Virtual Environment Installation

The easiest way for everyone to have the same environment is to use *virtual machine* that is pre-configured with all of the material for the course. By doing this, there should be minimal issues during the course with the environment.

The environment is configured with useful tools that are needed for heap exploitation:

* Pwntools
* Pwndbg
* The best heap exploitation debugging environment. This has multiple custom LibC compilations with debugging symbols and removed optimizations from Malloc. Additionally, all of the exercises are automatically loaded with GDB configured to the right version of LibC and the source code for Malloc.
* Tools for version control on challenges for incremental steps on the exercises and the challenges.

Prior to starting this tutorial there are some prerequisites:

* Virtualbox installed on your current platform. Install the latest version of Virtualbox.
* Virtualbox extension pack for the **same** version of Virtualbox installed. The extension pack is tied to the current version of Virtualbox. This allows for features such as easy mouse integration and copy-paste to work on the VM.
* At least 10GB of free space on the device.

# Virtual Machine Installation Steps

These instructions were written for installation on a Macbook. The steps are assumed to be the same on all OS’s (Windows, Linux, etc.) unless otherwise noted below.

1. Download the virtual machine from the link at ***TODO*.** The VM is 5 gigabytes in size. Make sure to give yourself ample time to download the file. Once this is done, unzip the VM.
2. Click on *File->Import Appliance*.   
   A screenshot of a computer

   Description automatically generated with medium confidence
3. Click on the folder icon. This can be seen in the *red box* should below.   
   Graphical user interface, text, application

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4. Click on the Heap Course file. This should be *heap\_course.ova*. Graphical user interface, text, application

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5. The configuration options for RAM, CPU, and everything else are the default on our systems. However, feel free to modify these as you see fit.
6. Once you are happy with the configuration options, click on *Import*. This should start the import process of the virtual machine. This may take a few minutes.  
   Graphical user interface, text, application, email

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7. Once the import process has completed, we need to confirm a few *settings*. First, go to *Settings->Network*. Once here, confirm that the networking is set to NAT. This allows for the VM to have internet.   
   Graphical user interface, application

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8. The second configuration item to check is under *Settings->General->Advanced.* Validate that the *Shared Clipboard* is set to *Bi-Directional*.   
   Graphical user interface, text, application

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9. Optionally, the CPU, Base Memory and other settings can be changed to fit the system. By default, they are relatively low. In order to change this, go to the *Settings->System* section for these settings. To make the VM run as fast as possible for the course, it is recommended that as many CPUs and memory is given to the system as possible.

# Virtual Machine Testing

Congratulations! The VM is now installed and ready to go. Now, it is time to give it a try.

1. Turn on the VM. This can be done by clicking on the VM (Heap Course) and clicking on the green start arrow.   
   Graphical user interface, text, application

   Description automatically generated
2. Once the virtual machine has finished booting, a login screen should appear. Use the username *pwn\_heap* and the password *pwn\_heap* to log into the VM. If all of this works, you should see a nice Linux desktop environment.

Graphical user interface, application

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1. Open up the *Terminal Emulator* application. This can be done by clicking on the terminal icon.  
   Graphical user interface

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2. Run *ping google.com* in the terminal. This is to confirm internet access. If there is internet access, then the result should a *0% packet loss.*   
   Text

   Description automatically generated