Udacity Cybersecurity Course #1 Project

Contents

Udacity Cybersecurity Course #1 Project	
Student Information	2
Scenario	3
1. Reconnaissance	4
2. Securing the PC	19
3. Securing Access	29
4. Securing Applications	44
5. Securing Files and Folders	54
6. Basic Computer forensics (Optional)	58
7. Project Completion	58

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: ABDULLAH ALSHALAN

Date of completion: 2021/06/17

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

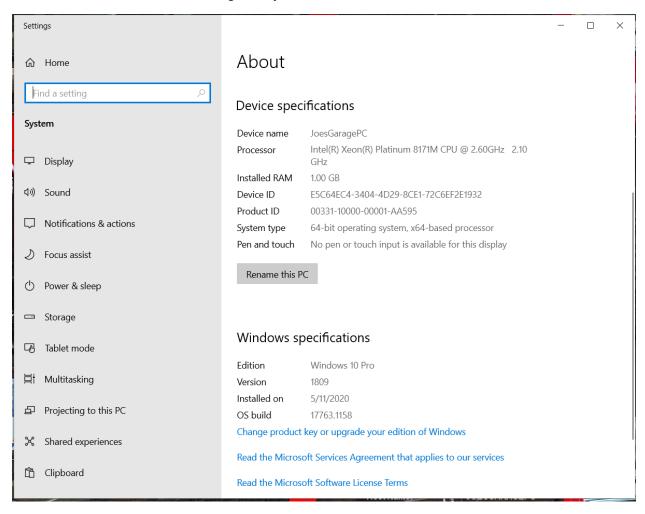
1. Fill in the following table with system information for Joe's PC.

Device Name	JoesGaragePC
Processor	Intel (R) Xeon(R) Platinum 8171M CPU 2.6 GHz 2.1 GHz
Install RAM	1 GB
System Type	64 bit OS x64-based processor
Windows Edition	Windows 10 Pro
Version	1809
Installed on	5/11/2020
OS build	17763.1158

2. Explain how you found this information:

Right click on windows icon > System

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



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:
- 7-Zip 19.00 (x64)
- Adobe Reader XI (11.0.01)
- Candy Crush Friends
- Farm Heroes Saga
- Google Chrome
- 2. Explain how you found this information. Provide screenshots showing this information.

Right click on windows icon > Apps and Features

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

CIS Control 02: Inventory and Control of Software Assets.

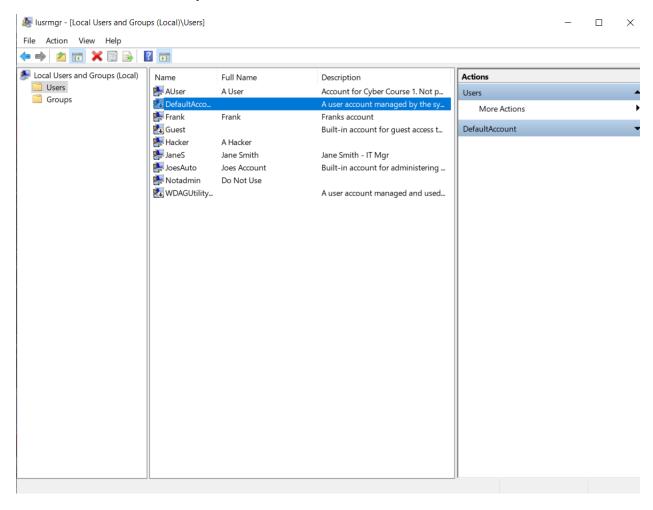
Accounts

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
AUser	A User	Standard User
Hacker	A Hacker	Administrator – Remote
		access
Notadmin	Do Not Use	Standard User - Remote
		access
Frank	Frank	Standard User - Remote
		access
JaneS	Jane Smith	Administrator – Remote
		access
JoesAuto	Joes Account	Administrator
WDAGUtilityAccount	-	-
Guest	-	Guest
DefaultAccount	-	System management
		Accounts group

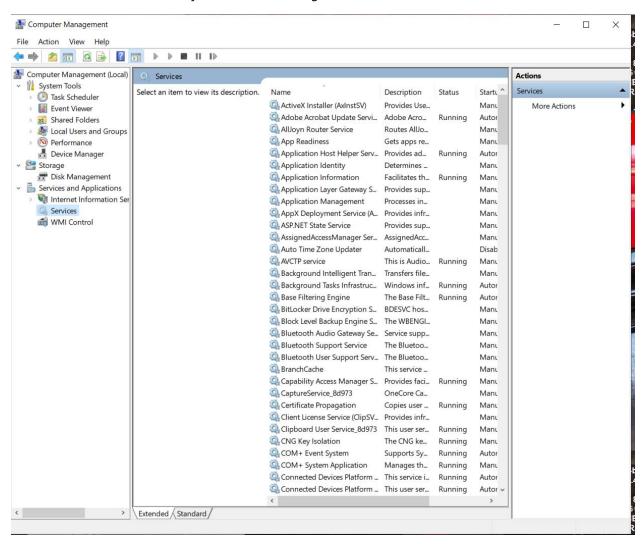
2. Provide a screenshot of the **Local Users**.



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.



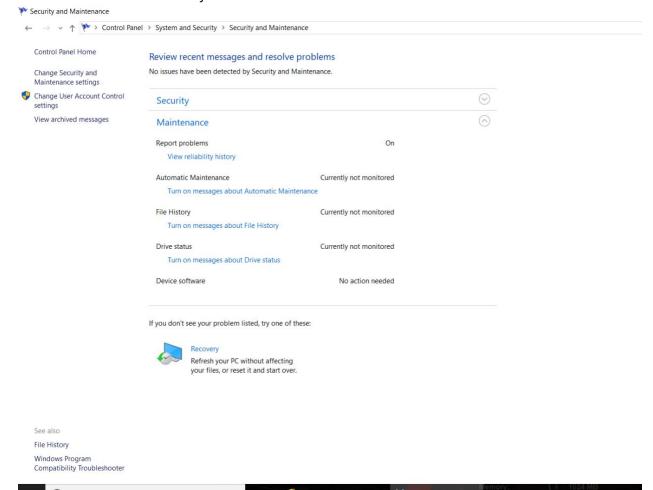
Security Services

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.

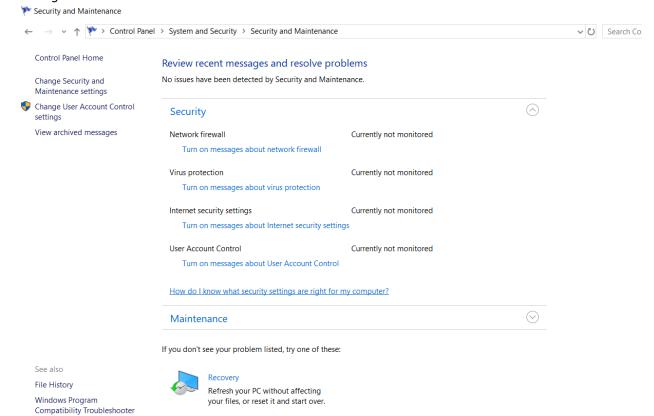
1. To view a summary of security on Windows 10, start from the **Control Panel**. Use the "Find a setting" bar and search on **Windows Defender**. You can also search for Windows Defender using the Windows Run bar. Take a screenshot of what you see on the Windows Security screen and include it here:



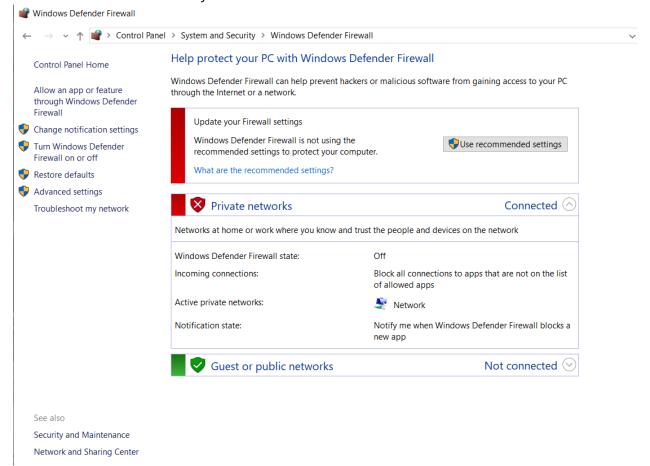
2. The Windows 10 Security settings are also found from the Control Panel > System and Security > Security and Maintenance. Start by viewing "Review your computer's status and resolve issues." Provide a screenshot of this below:



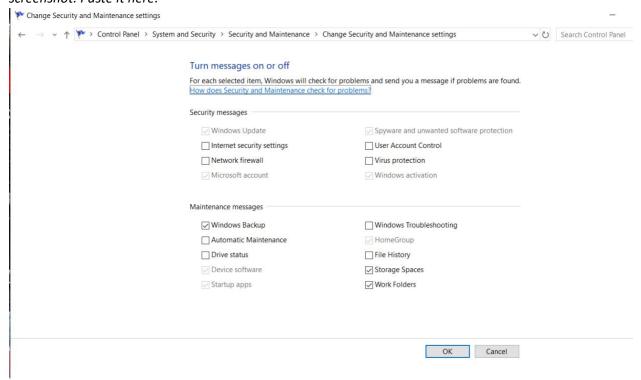
3. Click on **View** in **Windows Security** to see the **status** there. Provide a screenshot of the **Firewall** settings.



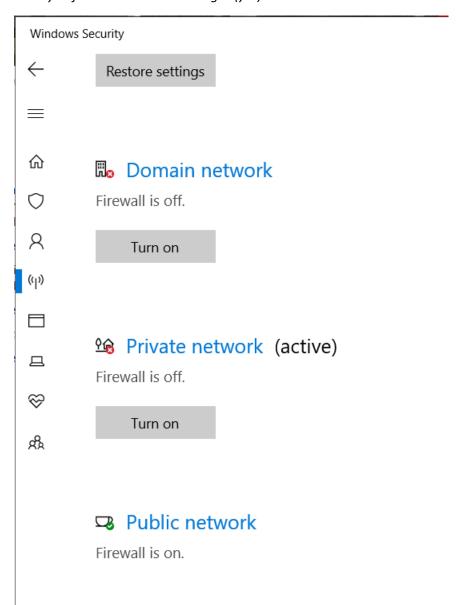
4. From the **Control Panel**, go to **System and Security**. In that window, select **Windows Defender Firewall**. Provide a screenshot of it here:



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).



○ Virus & threat protection

Protection for your device against threats.

Current threats

No current threats.

Last scan: 7/24/2020 6:36 PM (quick scan) 0 threats found.
Scan lasted 1 minutes 23 seconds 12903 files scanned.

Quick scan

Scan options

Threat history

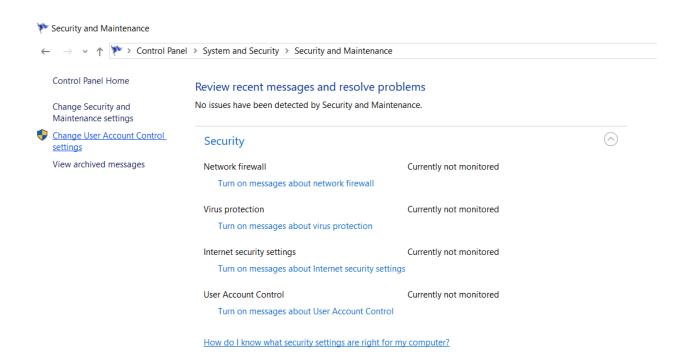
Virus & threat protection settings

No action needed.

Manage settings

Protection definitions are up to date.

Last update: 6/15/2021 8:20 AM



Security Feature	Status
Firewall product and status – Private network	From Windows Security - off
Firewall product and status – Public network	From Windows Security - on
Virus protection product and status	From Virus and threat protection – No
	current threats – and it's up to date – but
	there is no protection from ransomware
Internet Security messages	From Security and Maintenance - Currently
	not monitored
Network firewall messages	From Security and Maintenance - Currently
	not monitored
Virus protection messages	From Security and Maintenance - Currently
	not monitored
User Account Control Setting	From Security and Maintenance - Currently
	not monitored

- 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.]
- Maybe it will be a ransomware attack
- There is a user called Hacker has an administrator access he can add/delete/access whatever he wants
- He has a lot of unneeded games it may harm the PC by backdoors vulnerabilities

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?
 - CIS Control and Benchmarks Standards should be used for Joe because CIS Controls let us just say it collecting every aspect of protecting his information in PC.
- What industry baseline do you recommend to Joe? [Hint: Look in the documents folder inside the VM]

CIS Controls baseline because it has a set of best practices from cybersecurity professionals in IT field.

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?

CIS Control 04: Secure Configuration of Enterprise Assets and Software

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:

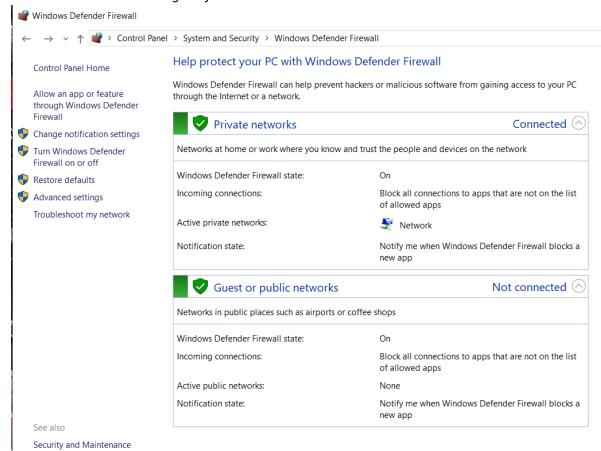
- Firewall
- Virus & Threat Protection
- App & Browser Control
- User Account Control settings
- Securing Removable Media

Firewall

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

Explain the process you take to do this.
 From control panel >> Windows Defender Firewall (WDF) – I changed notification settings and Turned WDF on.

2. Include screenshots showing the firewall is turned on.



3. What protection does this provide?

It provides blocking all connections to apps that are not on the list of allowed apps.

And notify Joe when WDF blocks a new app.

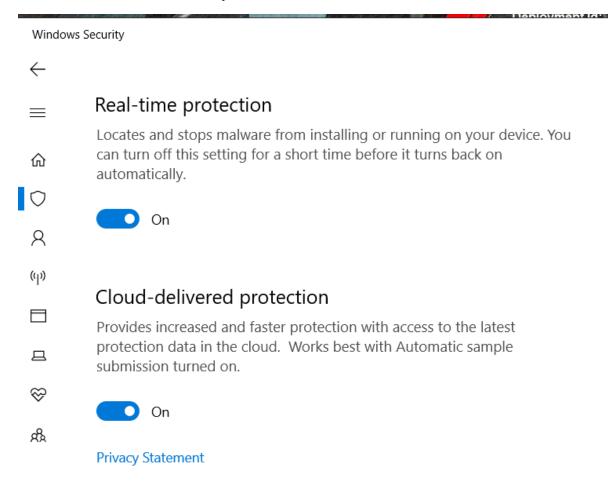
In both private and public networks.

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 <u>automatically update</u> and <u>continually scan</u> the PC for malicious software. Note: **Ignore any alerts about setting up OneDrive**.

Explain the process you take to do this.
 From settings and Virus and threat protection.
 I checked if there is an update and there were not, there is <u>0</u> threats found from the REAL TIME scanning.

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

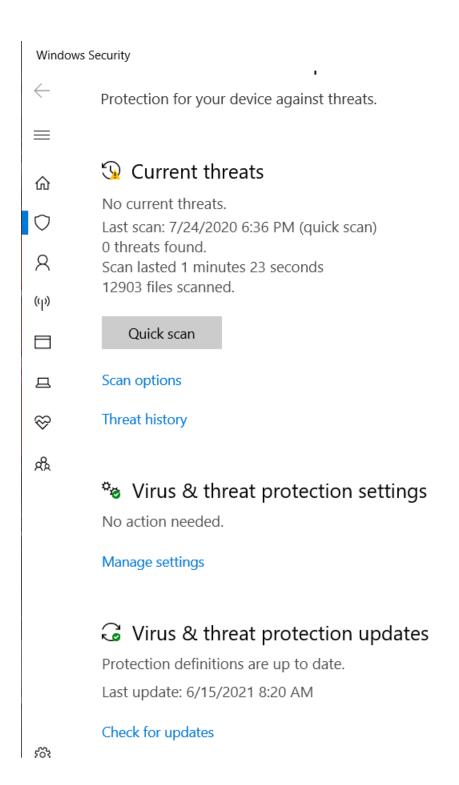


Automatic sample submission

Send sample files to Microsoft to help protect you and others from potential threats. We'll prompt you if the file we need is likely to contain personal information.

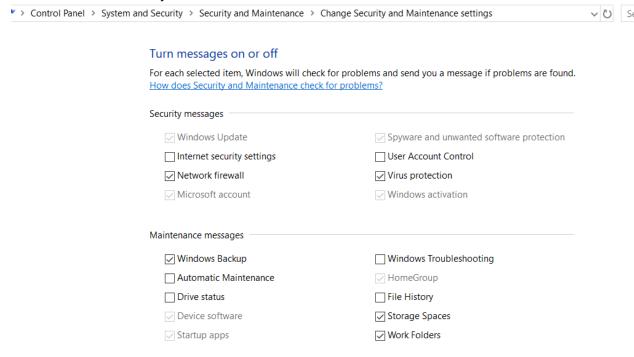


Privacy Statement



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:
- Now Joe can see if there is a threat REAL TIME message
- And can see if there is a Network breach from public or private network
- 4. From the CIS baseline controls, provide the controls satisfied by completing this.

CIS Control 08: Audit Log Management

CIS Control 10: Malware Defenses

App & Browser Control

The **App protection** within **Windows Defender** helps to protect your device by **checking for unrecognized apps and files** and from malicious sites and downloads. **Review the settings** found within the **Account protection window**, **and App & browser control windows** found on the **Windows Defender Security page**.

Advanced students: You should also review the settings on the **Exploit protection page**.

1. Change the settings to provide **maximum** protection for Joe's PC and provide a screenshot of your results.

User Account Control Settings

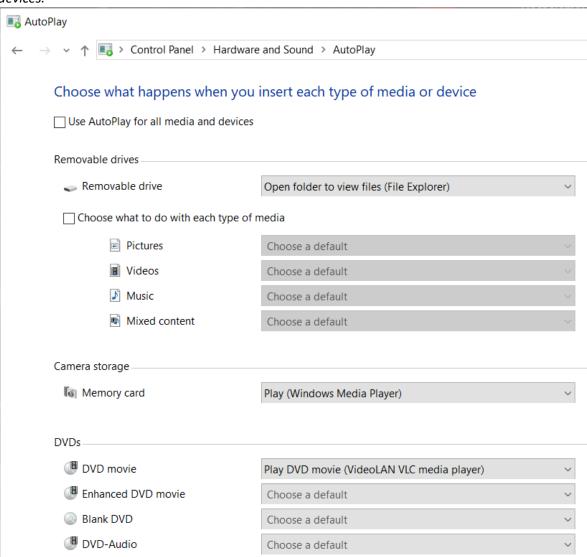
Joe wants to prevent potentially **harmful programs** from making changes and wants to be **notified** whenever apps try to make changes to his computer. This is done through the **User Account Control Setting**.

- 1. What is the current **UAC** setting on Joe's computer?
 - This is available from the above security settings.
- 2. What **should it be set to**? Include a screenshot of the new setting.

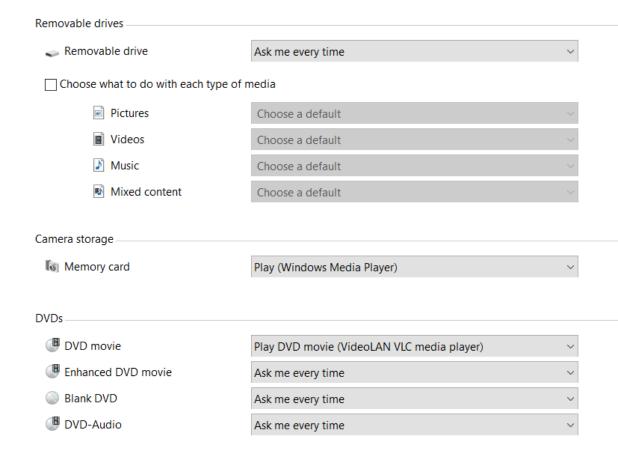
Securing Removable Media

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**.

 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.

Other users



Add someone else to this PC



A User

Administrator - Local account



Do Not Use

Local account



Frank

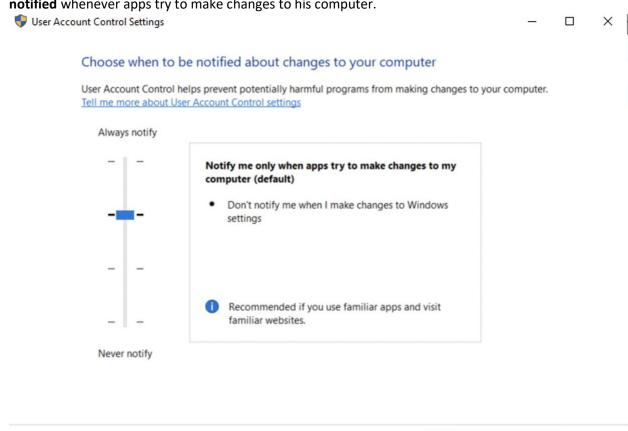
Local account



Jane Smith

Local account

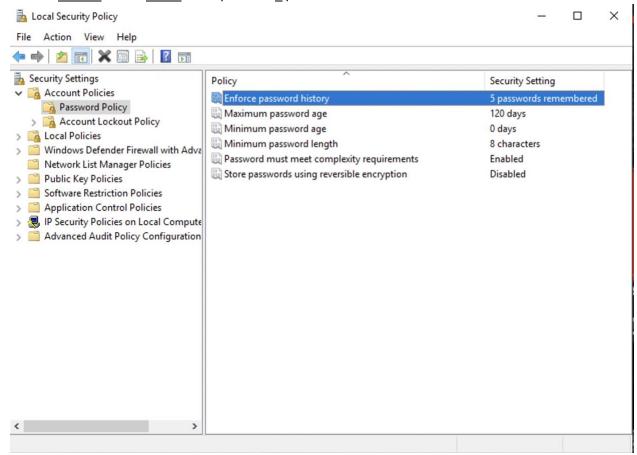
 Joe wants to prevent potentially harmful programs from making changes and wants to be notified whenever apps try to make changes to his computer.



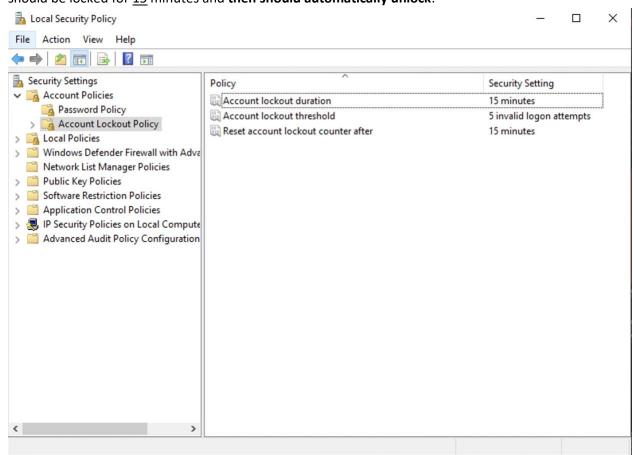
ОК

Cancel

- All valid users **should have a password** following Joe's password policy below
 - o At least 8 characters
 - o Complexity enabled
 - o Changed every 120 days
 - Cannot be the <u>same</u> as the previous <u>5</u> passwords

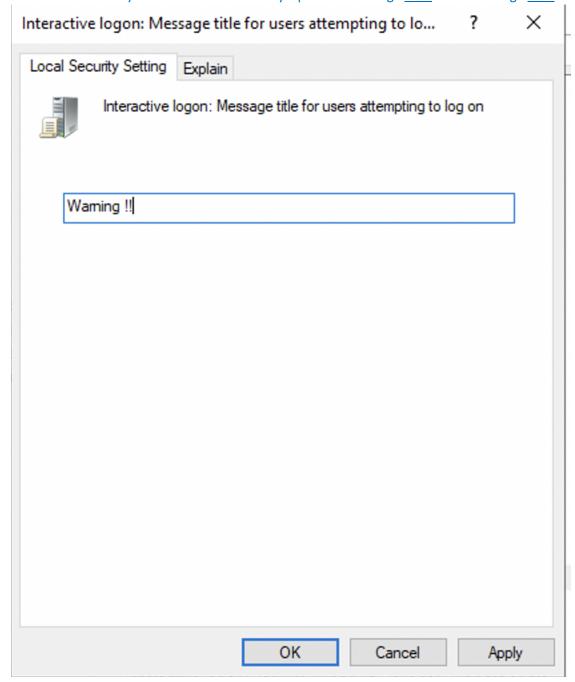


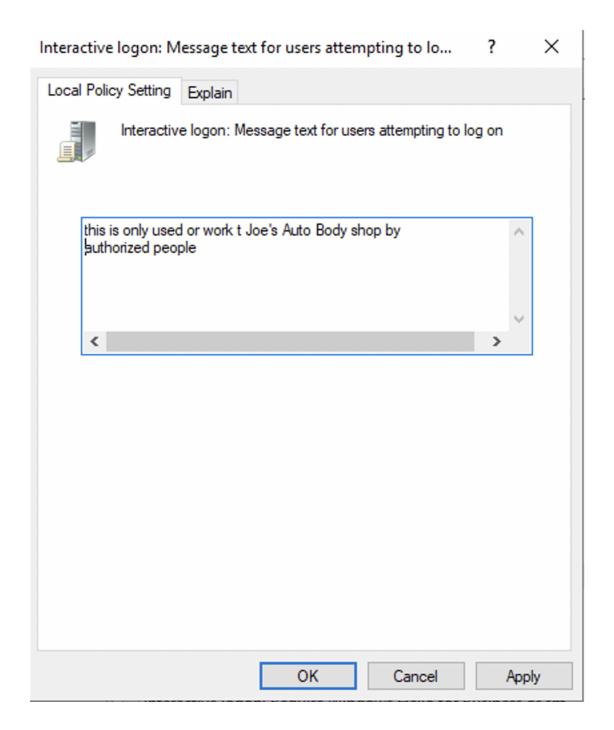
 Account should be automatically disabled after <u>5</u> unsuccessful login attempts. The account should be locked for <u>15</u> minutes and **then should automatically unlock**.

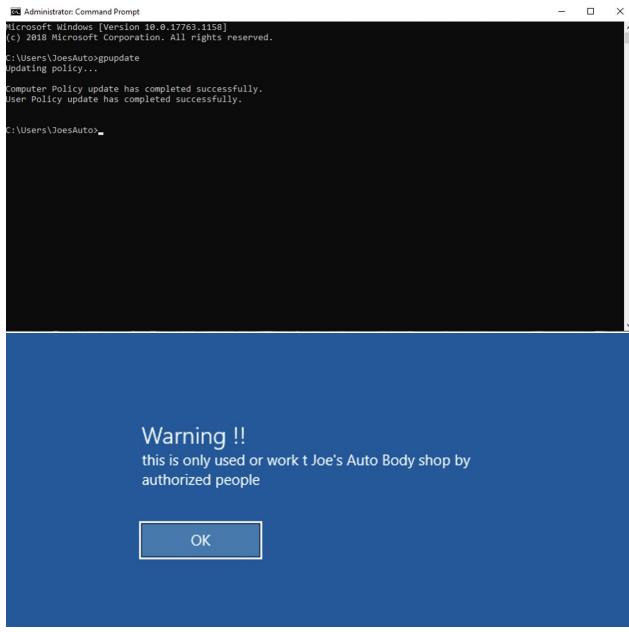


• Upon first logging into the PC, Joe wants a warning banner letting anyone using to know that this is to only be used for work at Joe's Auto Body shop by authorized people.

Under Local Security > Local Polices > Security Options > Message title ... and Message text ...







• There is to be **no remote access** to this computer.

User Accounts

- 1. What user accounts should not be there?

 A Hacker and Frank Accounts
- 2. Bonus questions: What is Hacker's password?
- 3. Explain the steps you take to disable or remove unwanted accounts.

 I opened Computer Management then Local Users > Groups then Users > right click on A Hacker account > Properties then I checked before Account is disabled, I did extra work for assurance, I removed all groups that he members of.
- 4. Why is it important to disable or remove unneeded accounts from a PC or application? Include potential vulnerabilities and risks.

To prevent unwanted users to <u>read</u> or <u>write</u> on files, <u>add</u> or <u>delete</u> apps.

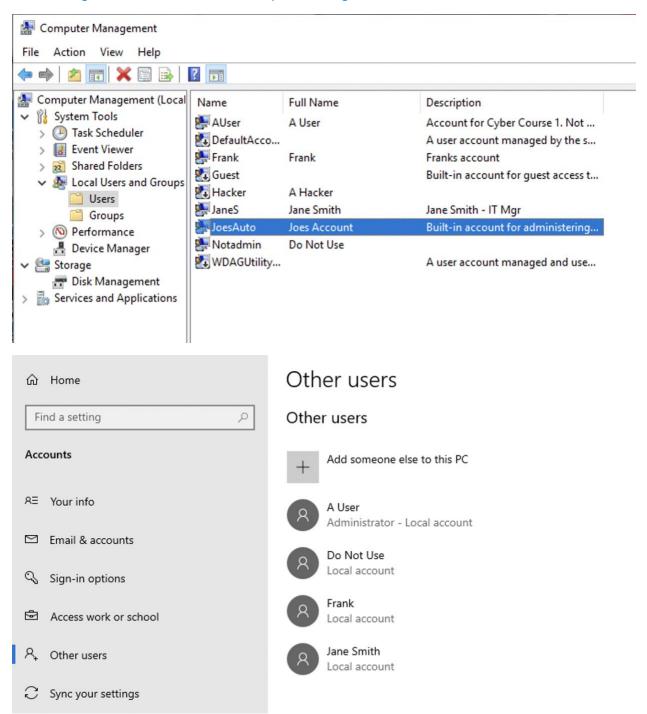
Only specific accounts should have administrator privileges. This reduces the ability for unwanted applications to be installed including malware.

5. Which account(s) have administrator rights that shouldn't?

A Hacker and Jane Smith

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

From Settings and Accounts, also from Computer Management



NOTE: I HAVE REMOVED ADMINISTRATOR FROM Jane Smith BEFORE.

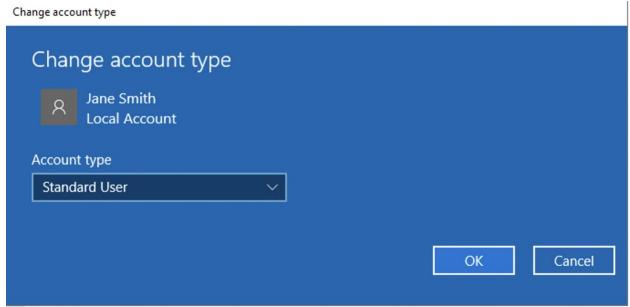
Administrator privileges for too many users are another security challenge.

- 7. Provide at least three risks associated with users having administrator rights on a PC.
- ability for unwanted applications to be installed and it may include a malware
- ability to modify important settings on the PC with no permission from no one
- ability to change the privileges of someone's user "like remove the administrator privilege from someone"

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.

From Settings and then Accounts and Other users and click on a specific account and click on change account type to Standard User.



- 9. What is the security principle behind this?

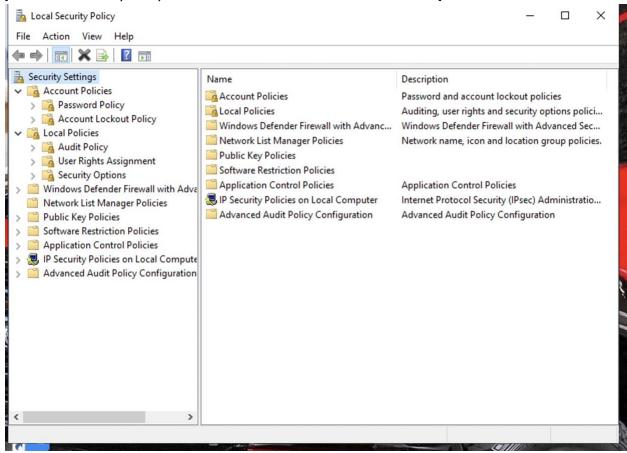
 It's preventing the unwanted edit/add/delete on files or applications or settings, it minimizes the privileges from the user.
- 10. The Center for Internet Security Controls lists this as one of their steps for security. Which step does this fulfill?

CIS Control 04: Secure Configuration of Enterprise Assets and Software.

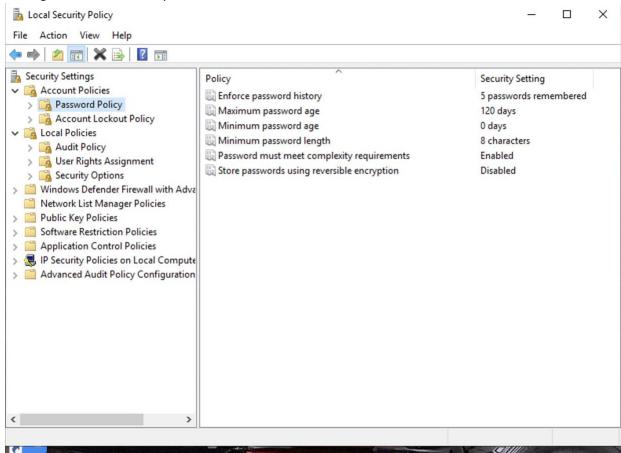
Setting Access and Authentication Policies

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.

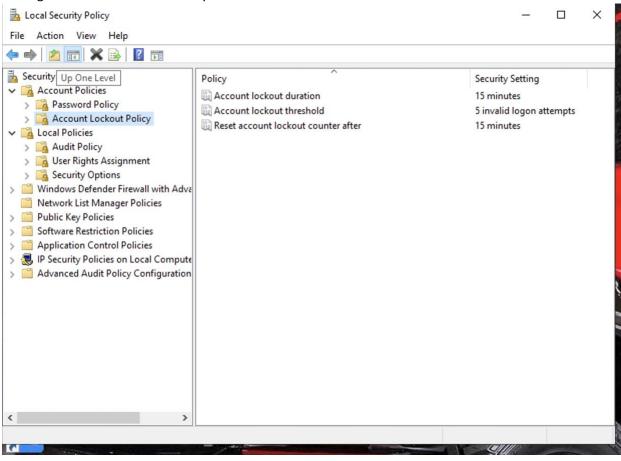
Provide a screenshot of the Local Security Policy window here.
 [Note: Local Security Policy is not available on Windows 10 Home edition.]



- 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:



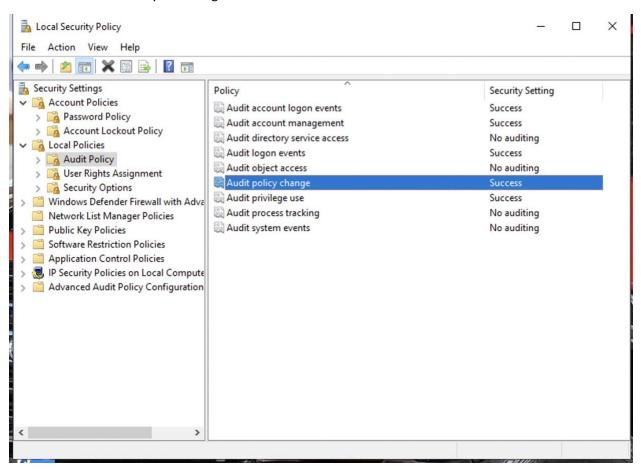
• Setting the Account Lockout Policy:



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.

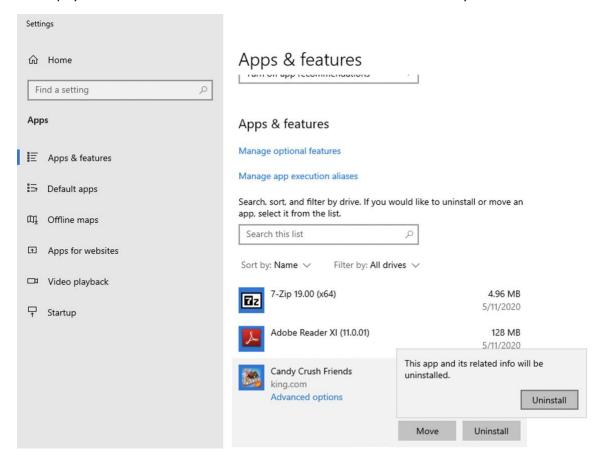
Joe has established the following rules regarding PC applications:

- 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
- Farm Heroes Saga
- MusicBee 3.3.7367
- Streaming audio recorder plus 2.3
- 2. Name at least three vulnerabilities, threats or risks with having unnecessary applications:
- May take employee's focus to do their work
- May has a back door to the system "like remote control"
- May contains hackers

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.

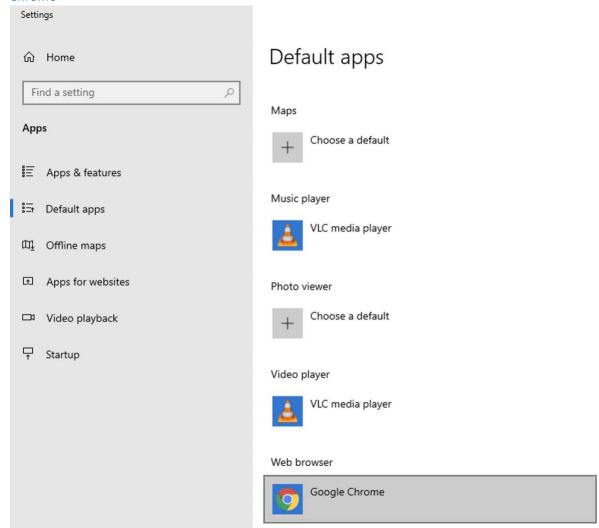


Default Browser

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.

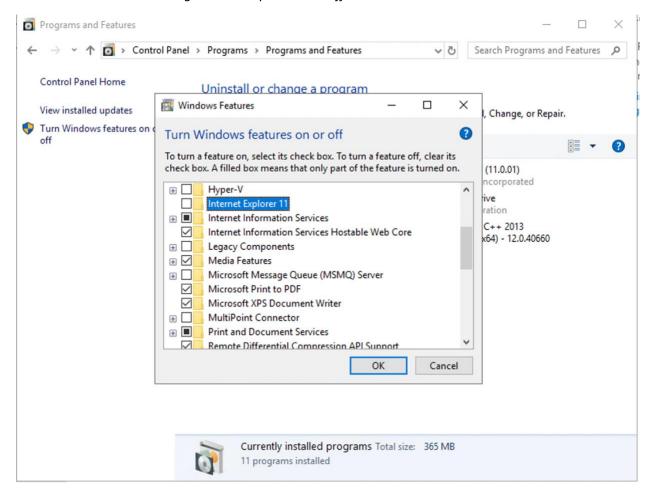
Right click on Windows icon > apps and features > Default apps > change the Web Browser to Chrome



- 2. Why should Internet Explorer be disabled from Windows PCs? Provide at least two risks or vulnerabilities associated with it.
 - Its unused app and maybe it will have new patches and didn't installed and that will increase vulnerabilities.
 - And from my research, there is a several zero-day vulnerabilities

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.

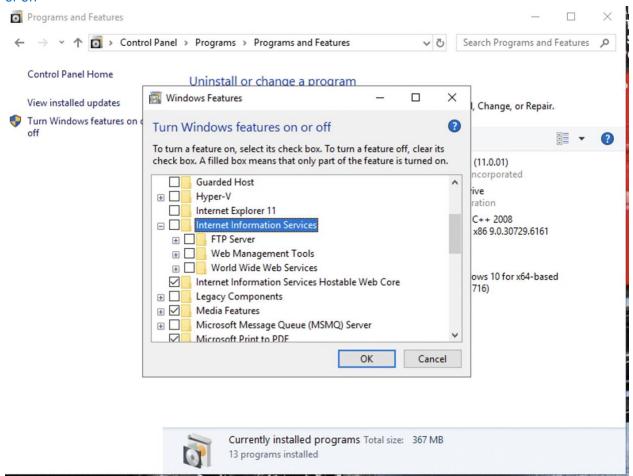


Windows Services

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.

I turned Internet Information Services OFF from > control panel >>> Turn Windows features on or off



2. Advanced users should provide at least two methods for determining a web server is running on a host

From Computer Management and from Windows Features

- 3. How do you disable them and make sure they are not restarted? All provided in the picture above.
- 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.

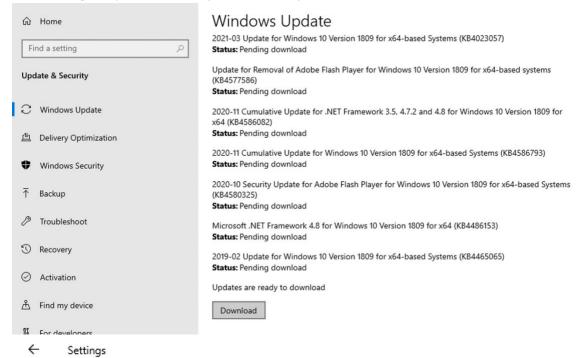
All provided in the picture above.

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.

From settings > Update & Security > I clicked download button From settings > Update & Security > Advanced options



Advanced options

*Some settings are managed by your organization

View configured update policies

Update options

Give me updates for other Microsoft products when I update Windows.



Automatically download updates, even over metered data connections (charges may apply)



On

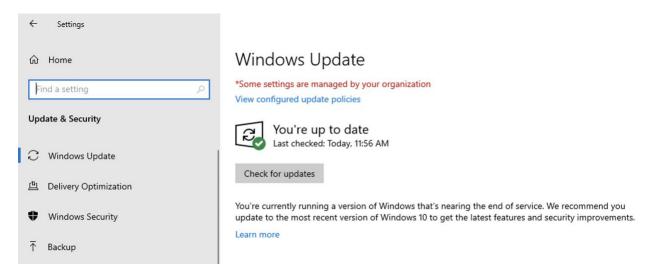
Update notifications

Show a notification when your PC requires a restart to finish updating



On On

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.

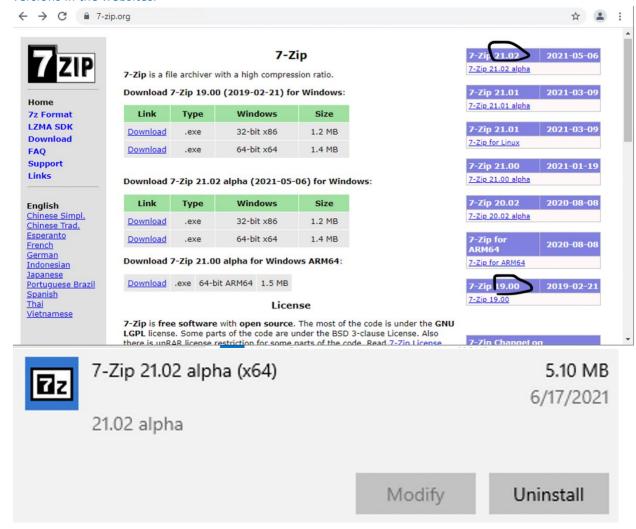


All applications should also be up to date on patches or fixes provided by the manufacturer. Any old versions of software should be uninstalled.

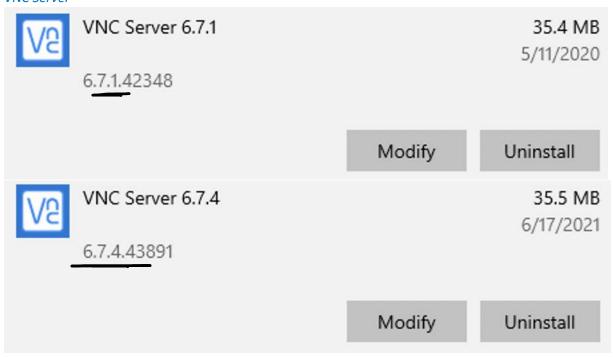
- 3. List at least two applications on Joe's PC that are **out of date**. List them below:
- 7-Zip
- VNC Server

4. Explain the steps you took to determine this information.

I was searched for the authors websites and match between the versions between Joe's PC and versions in the websites.



VNC Server



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

I downloaded the new files from the authors websites

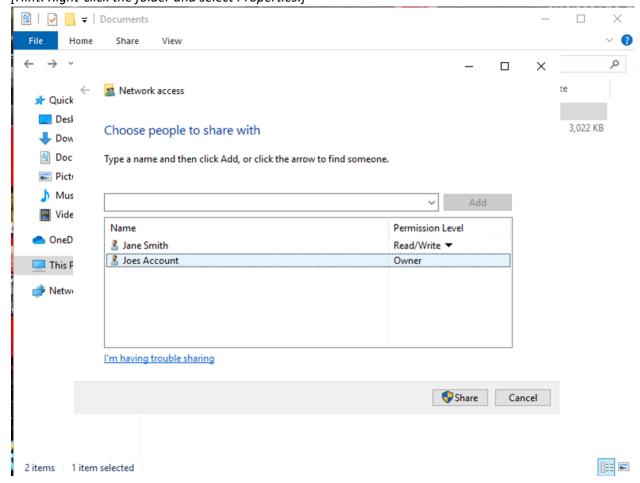
5. Securing Files and Folders

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.

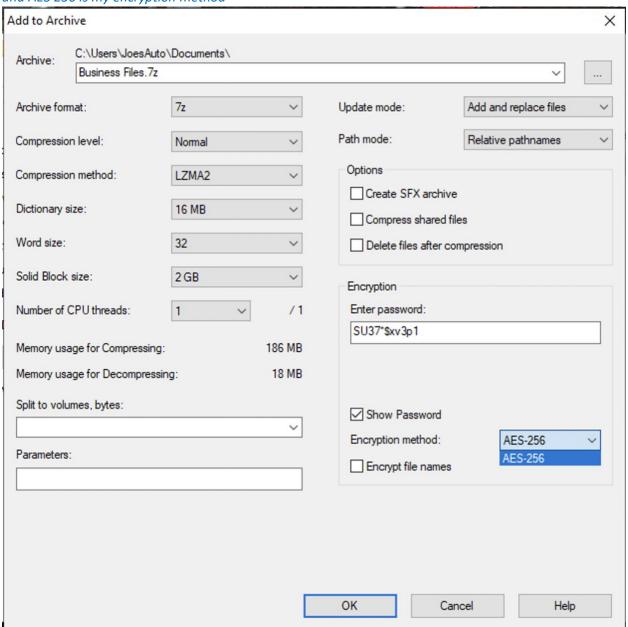
Encrypting files and folders

 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.

I right clicked on the Business file > 7-Zip > add to archive > I added the password "SU37*\$xv3p1" and AES 256 is my encryption method



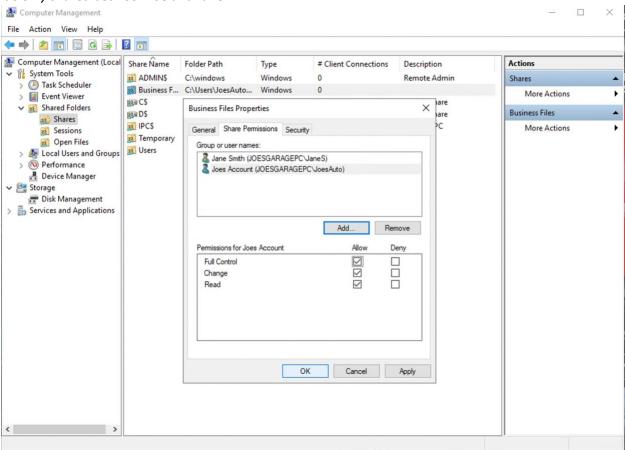
- 3. What security fundamental does this provide? Confidentiality and Integrity.
- 4. The Center for Internet Security Controls lists this as one of their steps for security. Which step does this fulfill?

CIS Control 03: Data Protection

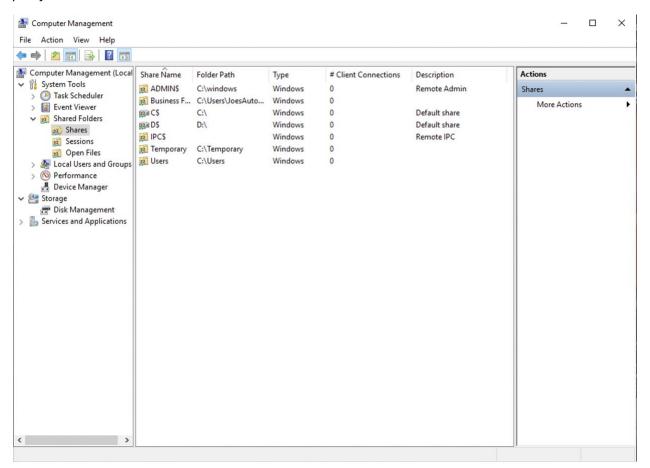
Shared Folders

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.



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.