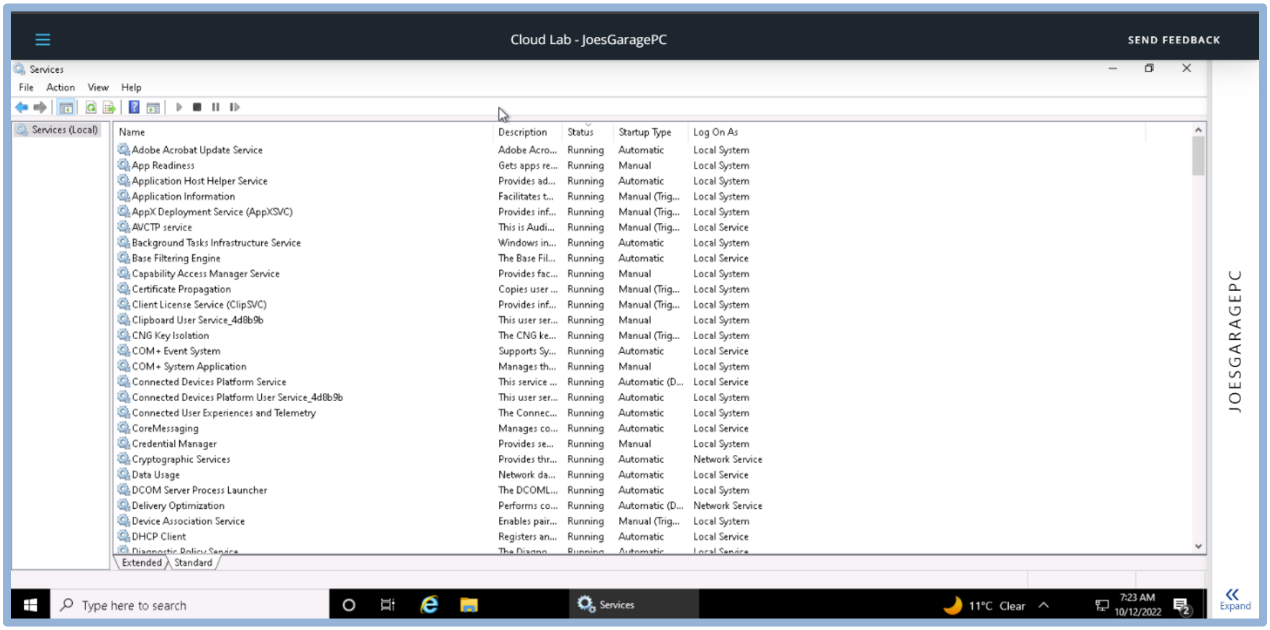


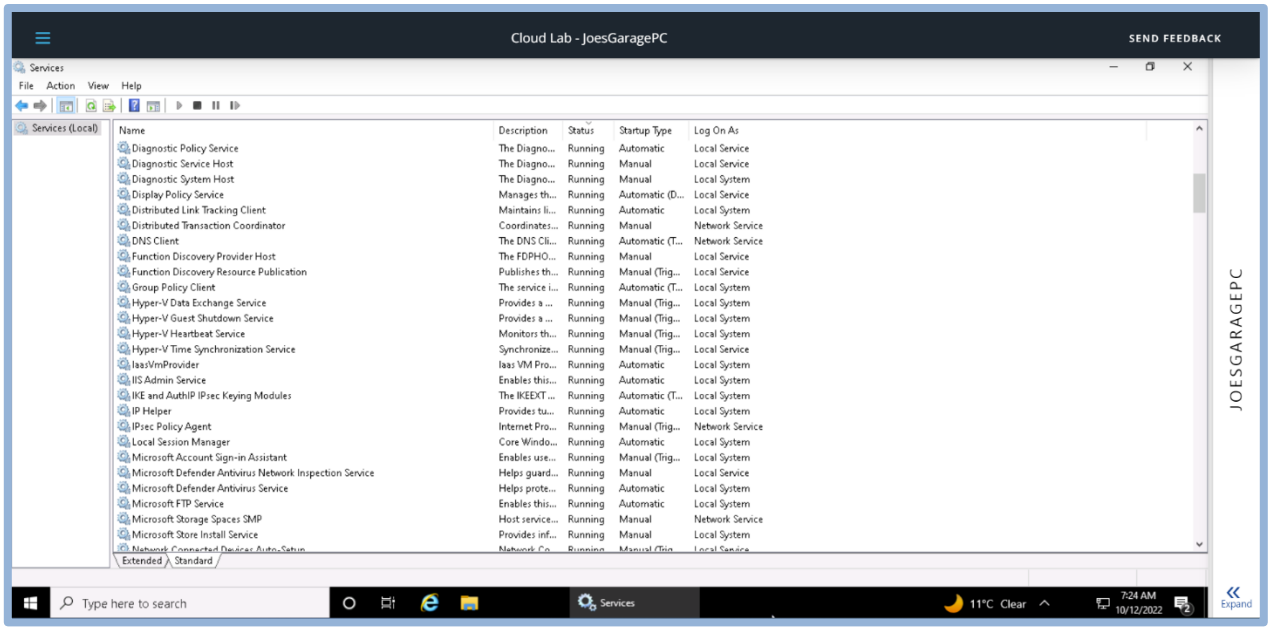


Services

Services are applications often running in the background. Most of them provide needed functionality for the PC. Some may also be used to violate security policies.

1. *Provide a screenshot of the services running on this PC.*

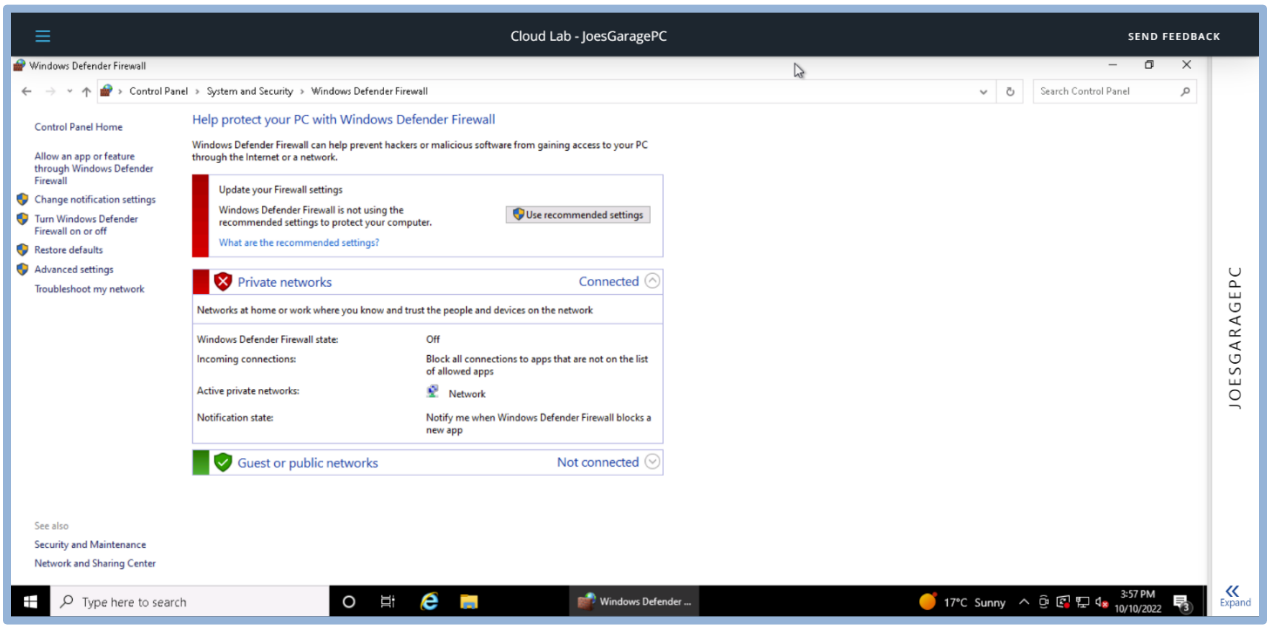


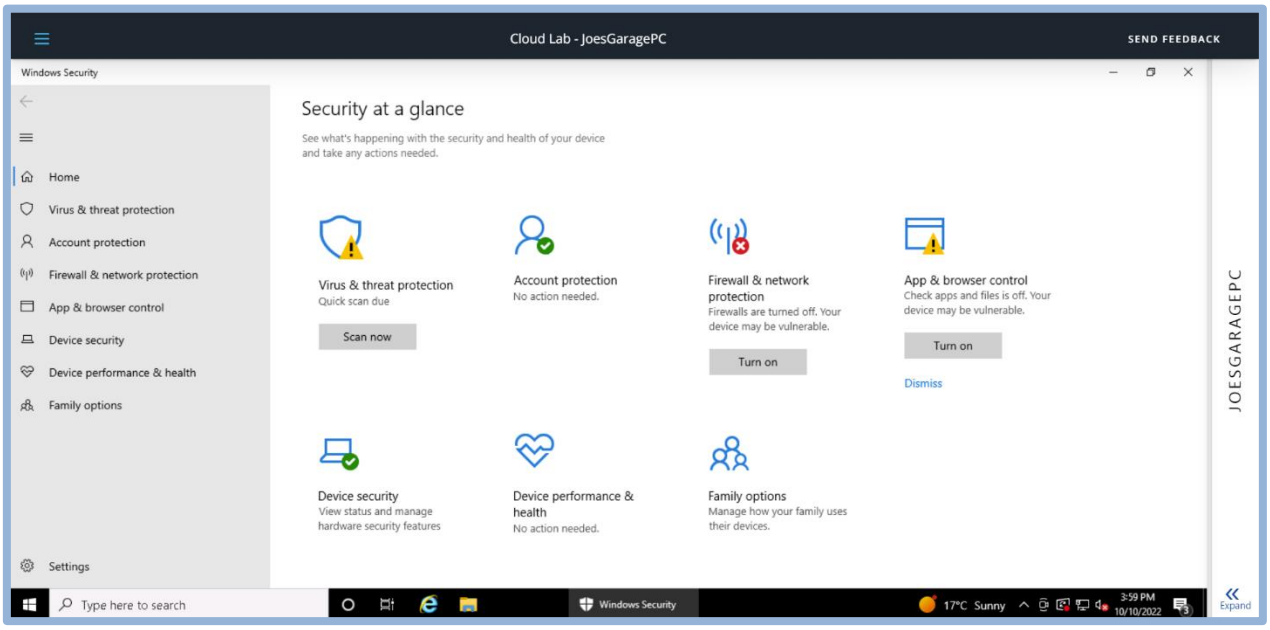


Security Services

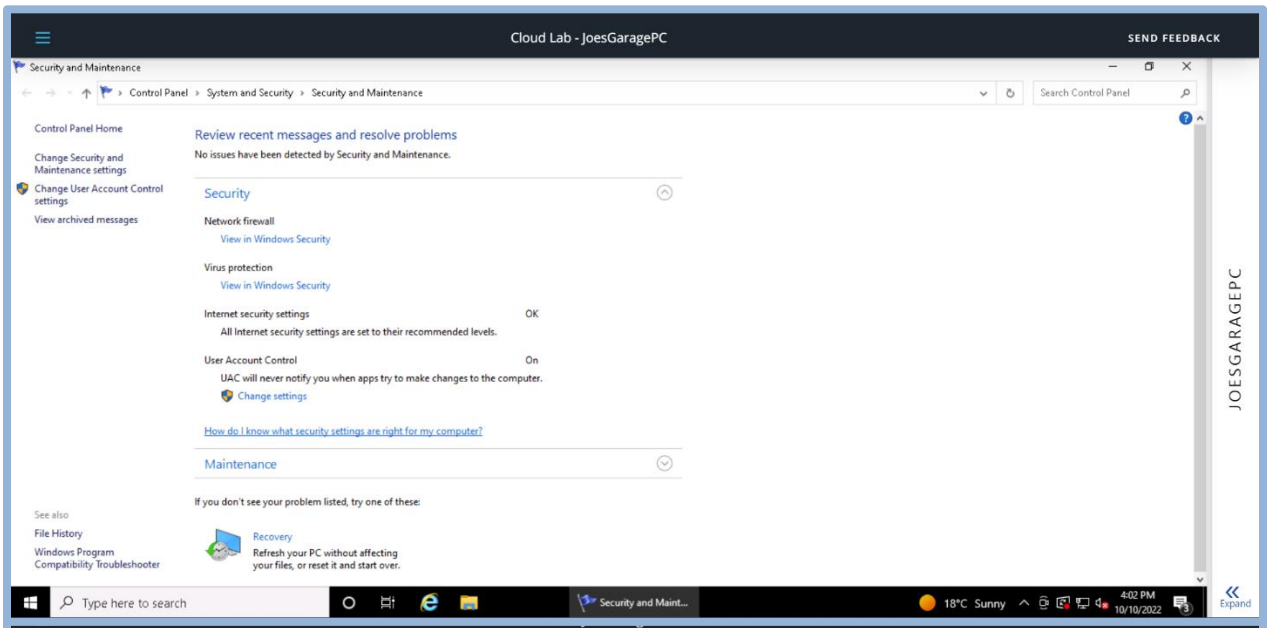
Joe wants to ensure that standard security services are running on his PC. He's content with using default Windows security settings and applications except for the rules outlined later. **Reminder that at this point you are just reporting what you observe. Do not make any changes to security settings yet.**

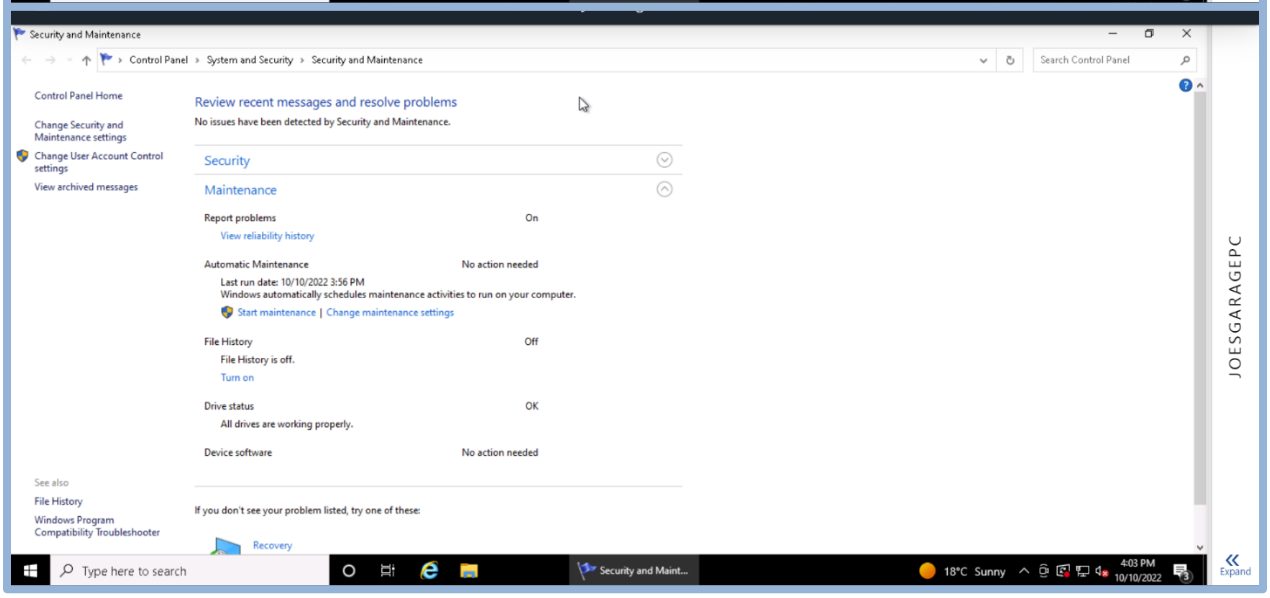
1. *To view a summary of security on Windows 10, start from the **Control Panel**. Use the "Find a setting" bar and search on Windows Defender. You can also search for Windows Defender using the Windows Run bar. Take a screenshot of what you see on the Windows Security screen and include it here:*



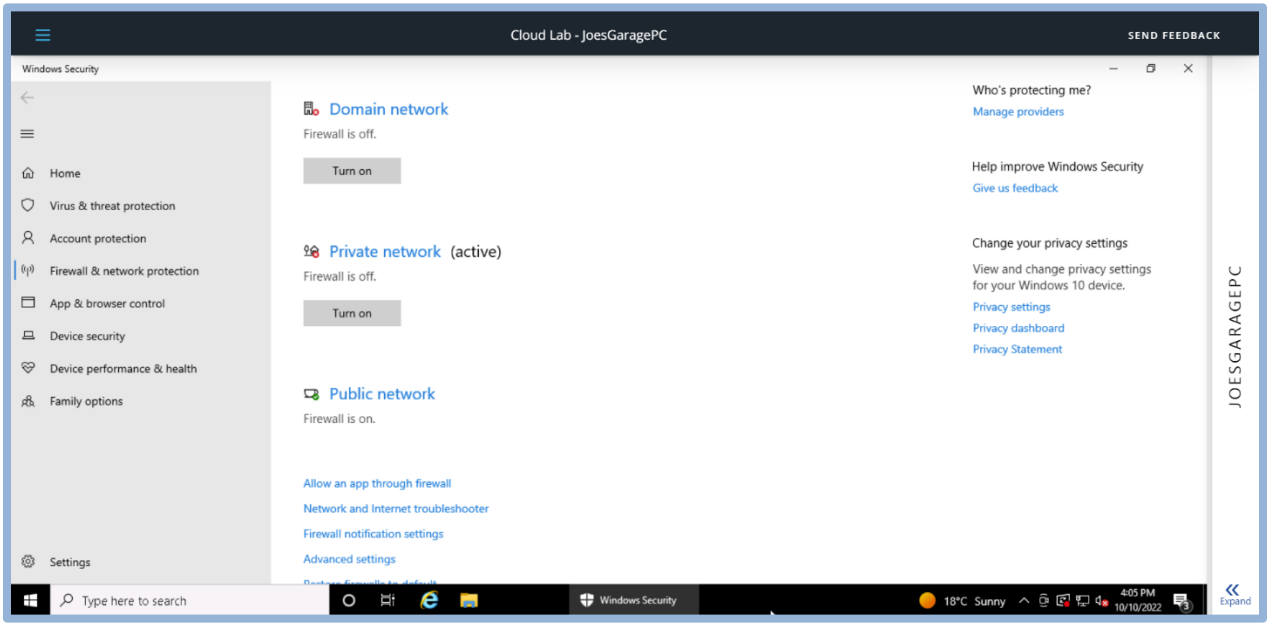


2. *The Windows 10 Security settings are also found from the* ***Control Panel > System and Security > Security and Maintenance****. Start by viewing* ***"Review your computer's status and resolve issues."*** *Provide a screenshot of this below:*

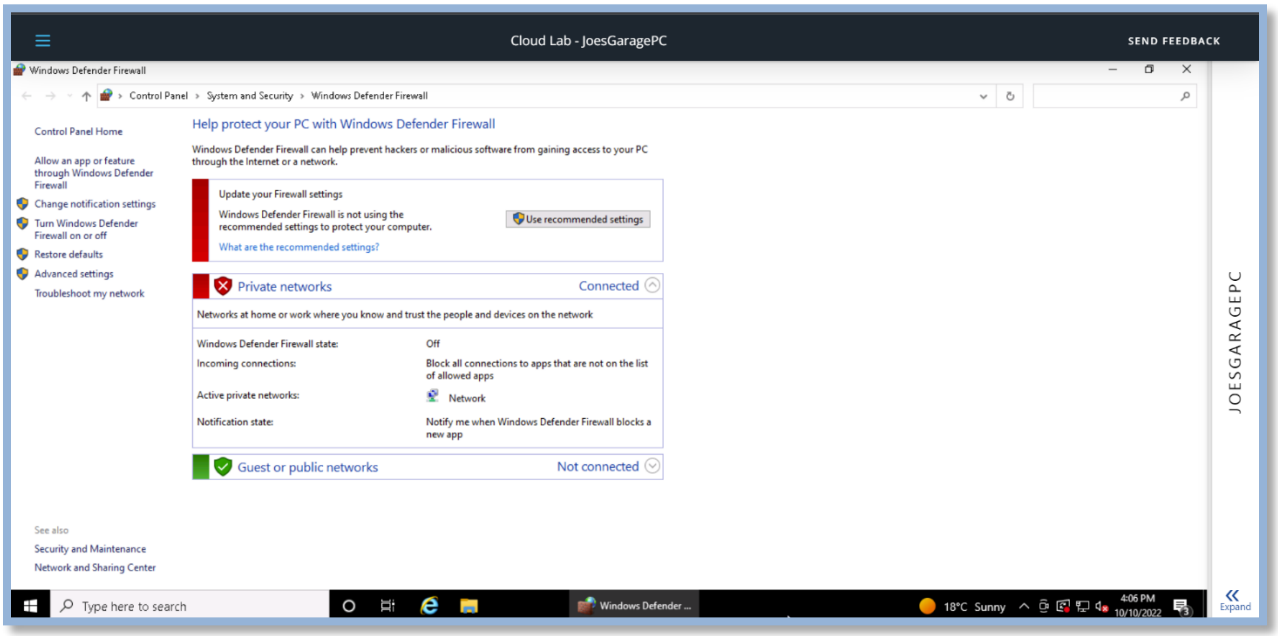




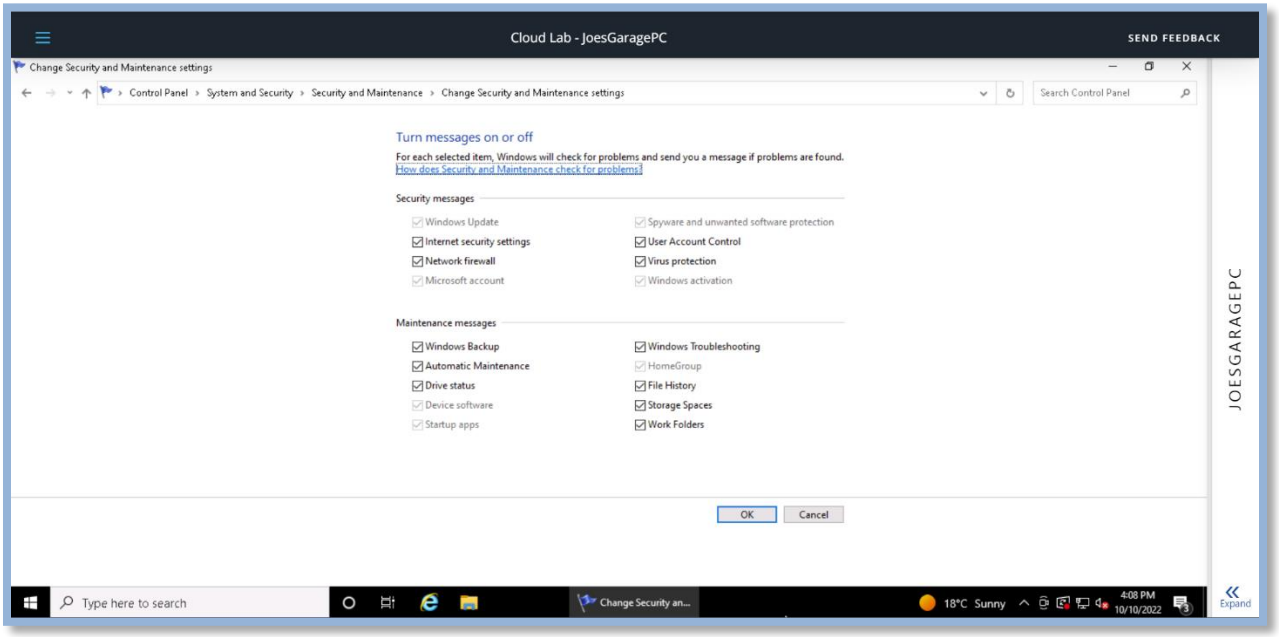
3. *Click on View in Windows Security to see the status there. Provide a screenshot of the **Firewall** settings.*



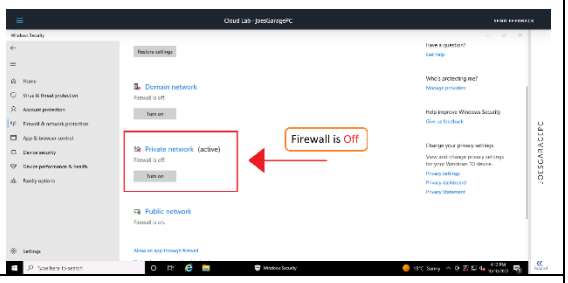
4. *From the **Control Panel**, go to **System and Security**. In that window, select **Windows Defender Firewall**. Provide a screenshot of it here:*

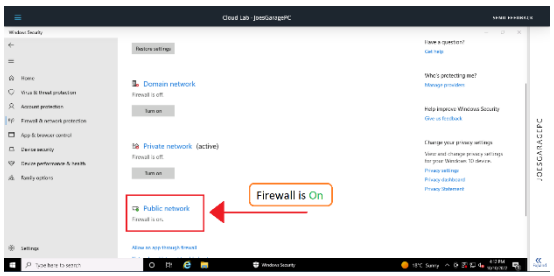


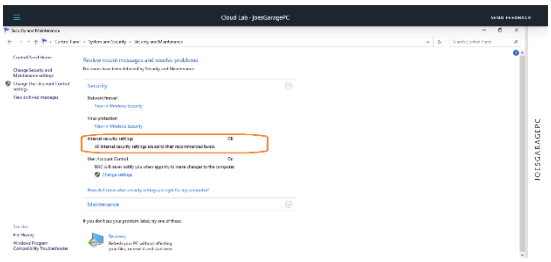
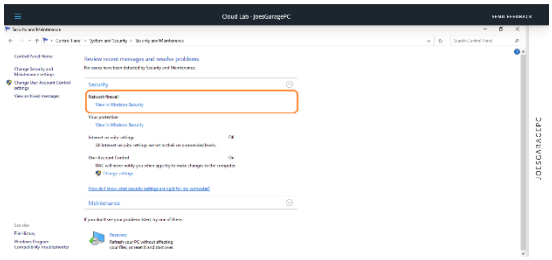
5. *PC users should be notified whenever there is a security or maintenance message. In the Security & Maintenance window, click on Change Security and Maintenance settings and take a screenshot. Paste it here:*

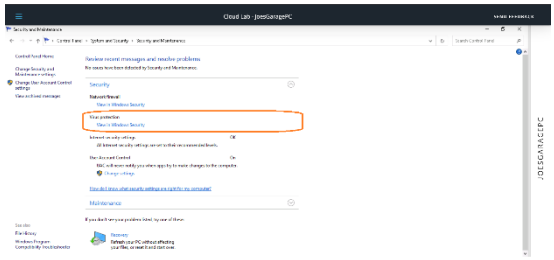
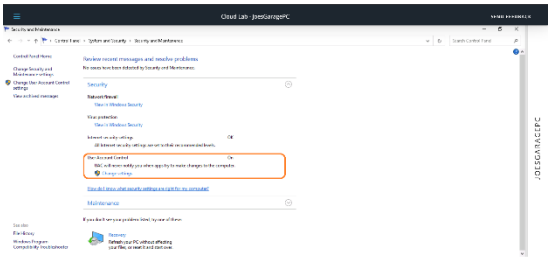


6. *Document the status of the PC's security settings listed below. Include the process you used to determine this information along with any screenshots. At this point, you are only documenting what you find. Do not make changes (yet).*

Security Feature	**Status**
Firewall product and status – Private network	A. **Status:** off B. **Steps:** Type "Windows security" in the search bar -> select **Windows Security** -> select **Firewall & Network Protection** from **Windows Security** window -> Scroll down to **Private Network** Status. C. **Screenshot:** 

Firewall product and status – Public network	A. **Status:** on B. **Steps:** Type "Windows security" in the search bar -> select **Windows Security** -> select **Firewall & Network Protection** from **Windows Security** window -> Scroll down to **Private Network** Status. C. **Screenshot:** 
Virus protection product and status	A. **Status:** on B. **Steps:** Type "Windows security" in the search bar -> select **Windows Security** -> select **Virus & Threat protection** from **Windows Security** window -> Scroll down and click on **Manage settings** from **Virus & Threat protection** window. C. **Screenshot:** 
Internet Security messages	A. **Status:** Ok B. **Steps:** Type "Control panel" in the search bar -> select **"Review your computer's status"** under System and Security from **Control Panel** window-> Click on the arrow from **Security** to the Settings.

	C. **Screenshot:** 
Network firewall messages	A. **Status:** Not Determined B. **Steps:** Type "Control panel" in the search bar -> select **"Review your computer's status"** under System and Security from **Control Panel** window-> Click on the arrow from **Security** to the Settings. C. **Screenshot:** 
Virus protection messages	A. **Status:** Not Determined B. **Steps:** Type "Control panel" in the search bar -> select **"Review your computer's status"** under System and Security from **Control Panel** window-> Click on the arrow from **Security** to the Settings.

	C. **Screenshot:** 
User Account Control Setting	A. **Status:** On B. **Steps:** Type "Control panel" in the search bar -> select **"Review your computer's status"** under System and Security from **Control Panel** window-> Click on the arrow from **Security** to the Settings. C. **Screenshot:** 

7. *Now that you are familiar with the security settings on Joe's PC, explain at least three vulnerabilities and risks with these settings. In other words, what can happen to Joe's PC if these are not changed?*
   [Hint: Refer to the CIS Controls document for ideas.]

- **Private Firewall** should turned on to prevent malicious traffic.
-
-

2. Securing the PC

Baselines

Joe has asked that you follow industry standards and baselines for security settings on this system.

1. *What industry standard should Joe use for setting security policies at his organization and justify your choice?*

2. *What industry baseline do you recommend to Joe?*
   [Hint: Look in the documents folder] ***CIS***

The System and Security functions in the Windows Control Panel are where you can establish the security settings for the PC. This is found from the Control Panel > System and Security > Security and Maintenance. On the Security and Maintenance window, you see a synopsis of the Windows 10 security settings.

3. Assume Joe uses the CIS as his baseline, what controls or steps does this meet?

System and Security

At this point, you need to enable security services for this PC. Pick at least 3 of the following 5 areas to secure in order to satisfactorily meeting the project requirements:

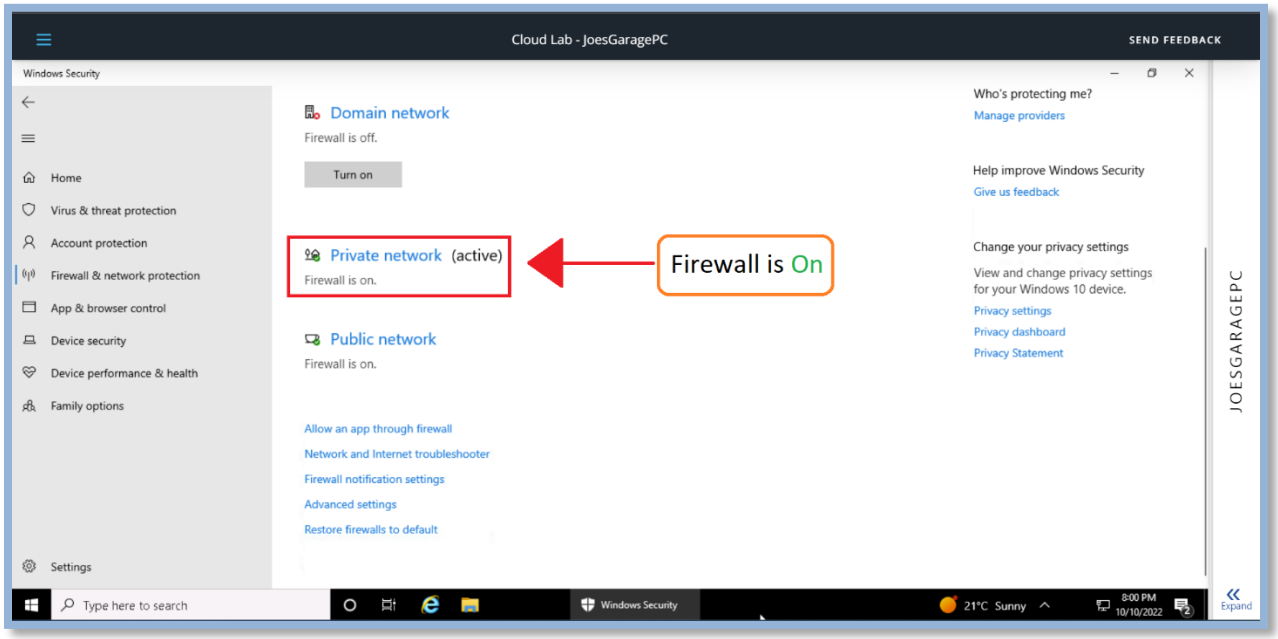
- Firewall
- Virus & Threat Protection
- App & Browser Control
- User Account Control settings
- Securing Removable Media

Firewall

You need to ensure the Windows Firewall is enabled for all network access.

1. *Explain the process you take to do this.*
   *Search for "Windows Security" using search bar -> Click on "Windows Security" App the appears as a result of the search -> Select "Firewall & Network protection" from "Windows Security" window -> under **Private network** click on "Turn on" Button.*

2. *Include screenshots showing the firewall is turned on.*



3. *What protection does this provide?*

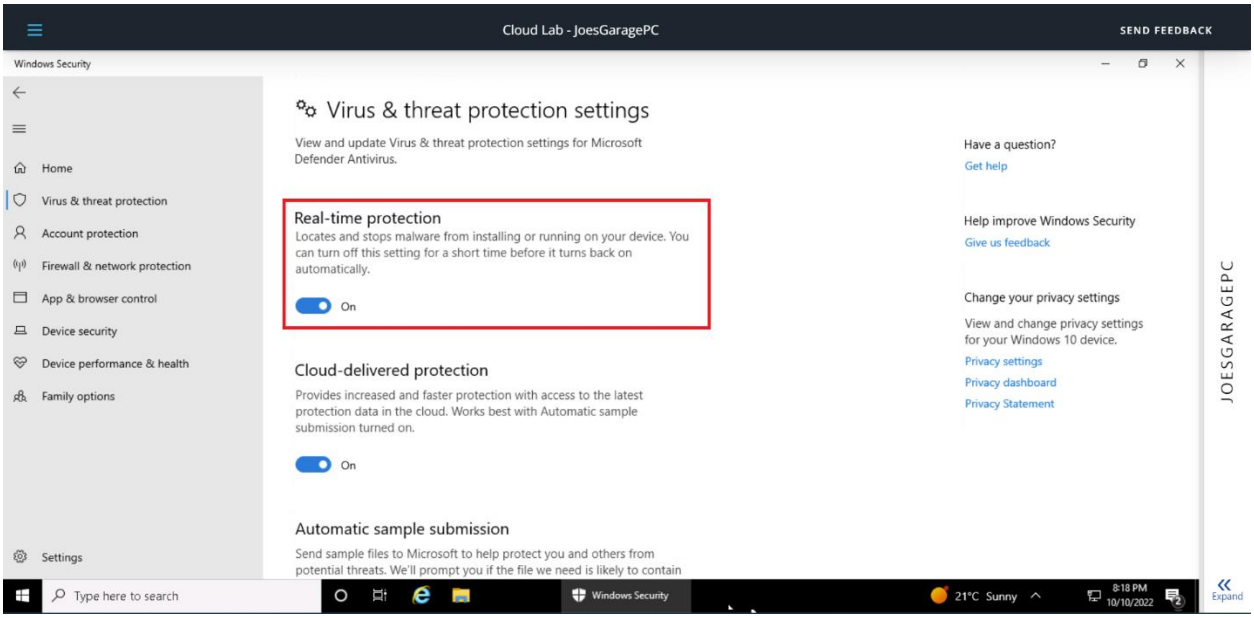
Blocks all connections to apps that are not on the list of allowed apps.

Virus & Threat Protection

You need to ensure the Windows Defender anti-virus is enabled to always protect against current threats. It should be set to automatically update and continually scan the PC for malicious software. Note: Ignore any alerts about setting up OneDrive.

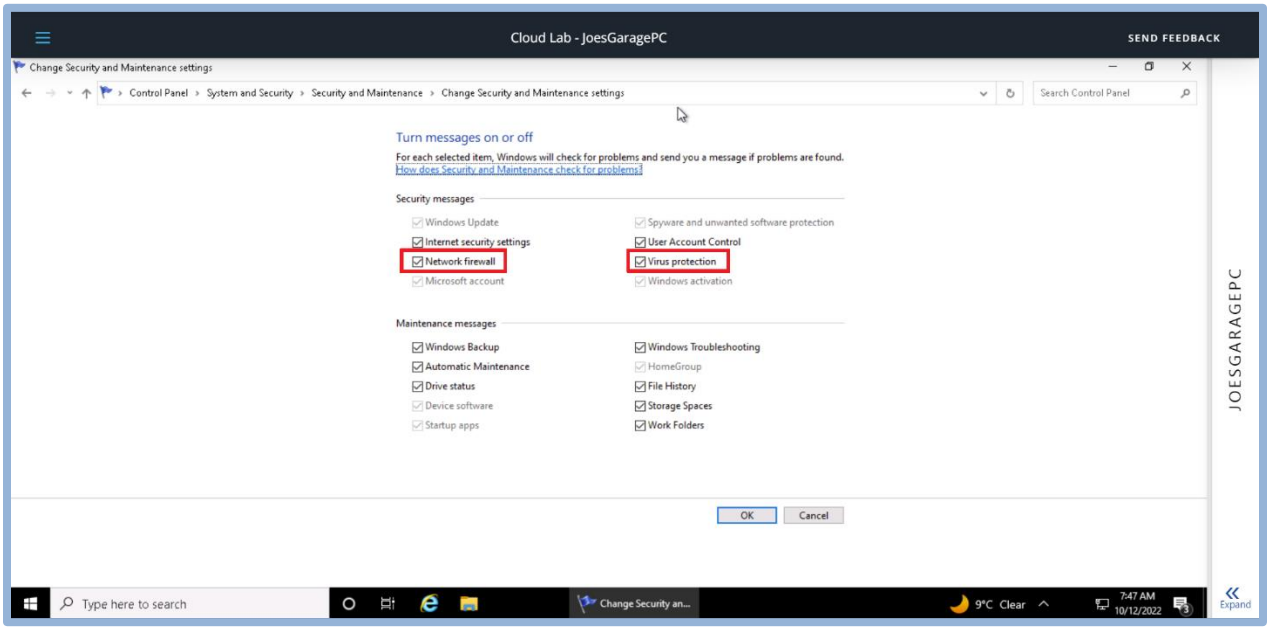
1. *Explain the process you take to do this.*
   *Search for "Windows Security" using search bar -> Click on "Windows Security" App the appears as a result of the search -> Select "Virus & threat protection" from "Windows Security" window -> under **Virus & threat protection settings** click on "Manage settings" -> under Real-Time protection switch it to "On".*

2. *Include screenshots to confirm that anti-virus is enabled.*



Once you determine that virus & threat protection is on and updated, you need to turn on messages about the Network firewall and Virus protection. Refer to the instructions above for viewing the settings within Security and Maintenance, Review recent messages and resolve problems.

1. *Turn on the Network firewall and Virus protection messages using Change Security and Maintenance Settings.*
2. *Show a screenshot here of them enabled.*



3. *Provide at least two risks mitigated by enabling these security settings:*

-
-

4. *From the CIS baseline controls, provide the controls satisfied by completing this.*

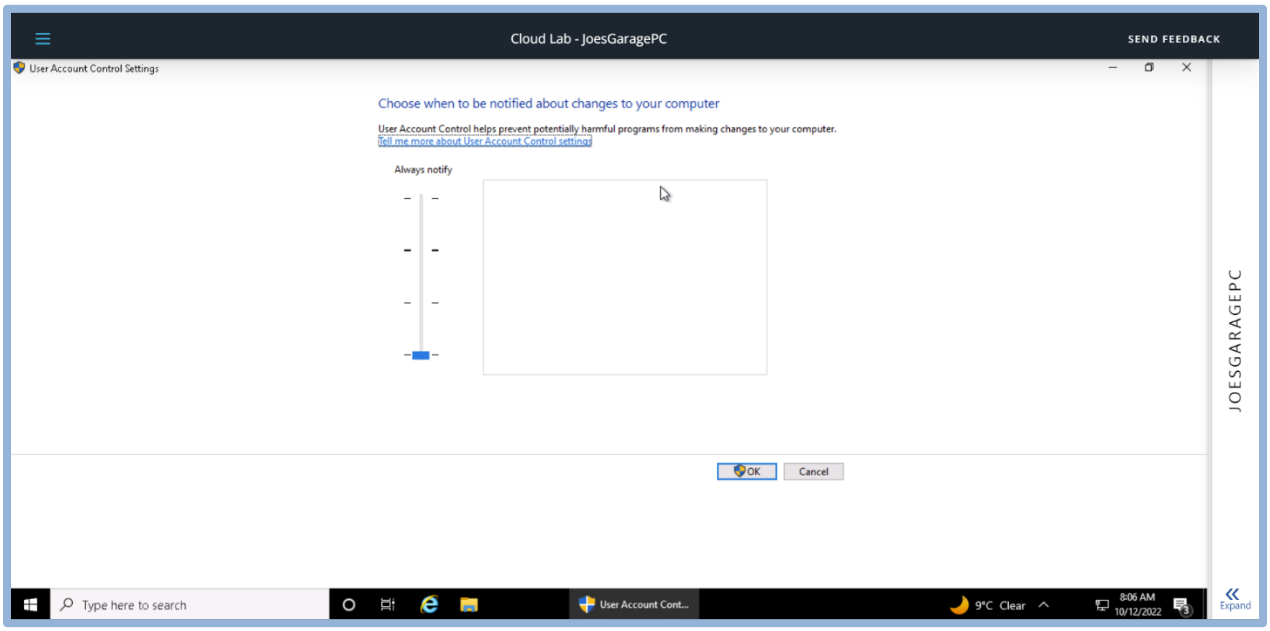
   CIS Critical Security Control 10: Malware Defenses

User Account Control Settings

Joe wants to prevent potentially harmful programs from making changes and wants to be notified whenever apps try to make changes to his computer. This is done through the User Account Control Setting.

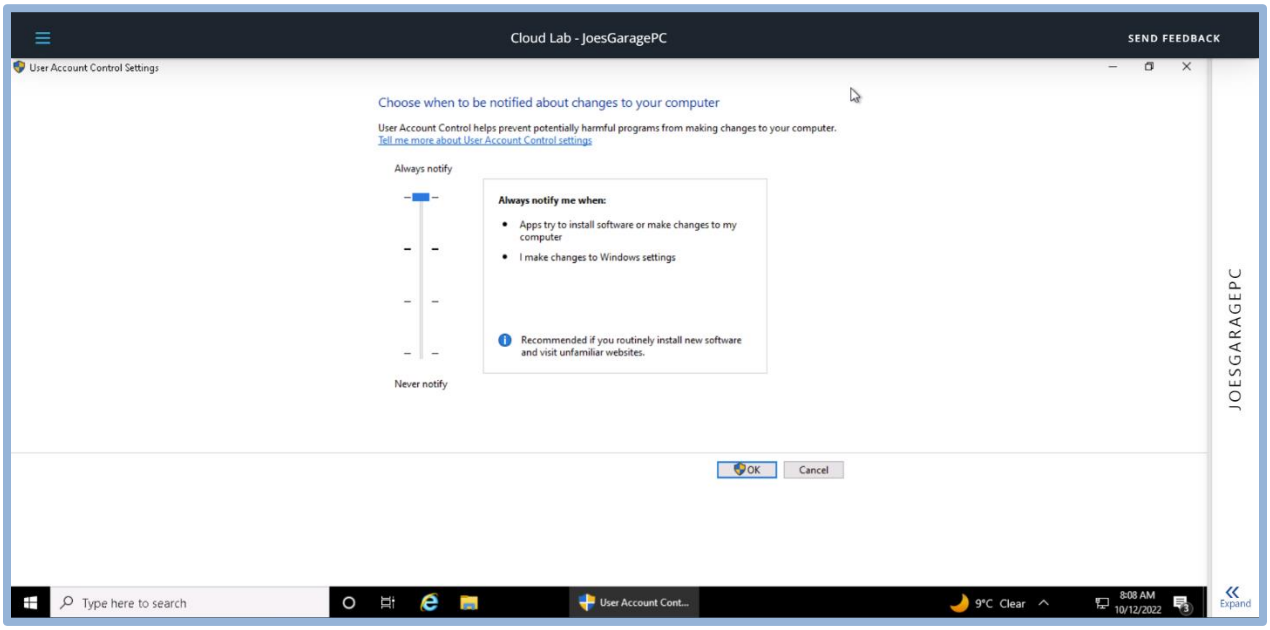
1. *What is the current UAC setting on Joe's computer?*

   This is available from the above security settings.
   Never Notify.



2. *What should it be set to? Include a screenshot of the new setting.*

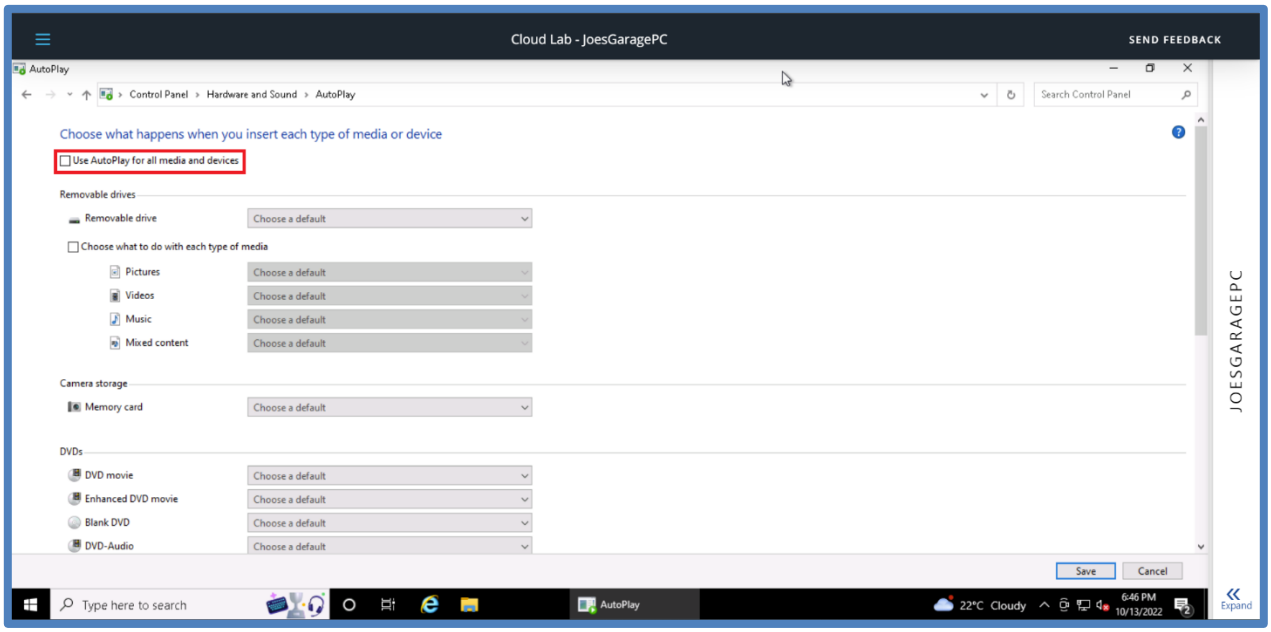
Always Notify.



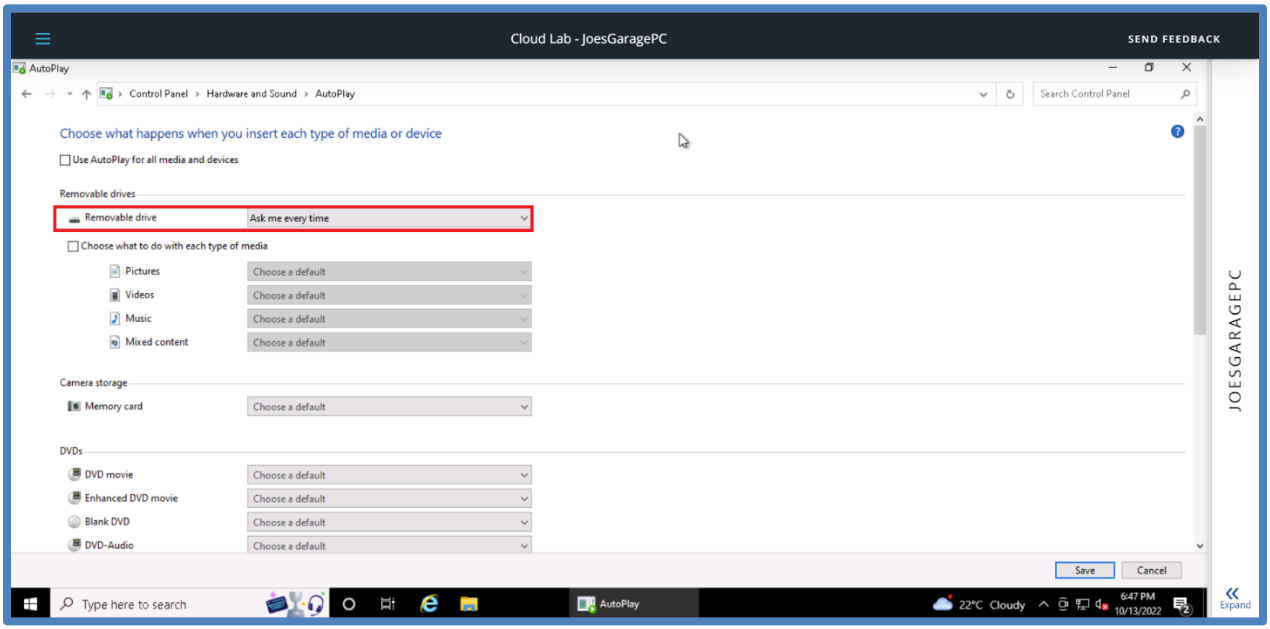
Securing Removable Media

A security best practice is to not allow the use of removable hard drives (USB sticks, Memory Cards, and DVDs). They are needed as part of Joe's backup policy. The next best thing is to make sure that any applications don't automatically start when the media is inserted and the user is asked what should happen. This is set from the Control Panel > Hardware and Sound > Autoplay menu.

1. *On Joe's computer, go to that function and deselect "Use AutoPlay for all media and devices."*



2. *For the Removable Drive, make the default, "Ask me every time." Include a screenshot of your results.*



3. Securing Access

Ensuring only specific people have access on a computer system is a common step in information security. It starts by understanding who should have access and the rules or policies that need to be followed.

On Joe's computer, only the following accounts should be in use:

- JoesAuto
- Jane Smith (Joe's assistant)
- A User - Used for exercises (Not used in this project)
- Notadmin - Built-in administrator account (Not used for this project)
- Windows built-in accounts: Guest, DefaultAccount, and WDAGUtility (Not used for this project)

Joe's Auto Access Rules:

- Only JoesAuto and A User should have administrative privileges on this PC.
- Joe wants to prevent potentially harmful programs from making changes and wants to be notified whenever apps try to make changes to his computer.
- All valid users should have a password following Joe's password policy below
    - At least 8 characters
    - Complexity enabled
    - Changed every 120 days
    - Cannot be the same as the previous 5 passwords
- Account should be automatically disabled after 5 unsuccessful login attempts. The account should be locked for 15 minutes and then should automatically unlock.
- Upon first logging into the PC, Joe wants a warning banner letting anyone using to know that this is to only be used for work at Joe's Auto Body shop by authorized people.
- There is to be no remote access to this computer.

User Accounts

1. *What user accounts should not be there?*
   Frank & Hacker.
2. *Bonus questions: What is Hacker's password?*

3. *Explain the steps you take to disable or remove unwanted accounts.*
   Type "Control Panel" in the search bar -> select "User Accounts" -> select "Remove user accounts" -> Select the Account you want to delete "a Hacker for example" -> Select "Delete the account" -> There are two choices "Delete Files" or "Keep Files".

4. *Why is it important to disable or remove unneeded accounts from a PC or application? Include potential vulnerabilities and risks.*

   Because Each one of these accounts offers a malicious actor an opportunity to gain access to resources.

   Potential vulnerabilities and Risks:

   unauthorized access.

   Data being misused.

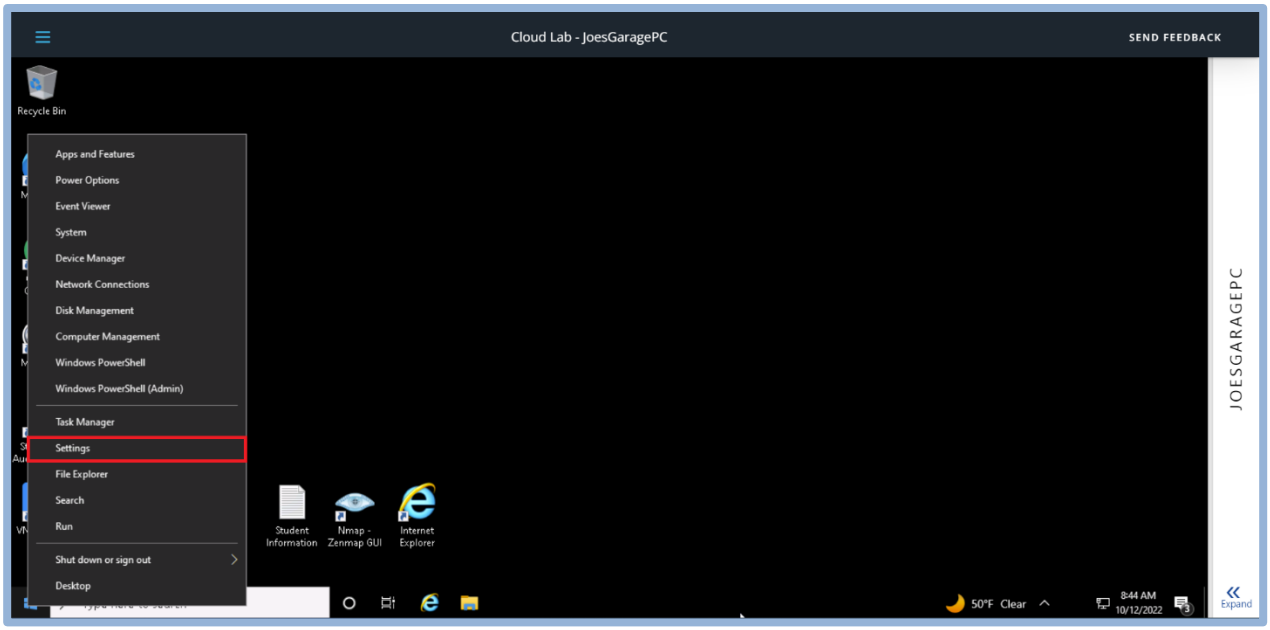
Only specific accounts should have administrator privileges. This reduces the ability for unwanted applications to be installed including malware.

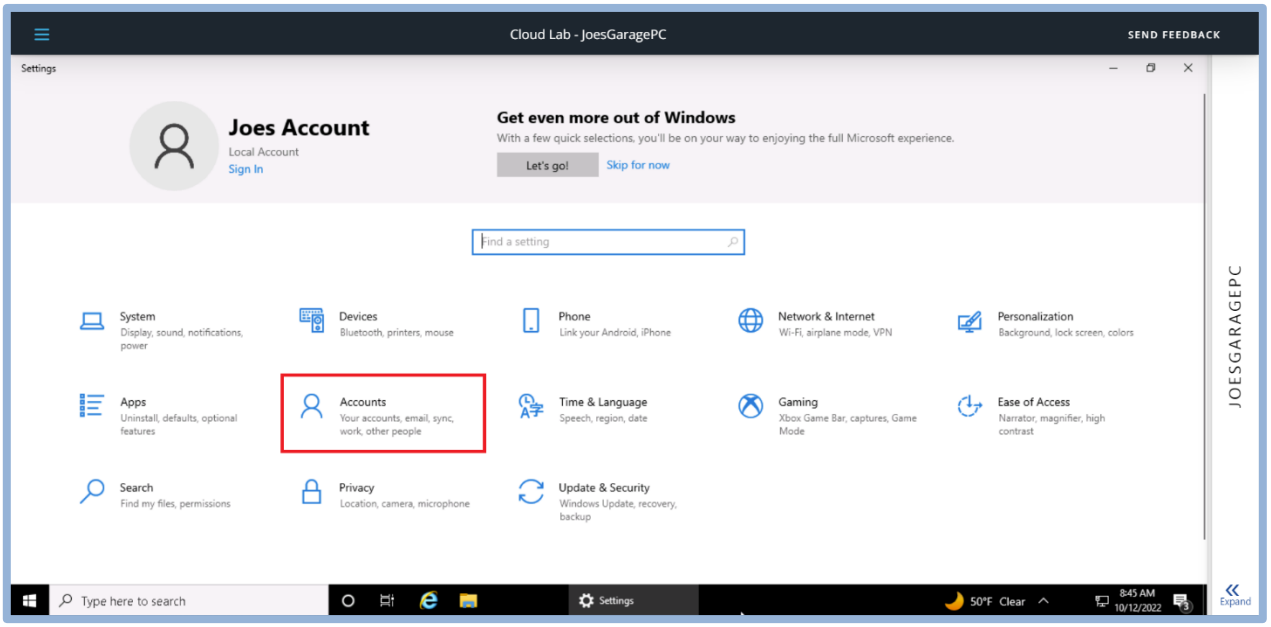
5. Which account(s) have administrator rights that shouldn't?
   A Hacker & Jane Smith.

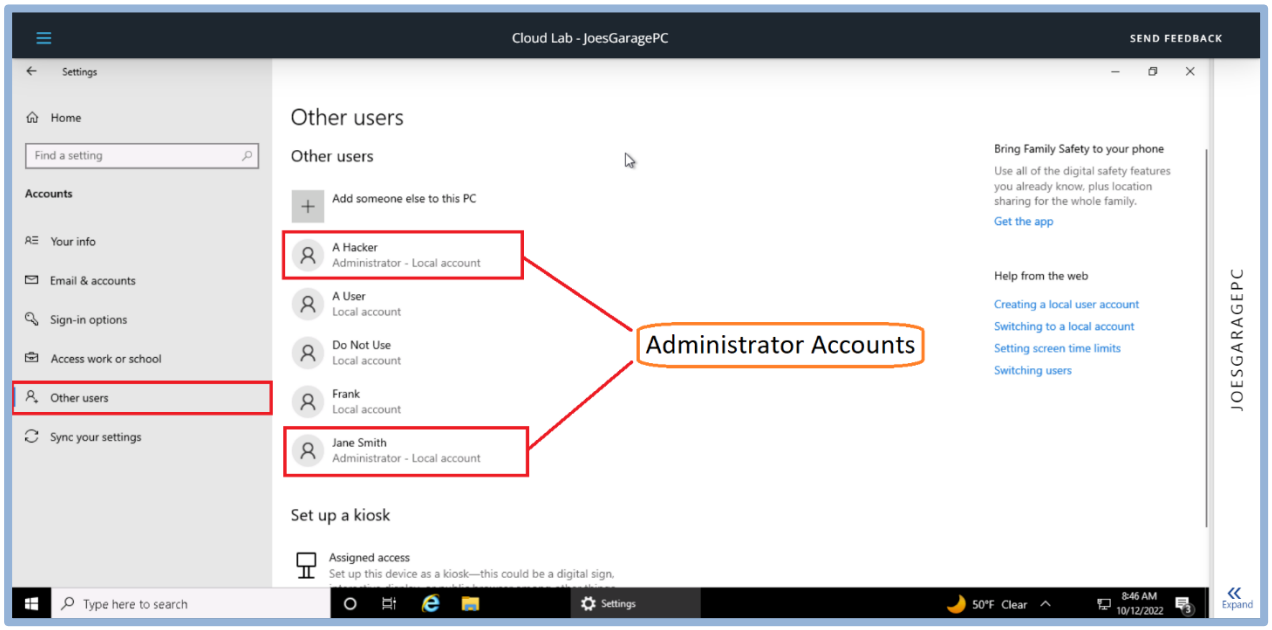
6. Explain how you determined this. Provide screenshots as needed.

   Right-Click on "Windows logo" and select "settings" -> Select "Accounts" -> Select "Other users"

   -> List of "Users" with "Account Type" appears.







Administrator privileges for too many users are another security challenge.

7. Provide at least three risks associated with users having administrator rights on a PC.

- Inactive accounts with administrative privileges could be used a platform attackers to gain access to your Active Directory
- The ability of Installing a harmful and malicious applications.
- The ability of removing a legitimate user and that user's files.

Now you need to remove administrator privileges for any user(s) that should have it.

8. *Explain the process for doing this. Include screenshots to show your work.*
   *Right-Click on "Windows logo" and select "settings" -> Select "Accounts" -> Select "Other users" -> Click on user who want to change its privilege -> Select "Change account type" -> Change account type from **Administrator** to **Standard**.*

9. *What is the security principle behind this?*
   Principle of Least Privilege.

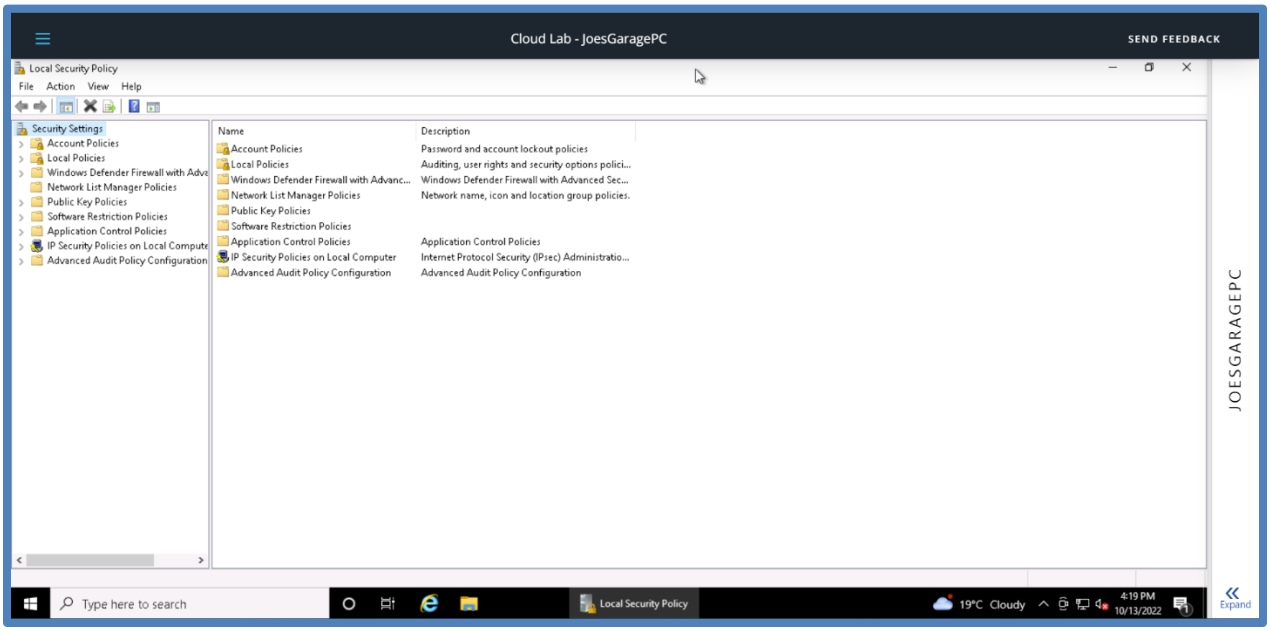
10. The Center for Internet Security Controls lists this as one of their steps for security. Which step does this fulfill?

    CIS Control 6: Access Control Management.

Setting Access and Authentication Policies

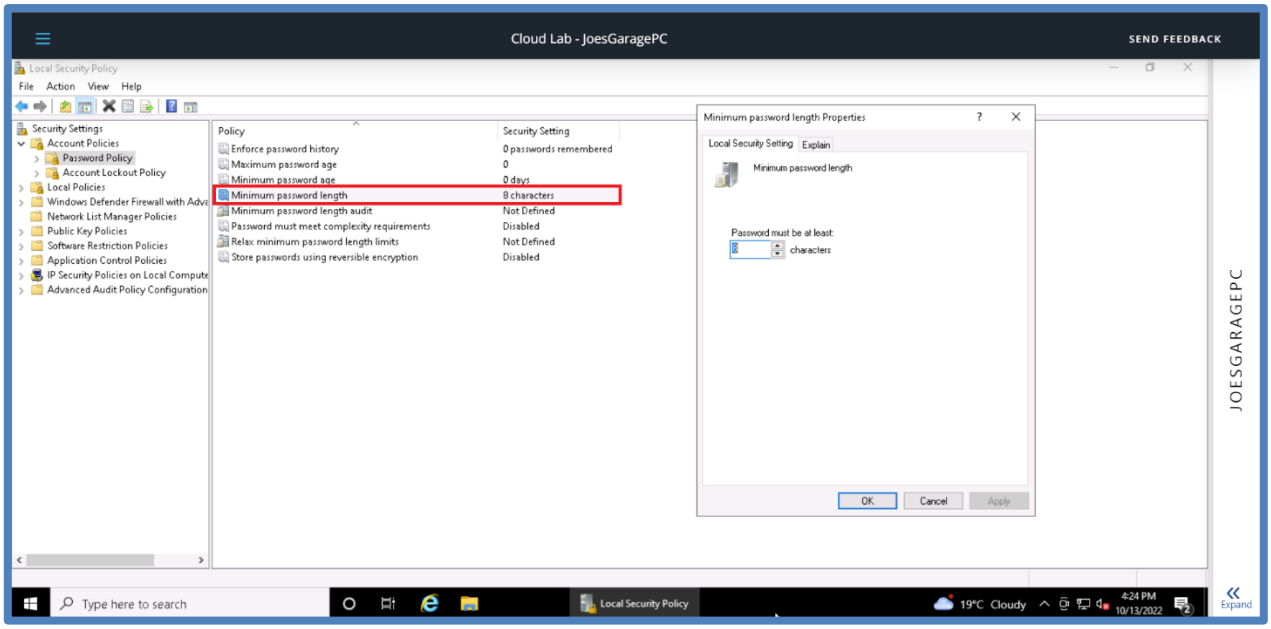
After you talked with Joe about security, he has asked that the access rules outlined above be in place on his PC. These are set using the Local Security Policy function in Windows 10. On the Windows search bar, type "*Local Security Policy*" to access it. Click the > arrow next to both "*Account Policies*" and "*Local Policies*" and review their contents.

1. *Provide a screenshot of the Local Security Policy window here.*
   [Note: Local Security Policy is not available on Windows 10 Home edition.]

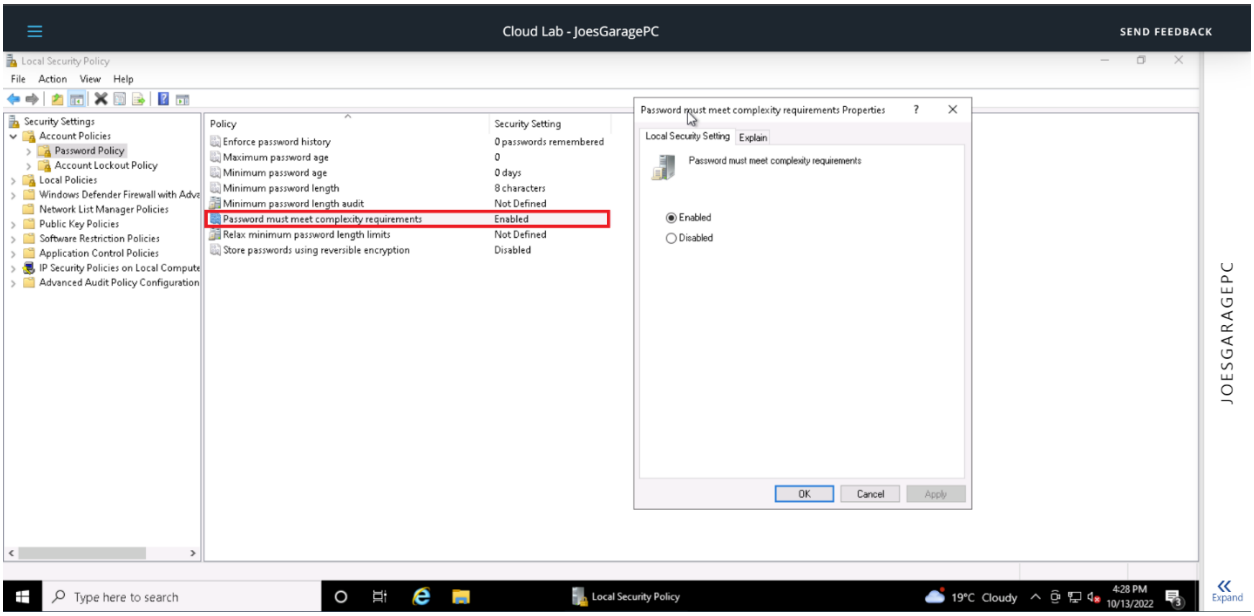


2. Explain the process for setting the password and access control policies locally on a Windows 10 PC. Provide screenshots showing how you set the rules on the PC.
   - Setting the Password Policy: Type "Local Security Policy" in the search bar -> Select "Local Security Policy" -> On the left pane: Select "Account Policies" -> Select "Password Policy"

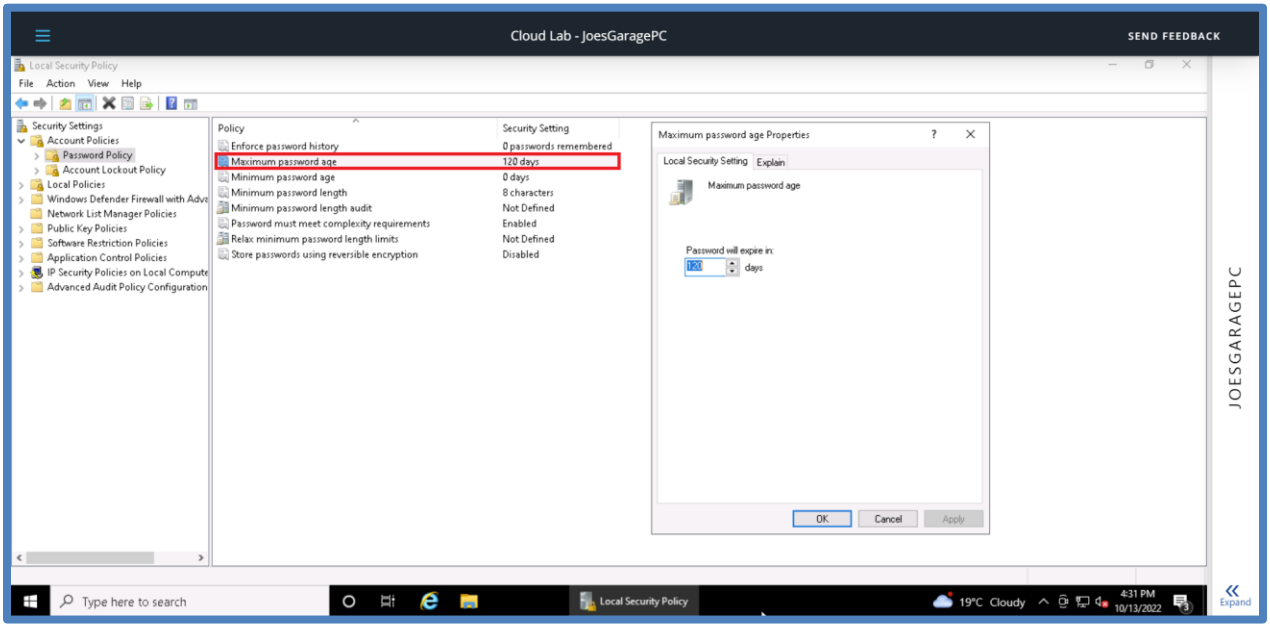
At least 8 characters:



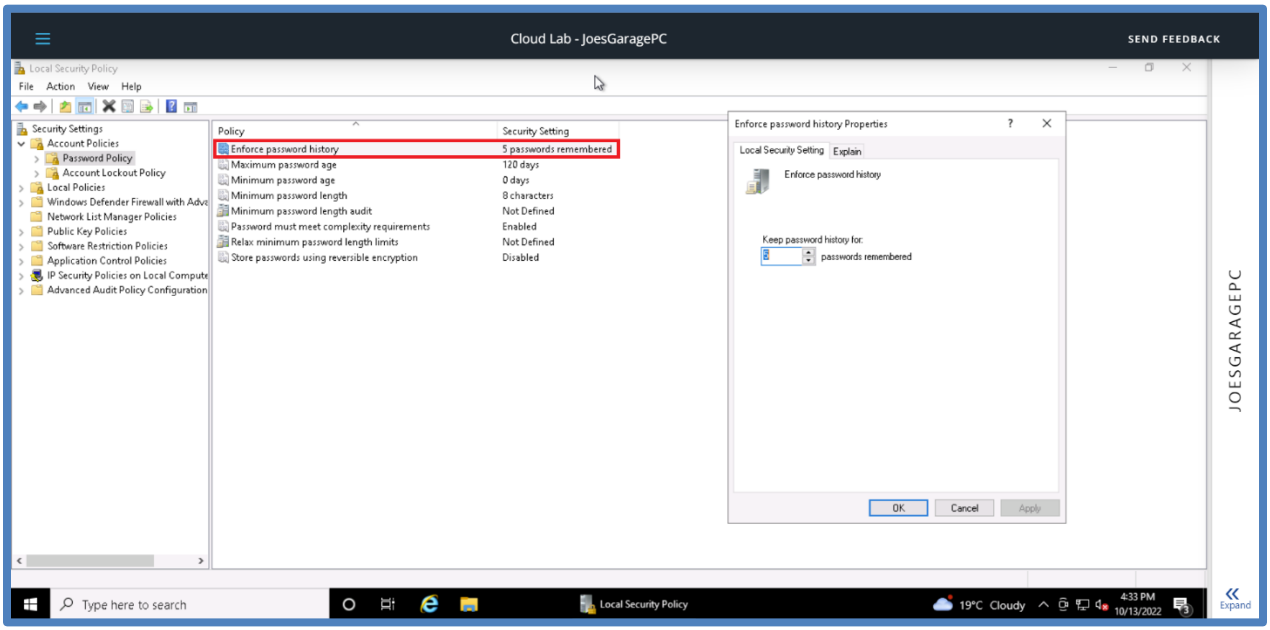
Complexity enabled:



Changed every 120 days:

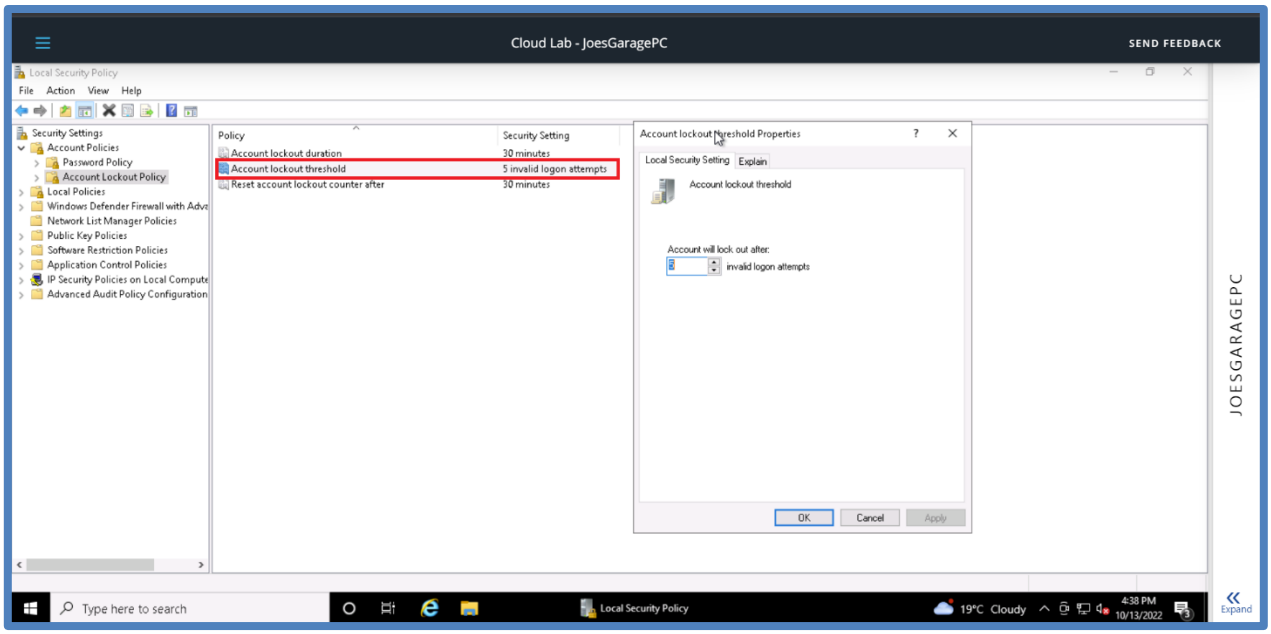


Cannot be the same as the previous 5 passwords

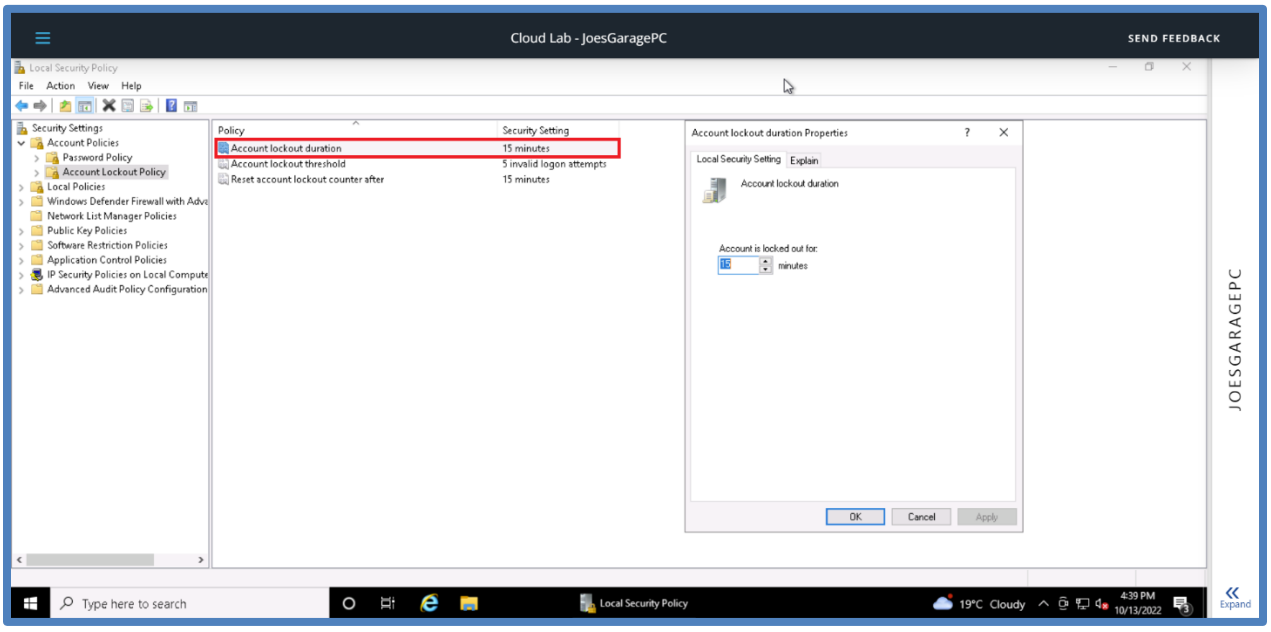


- Setting the Account Lockout Policy: Type "Local Security Policy" in the search bar -> Select "Local Security Policy" -> On the left pane: Select "Account Policies" -> Select "Account Lockout Policy"

Account should be automatically disabled after 5 unsuccessful login attempts:



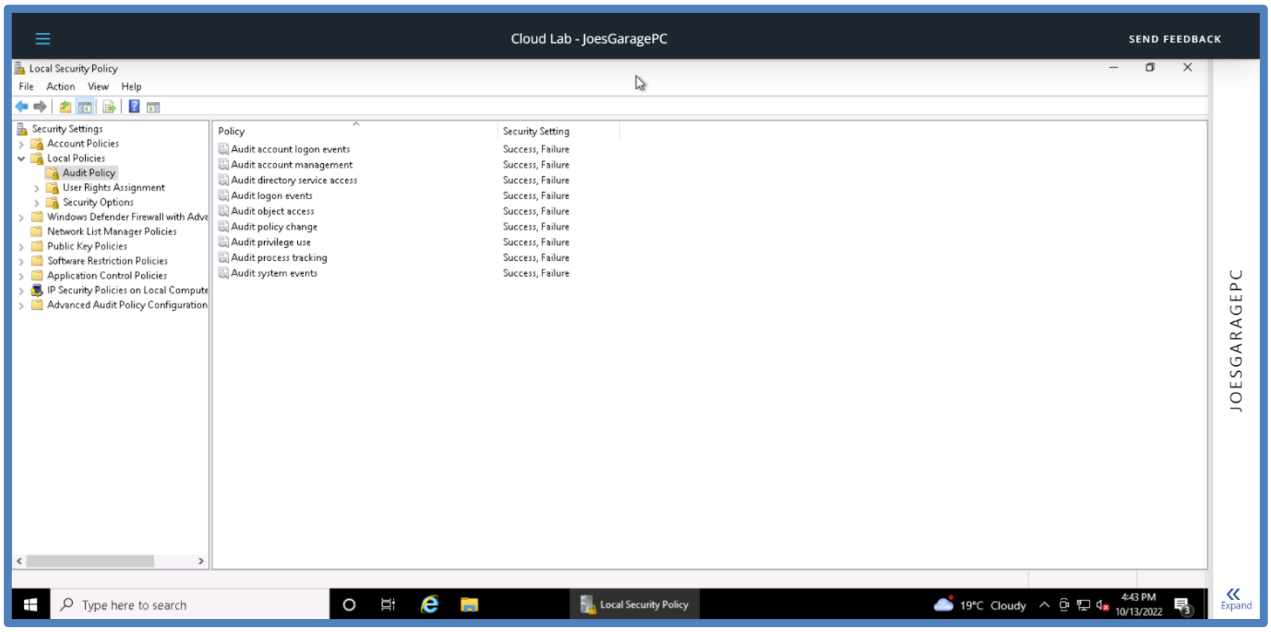
The account should be locked for 15 minutes and then should automatically unlock:



Auditing and Logging

Security best practices like those found in the CIS Controls or NIST Cybersecurity Framework require systems to log events. You need to enable the Audit Policy for Joe's PC to meet these standards.

1. From the Local Security Policy window, select Audit Policy and make applicable changes to Joe's PC to enable minimal logging of logon, account, privilege use and policy changes.
2. Provide a screenshot of your changes here.



4. Securing Applications

As part of the inventory process, you determined computer programs or applications on the PC. The next step is to decide which ones are needed for business and which ones should be removed. Unneeded programs could be vulnerable to attacks and allow unauthorized access into the computer. They also consume system resources and could also violate licensing agreements.

Joe has established the following rules regarding PC applications:

- Joe wants everyone to use the latest version of the Chrome browser by default.
- There should be no games or non-work-related applications installed or downloaded.
- Joe is also concerned that there are "hacking" programs downloaded or installed on the PC that should be removed.
- This PC is used for standard office functions. The auto-body has a separate service they use for their website and to transfer files from their suppliers.

Remove unneeded or unwanted applications

1. *List at least three application(s) that violate this policy.*

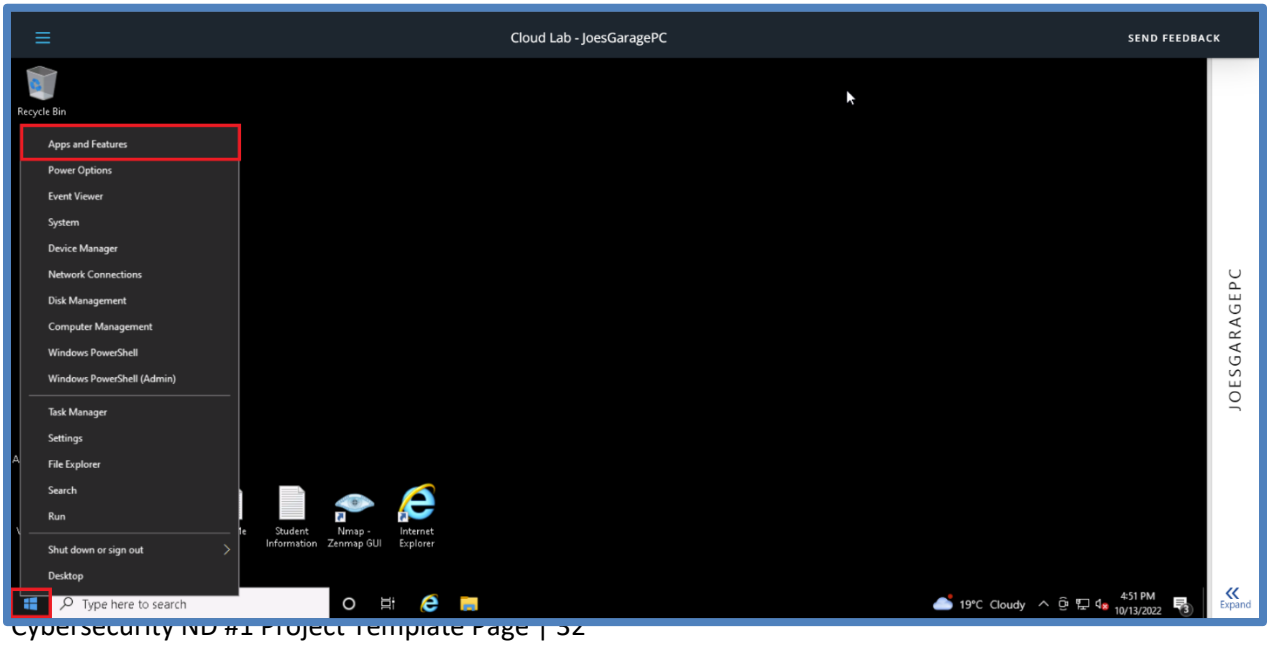
- *Candy Crush Friends. (Game)*
- *Farm Heroes Saga.(Game)*
- *Spotify Music. (Non-Work-Related)*

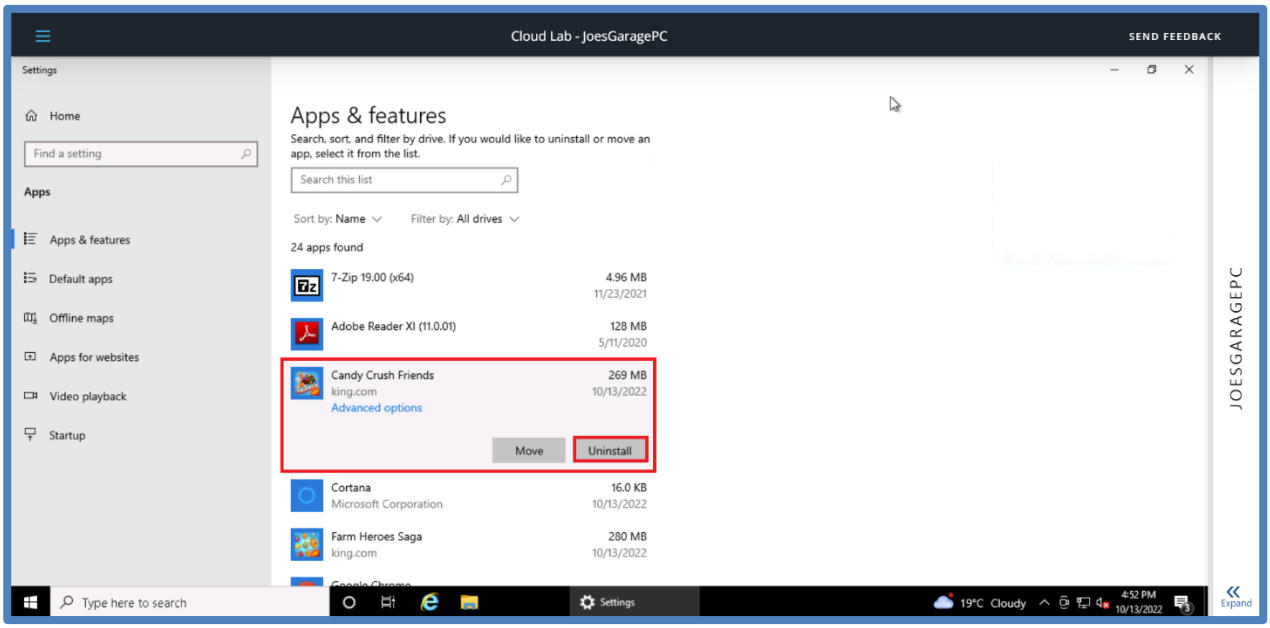
2. *Name at least three vulnerabilities, threats or risks with having unnecessary applications:*

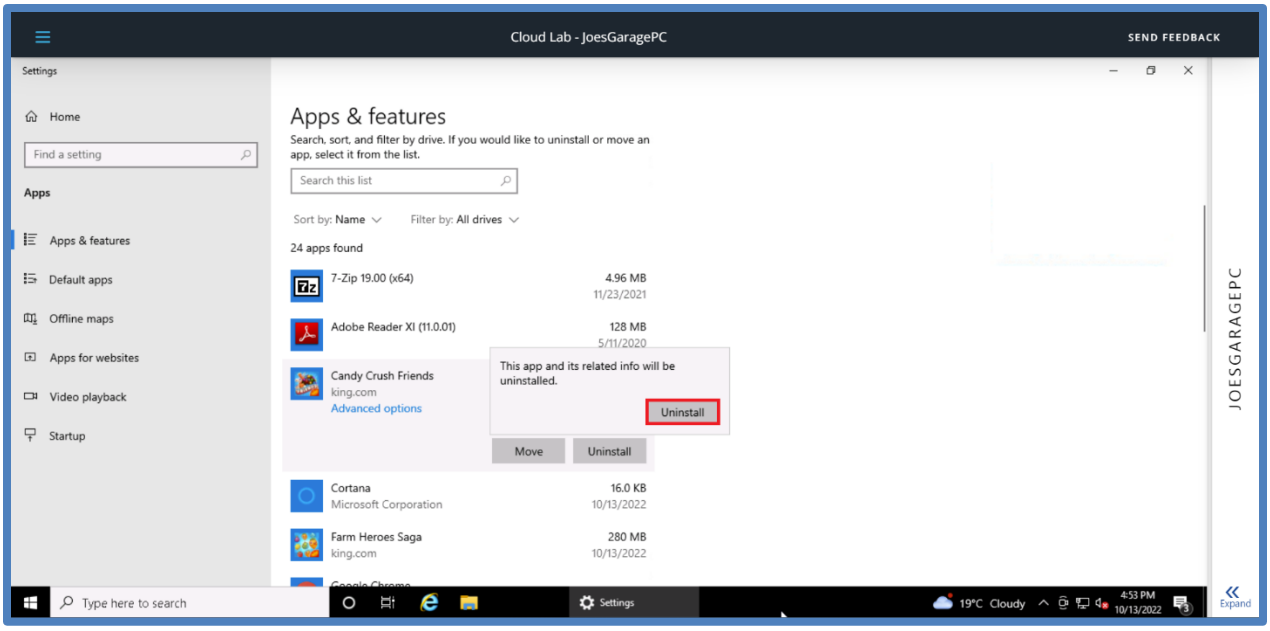
-
-
-

3. *Joe wants you to make sure unneeded applications or programs are no longer on the PC. Explain the steps you take to disable or remove them. Include screenshots to show your work.*

   Right-Click on Windows logo -> select "Apps and Features" -> Scroll down to Apps & Features section -> Click on unnecessary apps -> select uninstall -> Pop-up will appears: select uninstall.



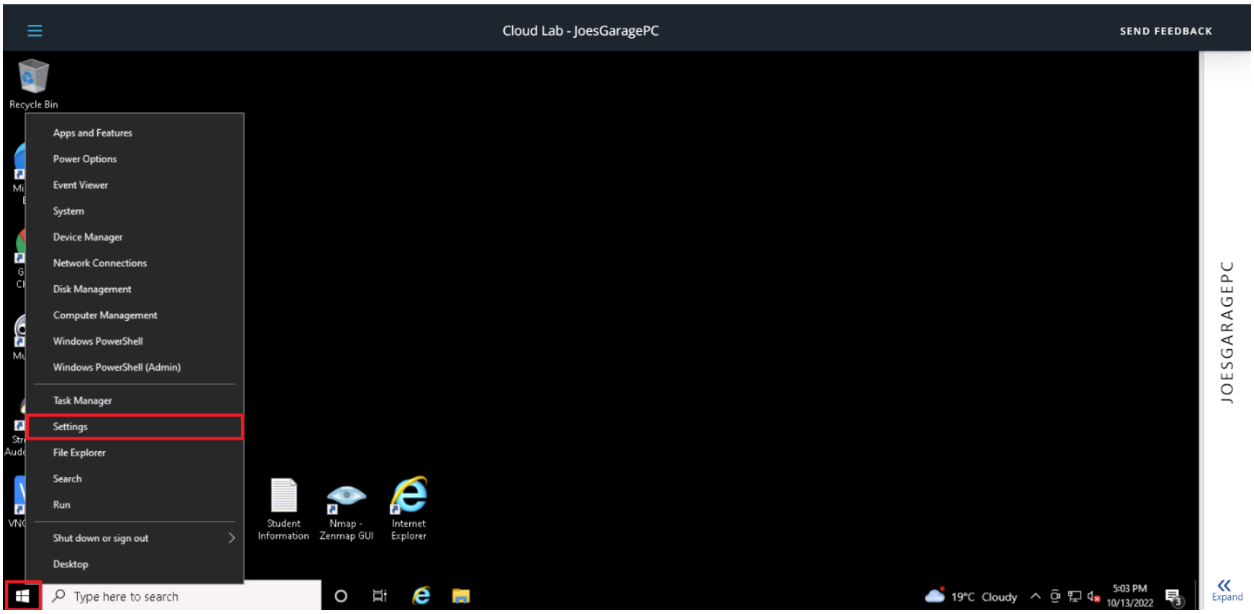

Cloud Lab - JoesGaragePC
SEND FEEDBACK
Settings
Home
Find a setting
Apps
Apps & features
Default apps
Offline maps
Apps for websites
Video playback
Startup
Apps & features
Search, sort, and filter by drive. If you would like to uninstall or move an app, select it from the list.
Search this list
Sort by: Name
Filter by: All drives
24 apps found
7-Zip 19.00 (x64) 4.96 MB 11/23/2021
Adobe Reader XI (11.0.01) 128 MB 5/11/2020
Candy Crush Friends 269 MB 10/13/2022
king.com
Advanced options
Move
Uninstall
Cortana 16.0 KB 10/13/2022
Microsoft Corporation
Farm Heroes Saga 280 MB 10/13/2022
king.com
Type here to search
Settings
19°C Cloudy
4:52 PM 10/13/2022
Expand
JOESGARAGEPC

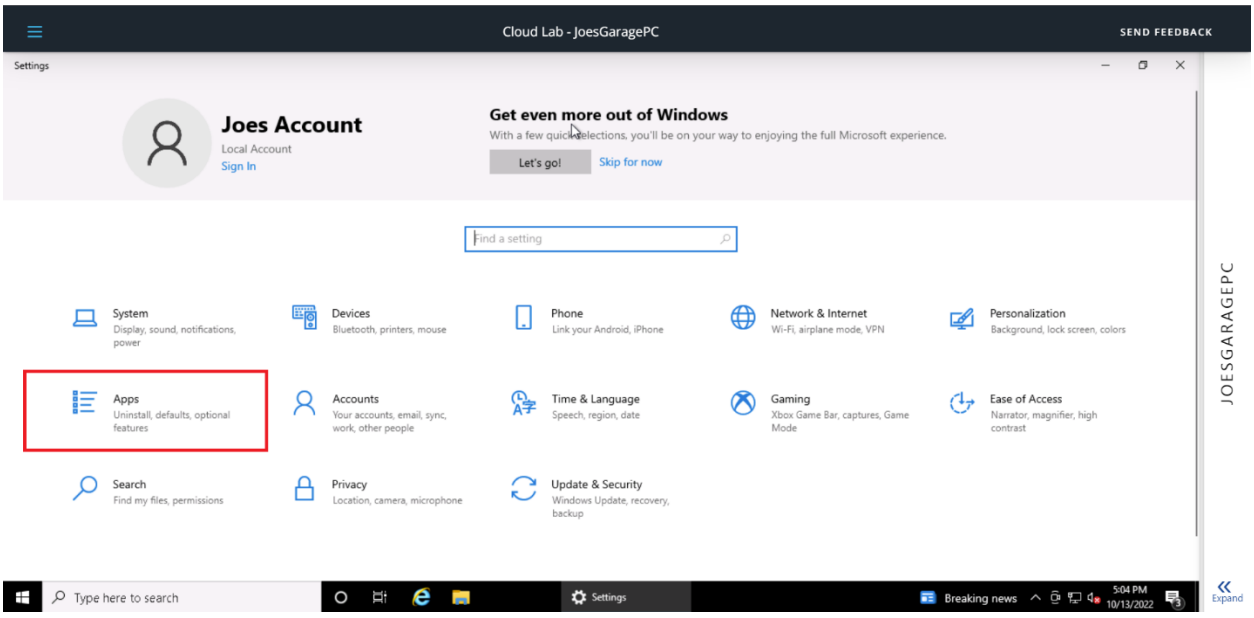

Cloud Lab - JoesGaragePC
SEND FEEDBACK
Settings
Home
Find a setting
Apps
Apps & features
Default apps
Offline maps
Apps for websites
Video playback
Startup
Apps & features
Search, sort, and filter by drive. If you would like to uninstall or move an app, select it from the list.
Search this list
Sort by: Name
Filter by: All drives
24 apps found
7-Zip 19.00 (x64) 4.96 MB 11/23/2021
Adobe Reader XI (11.0.01) 128 MB 5/11/2020
Candy Crush Friends
king.com
Advanced options
This app and its related info will be uninstalled.
Uninstall
Move
Uninstall
Cortana 16.0 KB 10/13/2022
Microsoft Corporation
Farm Heroes Saga 280 MB 10/13/2022
king.com
Type here to search
Settings
19°C Cloudy
4:53 PM 10/13/2022
Expand
JOESGARAGEPC

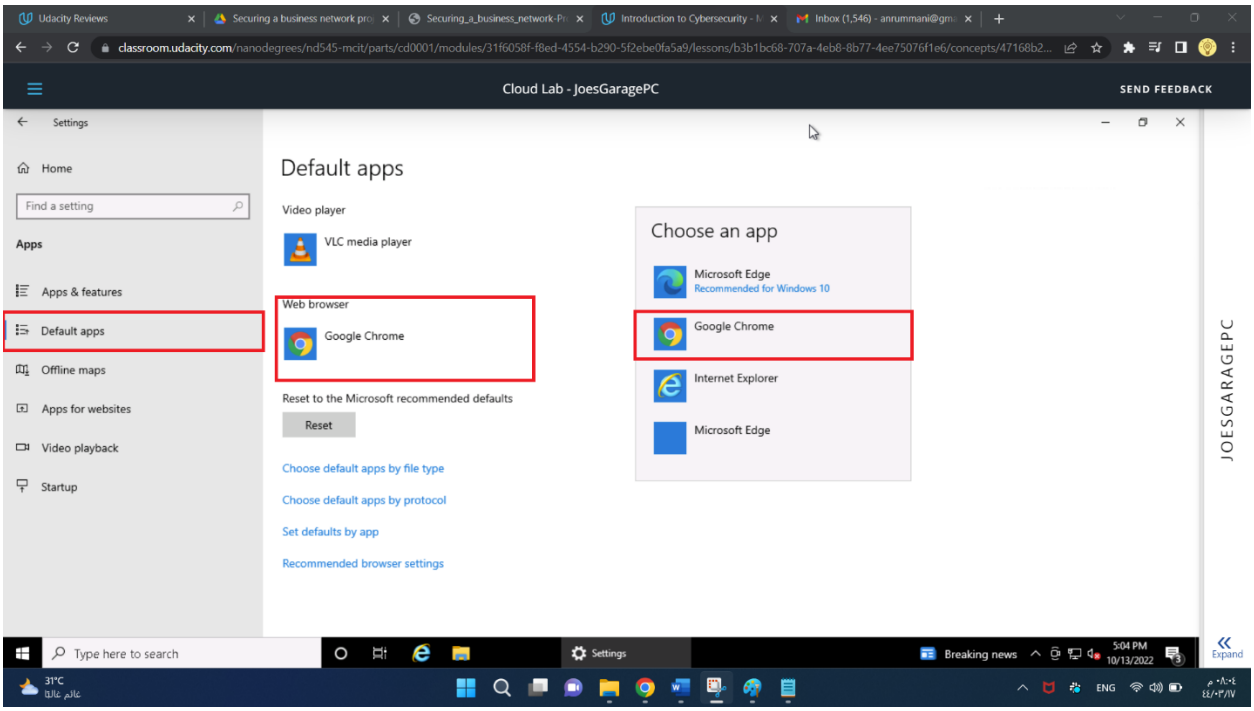
Default Browser

As mentioned in the policy, Joe wants all users to use Chrome as their browser by default.

1. *Explain how you set default applications within the Windows 10 operating system. Include screenshots as necessary.*
   Right-Click on Windows logo -> Select Settings -> Select Apps -> On left pane: Select Default Apps -> Scroll down to web browser section and click on the app that appears -> List of installed web browsers appears: Select ***Google Chrome.***



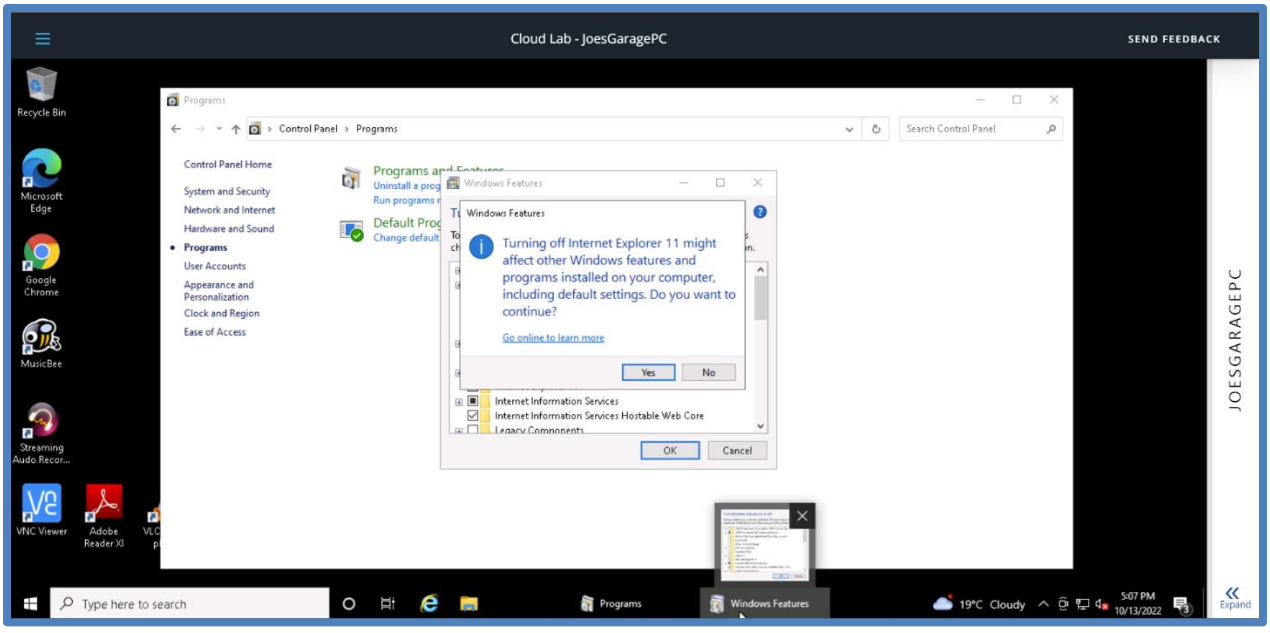




2. *Why should Internet Explorer be disabled from Windows PCs? Provide at least two risks or vulnerabilities associated with it.*
    -
    -

Because of the reasons you give above, Internet Explorer should be removed. To do that, go to the **Control Panel**, select **Programs**. On the **Programs and Features** window, select "**Turn Windows features on or off**."

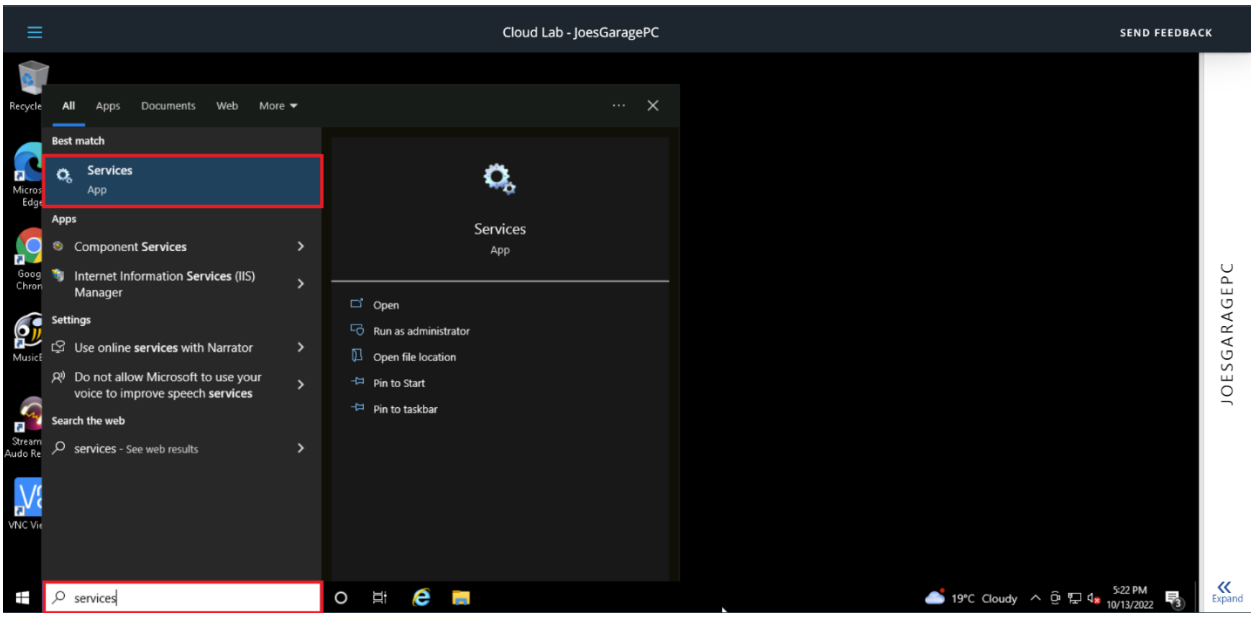
3. *Provide a screenshot showing Internet Explorer 11 is off.*

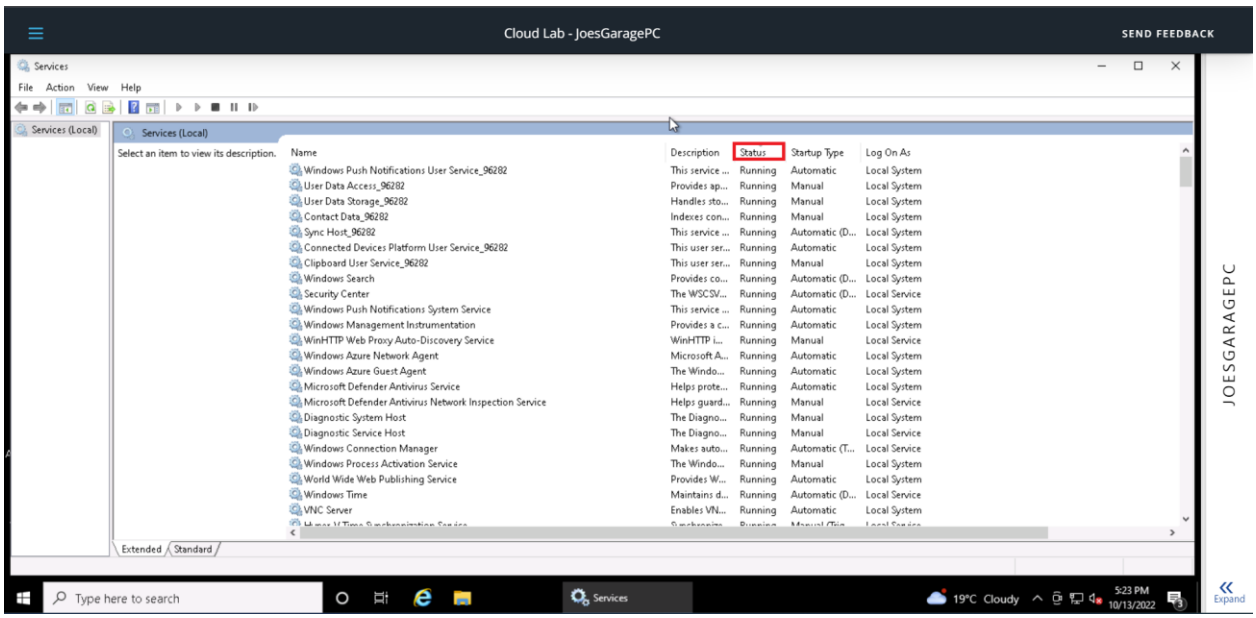


4. *Windows Services*

There are Windows features running on Joe's computer that could allow unwanted activity or files. He suspects that someone may have used the PC as a web server in the past. Joe wants you to confirm if web services are turned on, stop it if it is and make sure it is not running whenever the computer restarts.

1. How did you determine these services were running? Include screenshots to show how you found them.
   Type "Services" on the search bar -> On the "Services" windows click on "Status" At top of the list to display Running services first.





2. Advanced users should provide at least two methods for determining a web server is running on a host
3. How do you disable them and make sure they are not restarted?
   Right-Click on a Running Service -> Select **Stop** then Select Properties -> on Properties window: Select **Disabled** from "Startup Type" Drop down list.
4. Advanced Users: The File Transfer Protocol FTP service is also running on this PC and shouldn't. Explain the process for disabling it and ensuring it is not automatically restarted.

Patching and Updates

Keeping the operating system current on patches and fixes is a critical part of security. Joe wants his PC to be on the latest version of Windows 10. He also wants you to set it up for automated updates.

1. *Explain the process for doing this. Include screenshots as needed.*
   Right-Click on Windows logo -> Select Settings -> Select Update & Security -> Select Check for updates.
   By default, Windows 10 updates your operating system automatically.
2. *Go ahead and update this PC to the latest version. Warning this may take a while and require numerous restarts. When it is complete, provide a screenshot showing the PC is on the latest version.*

All applications should also be up to date on patches or fixes provided by the manufacturer. Any old versions of software should be uninstalled.

3. *List at least two applications on Joe's PC that are out of date. List them below:*

- Google Chrome: Current version (68.0.3440.84), Latest Version (106.0.5249.119).
- Adobe Reader XI: Current version (11.0.01.36), Latest version (22.003.20258).

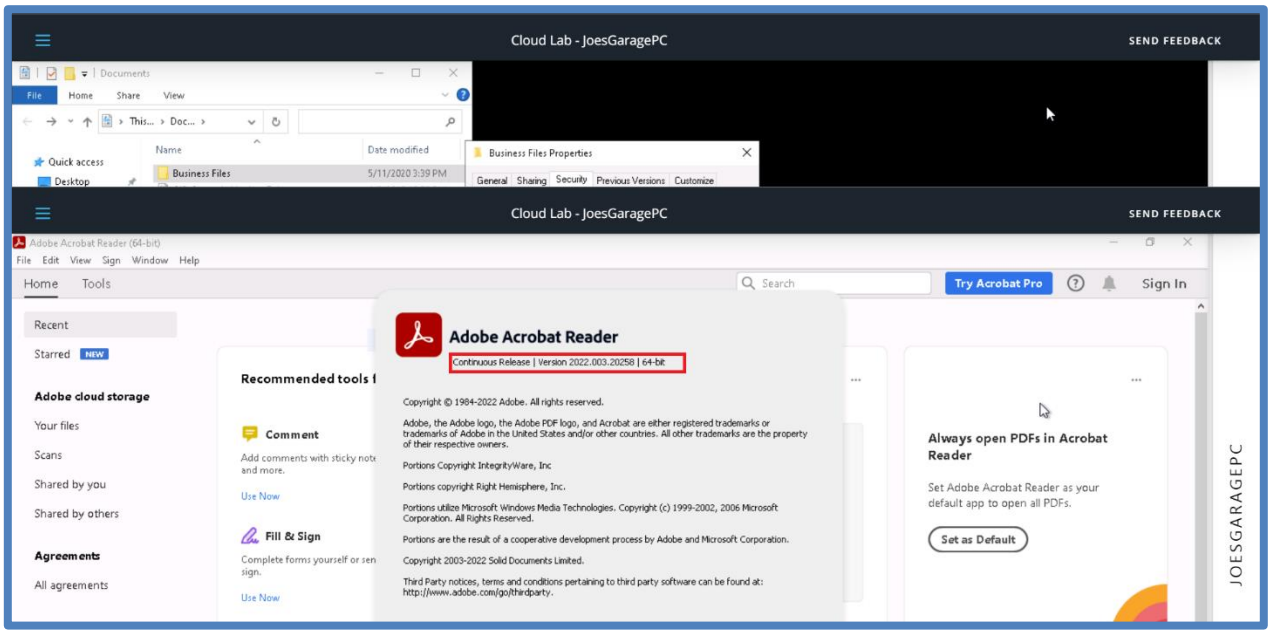
4. *Explain the steps you took to determine this information.*
   Adobe Reader XI*: open the app -> select help from top bar -> select about adobe reader xi from the drop down list.*

   Google chrome*: open the app -> click on the three dots "⋮" ->* select help from the drop-down list -> Select About google chrome.

Explain the steps for updating each of these applications. Include screenshots as needed.

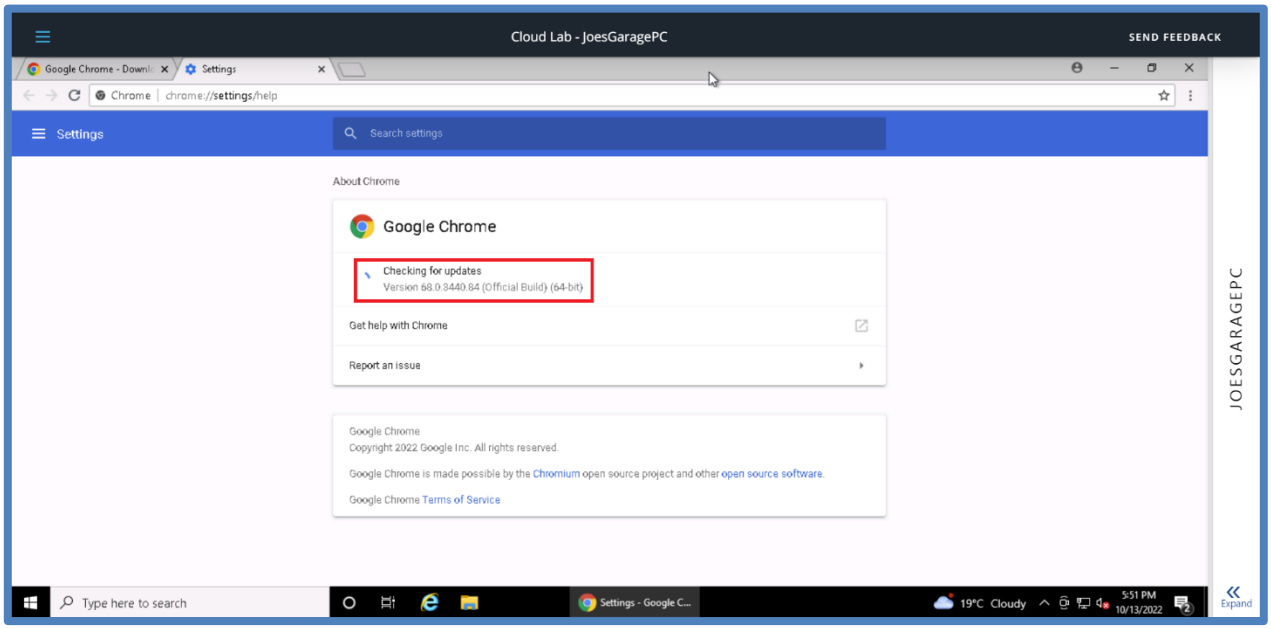
***Adobe Reader XI**: open the app -> select help from top bar -> select Check for Updates… from the drop down list -> Click Download.*

After update:

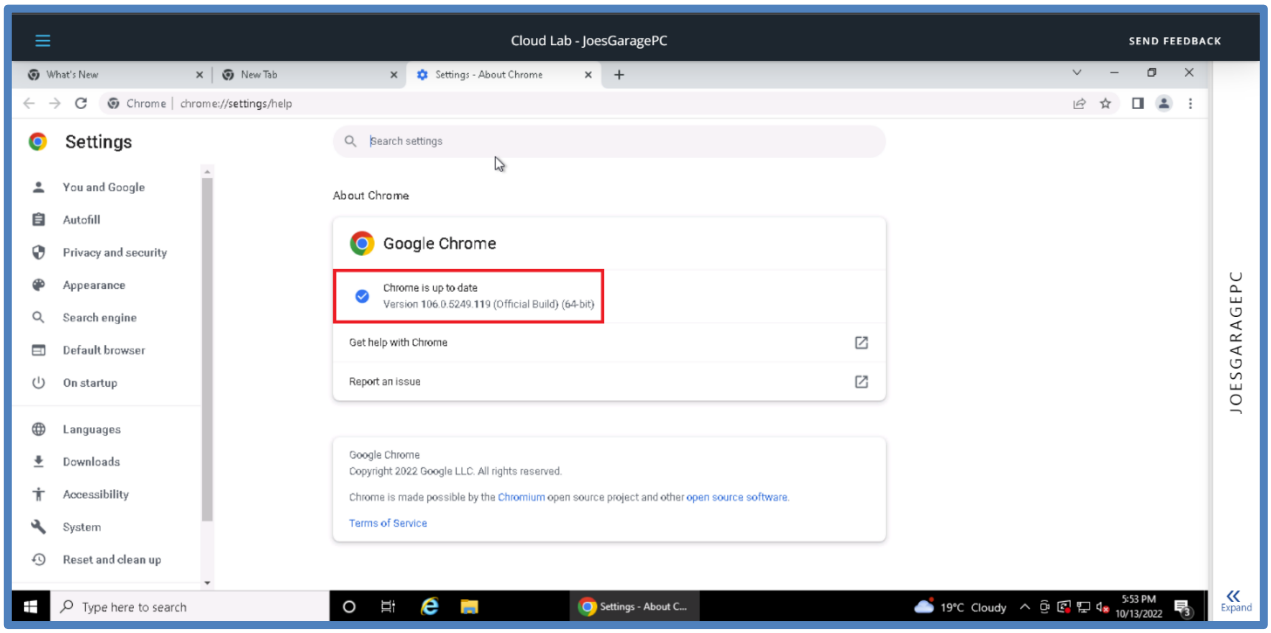


***Google chrome**: Download the latest google chrome app from the official site -> The new app installation will overwrite the previous version.*

Before update:



After update:



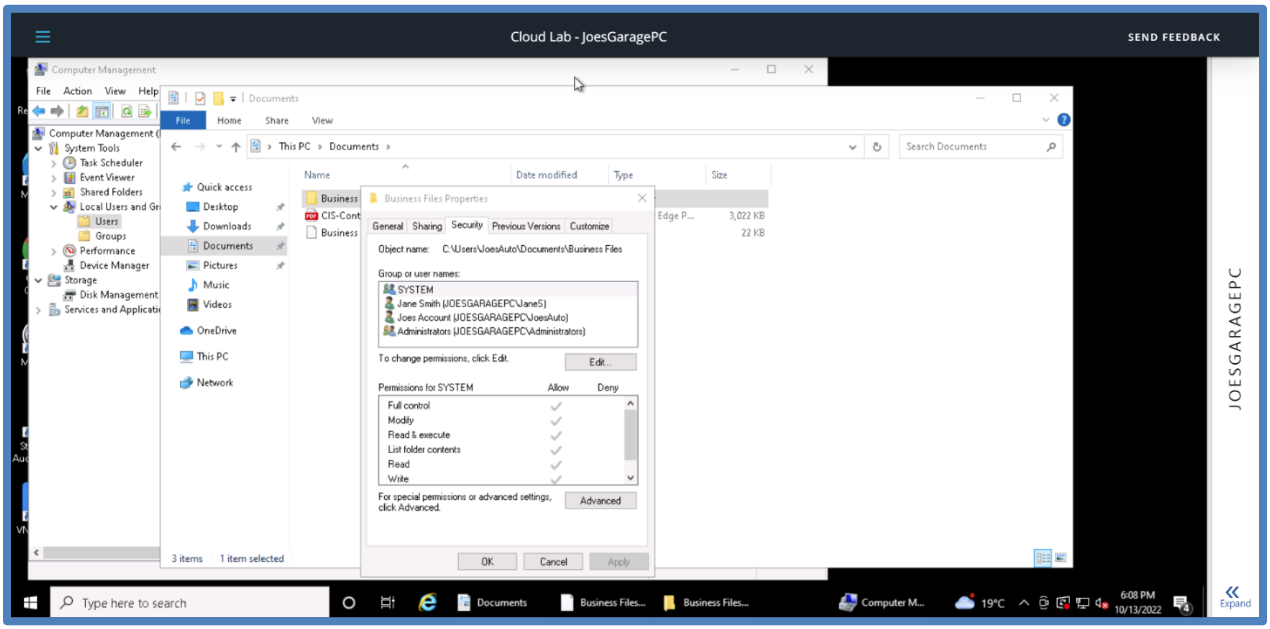
5. Securing Files and Folders

Joe has some work files in his Business folder that he wants to secure since they contain his customer information. They are labeled “JoesWork.”

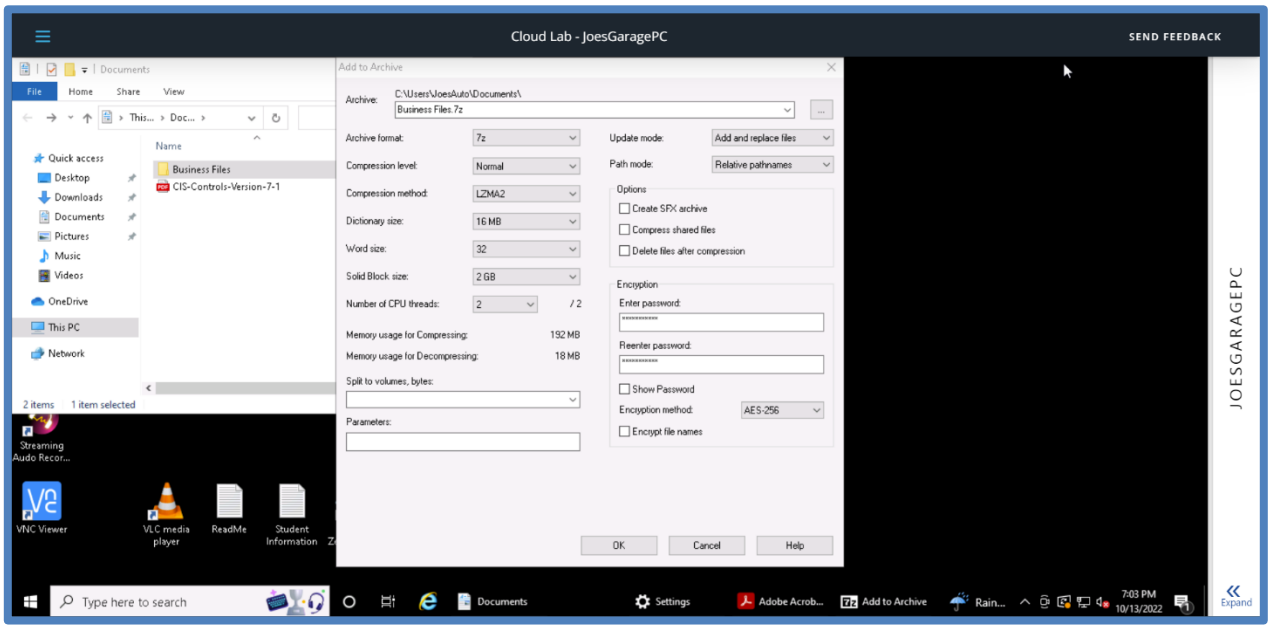
Joe suspects that other users on this computer beside him and Jane can see and change his business files. He wants you to check to make sure that only those two users have privileges to view or change the files.

Encrypting files and folders

1. *Explain the process for checking this and changing any necessary settings on the file. Include screenshots showing that ONLY Joe and Jane have permissions to change Joes work files. [Hint: Right-click the folder and select Properties.]*



2. *Joe wants his work files encrypted with the password, “SU37*$xv3p1” Explain how you would do this. What encryption method do you recommend? You may use the pre-installed program 7-Zip for this.*



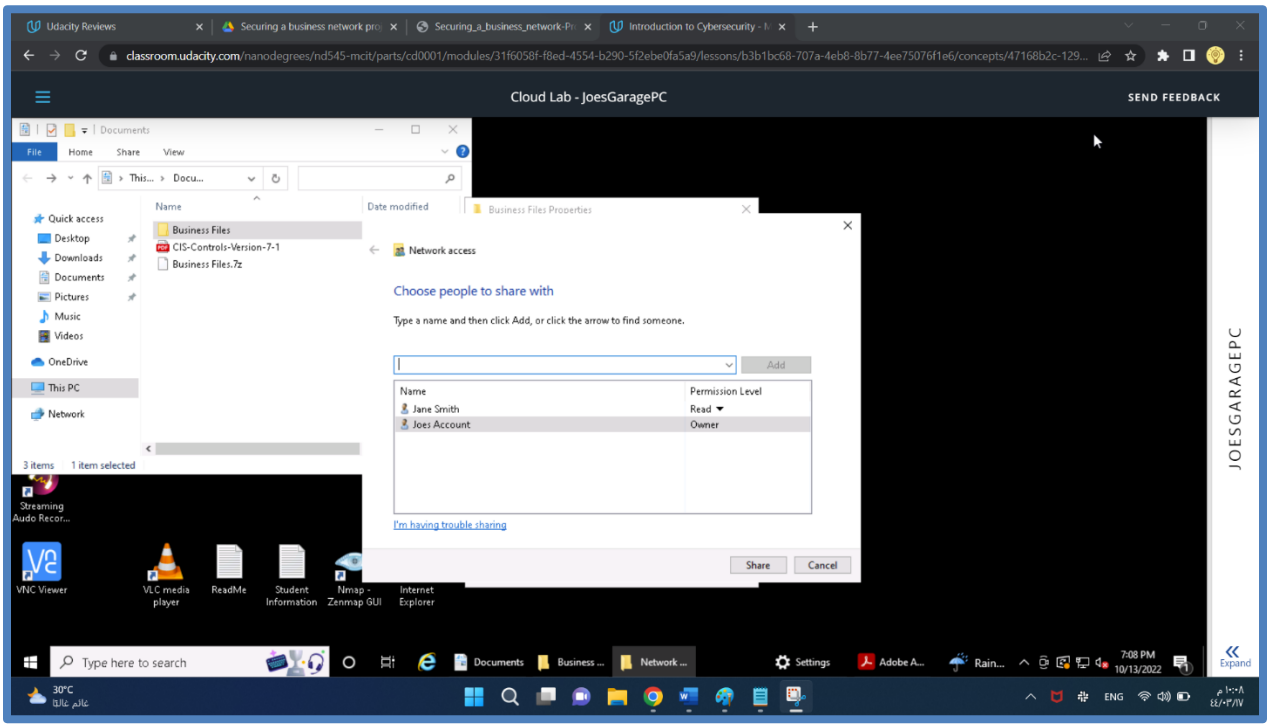
3. *What security fundamental does this provide?*

4. *The Center for Internet Security Controls lists this as one of their steps for security. Which step does this fulfill?*

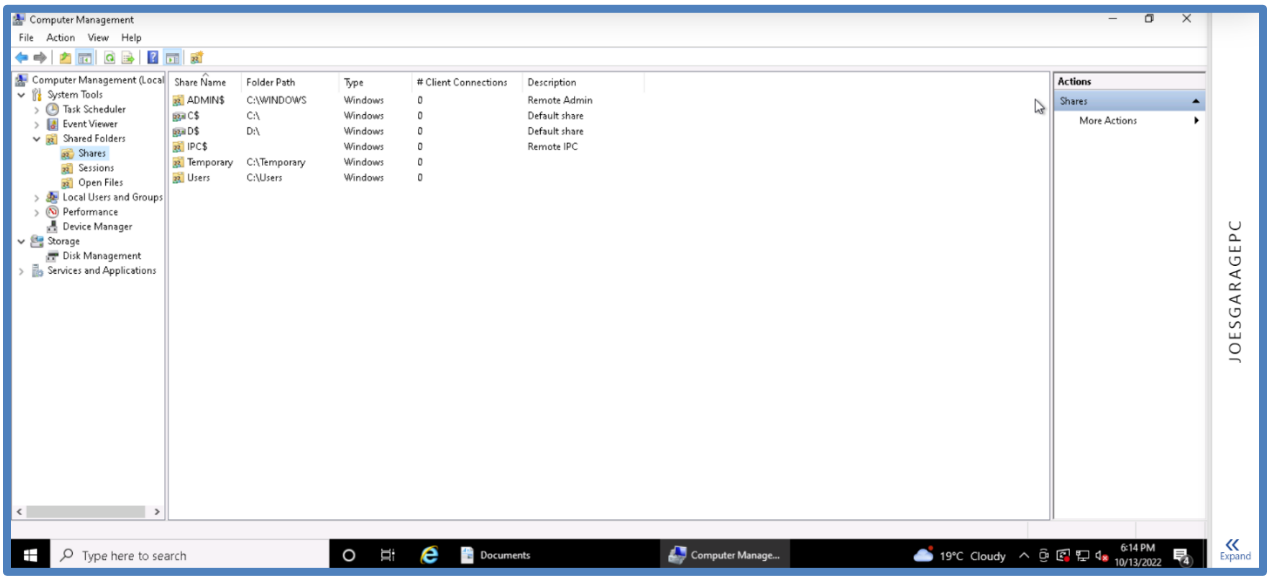
Shared Folders

Shared folders are a common way to make files available to multiple users. There's a folder under Joe's documents called "Business Files" that Joe wants shared with his administrator Jane.

1. *Explain how you would do that and provide a screenshot showing how you can do it. Make sure it's only shared between Joe and Jane.*
   Right-Click on "Business Files" -> Select Properties -> Select Sharing -> Select "Share" -> make sure only Joe & Jane accounts there -> click share.



2. *For advanced students: Joe wants to make sure there are no other folders shared on the PC. Explain how you view all shared files and folders on a Windows 10 PC. Include a screenshot as proof.*



6. Basic Computer Forensics (Optional)

Joe has asked that you investigate his PC to see if there are any other files left behind by previous unwanted users that may show they wanted to harm Joe's business. Look through the unwanted users' folders and list suspicious files. General students should document three issues and advanced students at least five issues. Include a brief explanation of their contents and their risks. [Hint: there is a "Hacker" in the PC]

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7. Project Completion

Take the following steps when you are done answering the challenges and securing Joe's PC:

- Save your answer template as both a Word document and PDF. Make sure your name and date are on it.
- Shutdown the virtual Windows 10 PC.
- Submit the PDF to Udacity for review.