**Lab4**

1. **Labsetup**

**A computer screen shot of a computer screen

Description automatically generatedFigure 1. Download and unzip set-up files**

**A computer screen shot

Description automatically generatedFigure 2. Running docker server**

Open a new terminal  
**A screenshot of a computer

Description automatically generated**

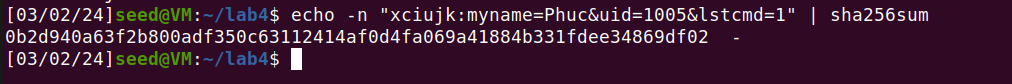
**A screenshot of a computer program

Description automatically generatedFigure 3. Interacting with the docker**

**A screenshot of a computer program

Description automatically generatedFigure 4. Host file modification**

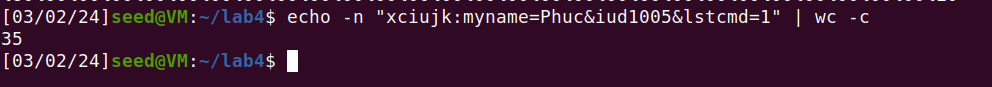
1. **Send a request to list files**

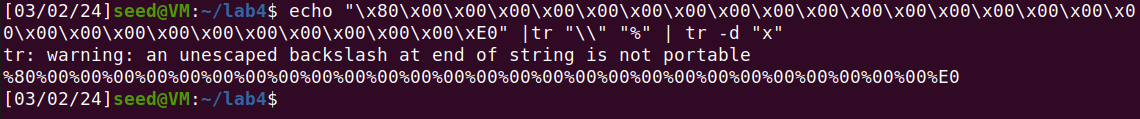
**Figure 1. Viewing the critical file and calculating the sum for the request**

**A computer screen with a black background

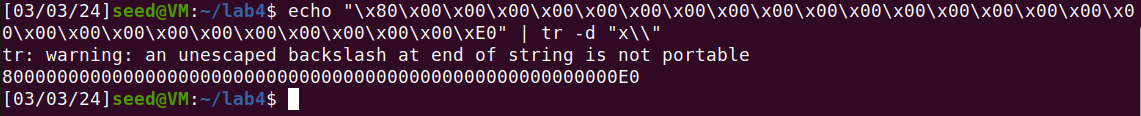
Description automatically generatedFigure 2. Access the page using the MAC calculated**

1. **Create padding**

**Figure 1. Find the size of the original command**

**Figure 2. Replace character to create padding string**

1. **The length extension attack**

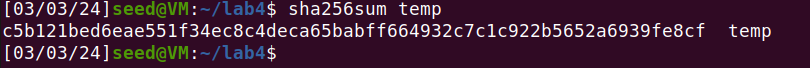
**Figure 1. Modify the string for our need**

**A computer screen with white text

Description automatically generatedFigure 2. Creating the file for padding purposes**

**A screenshot of a computer program

Description automatically generatedFigure 3. Concatenate and view the file**

**Figure 4. New MAC value from padding the extension command**

**A computer screen with text

Description automatically generatedFigure 5. Access the page with the new MAC calculated**

1. **Attack Mitigation using HMAC**

**A black background with white text

Description automatically generatedFigure 1. List the file in the server folder**

**A computer screen shot of a program code

Description automatically generatedFigure 2. Alter the HMAC algorithm**

**A screenshot of a computer

Description automatically generatedFigure 3. Rebuild the machine**

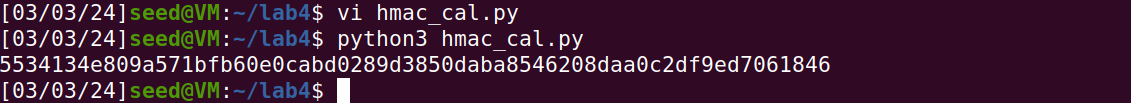
**A screenshot of a computer

Description automatically generated**

**Figure 4. Retart the machine**

**A computer screen shot of a program code

Description automatically generatedFigure 5. Program to calculate HMAC**

**Figure 6. Recalculating HMAC**

**A computer screen shot of text

Description automatically generatedFigure 7. Access the page with HMAC**