Chapter 1

User manual

1.1 Local installation

The game may not be permanently available over the Internet. A local installation on the PC will enable the users to access the game. Other PC or mobile phone users can also play the game without installation, as long as they are in the same local area network as the PC which serves the game. The source code of the game is downloadable at github as:

> https://github.com/luyangshang/CyberCraft

To set up a server which serves the game, it's compulsory to have an Apache server first. You can choose the Apache Http Server itself, or you can choose other tools that incorporate apache server. Installing Apache Http Server itself in most cases starts from the source code, which means it tends to be more complexed, with more dependencies to deal with. Therefore, this approach may bring problems for non-programmers. On the other hand, using a tool with apache inside would mean relatively a bigger installation, with modules not strictly necessary for the game also installed. However, it's a quicker solution, especially if you don't want any problems before starting running the game. The following subsections will introduce both ways.

1.1.1 Install Apache HTTP Server

The Apache HTTP Server Project itself provides only source codes, not binary. That means, you have to compile yourself to obtain the executable.

- To compilation and installation on Unix or Unix-like systems, refer to this page (The page is official and in detailed, so that it will not be repeated in this manual.):

  `http://httpd.apache.org/docs/current/install.html`

  You can use the "install" command of your OS and directly get apache2 (recommended). Alternatively, you can download the source file and compile to binary on your machine. Then you have to take care of the dependencies.

  N.B. For downloaded source file, Apache website also requires the user to verify the integrity of the downloaded files for security purpose. It provides both SHA256 hash value and PGP certificate. Except for the tools suggested on the website, one can also use the following command for a quick check of the hash values of a target file:

```
Windows 7 or later:
certiutil -hashfile <path to file>  SHA256
Linux:
sha256sum <path to file>
```

What inside the angular bracket should be replaced with the path of the file from the current directory of course. These commands calculate the hash values using SHA256 hash algorithms. Unfortunately, PGP signature is another thing, and cannot be verified in this way. Nevertheless, a matched SHA256 hash value alone is enough for the integrity check.

- To compile from source on Windows, refer to this page:

  http://httpd.apache.org/docs/current/platform/win_compiling.html

  You can build apache either from command line, or from within the Visual Studio IDE.

  After installation you can use Apache in this way:

  http://httpd.apache.org/docs/current/platform/windows.html

  It recommends running apache as an service, which runs in non-blocking mode without occupying the command line.

  Note that, if you have already installed XAMPP, you will find the contained Apache server in the a folder called "apache". This contained Apache can be used the same as standalone Apache.

1.1.2   Install Tools containing Apache

There are many tools incorporate Apache like ApacheHans and XAMPP. Apache official website also recommend this tools for those who prefers executables. This part will take XAMPP as an example. Afterall, XAMPP features cross-platform, which satisfies users of all the current operating systems. Whereas, it should be known that other tools works also. XAMPP can be downloaded at https://www.apachefriends.org/download.html, which support Windows, Linux and OS X alike.

The default installation folder for XAMPP will be:

- Windows: C:\xampp

- Linux: /opt/lampp

- OS X: /Applications/XAMPP/xamppfiles

This will be your root folder of XAMPP if you don't choose another path. Inside this folder, there is a subfolder called htdocs. This is where you have to copy the game (that is, the folder CyberCraft) into. For other tools apart from XAMPP, the place to copy the game may be different. Some could even put on no restriction on where the game should be. Therefore, refer to the tool's manual for the actual path.

Now, one can start the XAMPP and start the Apache server. The way varies for different operating systems, so refer to the FAQ here:

- Windows: https://www.apachefriends.org/faq_windows.html

- Linux: https://www.apachefriends.org/faq_linux.html

- OS X: https://www.apachefriends.org/faq_osx.html

When the Apache server is started, enter "localhost" in the address bar of your browser and press enter, and you will be directed to the splash page. If by any means the server is still off, you will receive an error of connection refuse, and no page will be loaded.

Now, if you have successfully started the server, and the game is copied into the designated place, type in "localhost/CyberCraft" and enter, you should see the game start loading. N.B. The game will try to adapt to window size before loading. Therefore, if you want to play with maximum size, you may need to load or reload the game with maximum window size.

1.2 Begining

You are firstly asked to enter the name, surname and a casual 4-digit number, before you are allowed to start the game. This name + surname + number will be your identitifer throughout the game, with progress and score bound to it. When you have finished the game, and learning data collected, this triplets will be useful to identifier one player.

1.3 Tutorial

It's strongly suggested that the players start with the tutorial. In one hand, without the tutorial, the players may get stuck, even before the cyber battle really starts, not knowing what to do and how to do. On the other hand, the tutorial itself is designed as an equivalence of the later scenarios, with as much stories and gameplay as the formal scenarios.

There are three tutorials. Tutorial 1 focuses on the operations in the hall scene, which will be a preparation scene before the fight starts. The player can always quit from this tutorial through the gate, but it's recommended that he be patient enough, and finish the mission assigned by the boss. Tutorial 2 teaches the fight in the cyberspace as defender. The defender need to use your resources to build up defence and protect the assets for a certain number of rounds. The defender has to also be careful about those of DoS attack category, as such attacks will consume the server capacity, which makes you earn less resource in the next round. The defender should fix as much holes as possible before the intruder starts attacking in the next round. Tutorial 3 is about the fight in the cyberspace as intruder. The intruder earns a small amount of resource as the turn goes, but the a better source of resource is by dealing damage to the assets under the protection of the defender. However, the intruder should choose the attack pattern carefully, as some of the vulnerabilities might be temporarily or permanently fixed by the defender. The intruder can also impair the defender with those like DoS attacks.

1.4 Scenarios

With "Play" button you can enter the scenario selection scene (1.1). The scenarios are made in pairs, and will also be unlocked in pairs. In each pair, the first scenario is the one with even scenario number, where you play as an intruder(who is called Christopher); the second scenario is the one with odd scenario number, where you play as defender(who is named Godfried). As can be seen in the figure, "highest Score" will be noted down for each scenario completed. Successful completion of both scenarios of the previous pair will unlock the next pair. The player can

Figure 1.1.   Scenario Selection

repeat scenarios already completed, to get higher score or to perform better. The AI have its a preset action patterns for the specific scenario, but it will act differently each turn. Therefore, Repeating the same scenario usually resulting in different situations where the player has to adapt himself/herself to it.

1.5   Acts and buffs

The acts represent a security action that the character do to achieve the goal. The intruder uses cyber security attacks, denoted as offensive acts. These acts usually deals damage to the assets or impairs the opponent, opening door for future attacks. The defender uses defensive techniques of cyber security, sometimes called as defensive acts, to enhance the defence of all kind, so that the service being protected will survive longer.

However, not all acts take effect immediately. Some acts will even has some lasting effects, which will remain for a certain number of rounds, or even, forever. This long lasting effects are called buffs. The buffs represent that something is in use, or the state that an attack in progress. For example, a "MITM" attack by the intruder will, on success, give the defender a "MITM" buff. This buff, before expiration, will allow the attacker to perform a "Sniffing attack", which will deal considerable damange to the assets, which the defender should protect well. On the other hand, the defender can apply the defensive act called "MQV" (an authentication protocol) to obtain the corresponding buff, which nullify future "MITM" attack, until the buff expires.

N.B. besides the acts enforcing buffs, there are also the acts that cleaning buffs on the character. This happens when the intruder break some kind of defence, or when the defender turn to alternative technique in place of the old one. Figure 1.2 gives the explanation of all the possible relation between an act the buffs.

Figure 1.2.   Requirements on buffs and effects to buffs that might be found on an act

1.6   Cyberspace

The fight in the cyberspace always start with the defender's round. However, the defender need to calculate his/her resource carefully, as he/she usually does not have enough resource to strengthen on all aspects. The intruder, on the other hand, exploits this defendless points. The main screen of cyberspace is given as figure figure:cyberspaceWithDescription.

Personal notes

If the player is a new comer, and is unfamilar to the terms refered to in the game, he/she may need to frequently refer to personal notes. It can be opened with the book-like button on the top-left corner of the screen, or using a shortcut key N. But a better way is to use the button near the act description or buff description (shortcut key is also N). The buttons at act description or buff description will go directly to the specific entry in personal notes, which saves the player's effort to search for the term. There are also internal links where the player can navigate to other correlated terms. A chain-like button will also lead the player to external resources, to facilitate those who are interested to know more.

Except for the personal notes used for the explanation of the terms, other two things are frequently refered to. They are buffs on the character and action log.

Buffs on the character

By clicking on the portrait of the player avatar (or with a "S" key), one will be able to see the buffs on the avatar. Similarly, by clicking on the rival's portrait (or with a "R" key), the player will be able to see the buffs on the rival. Nevertheless, most of the buffs are supposed to be found on the defender. The intruder will (frequently) check the buffs on the defender, especially those positive buffs, which represent the defence that has been set up. The intruder should strike only the defendless point or at least those that are not very well defended. On the other side, the defender will check the buffs on himself/herself, to know where needs more strengthening.
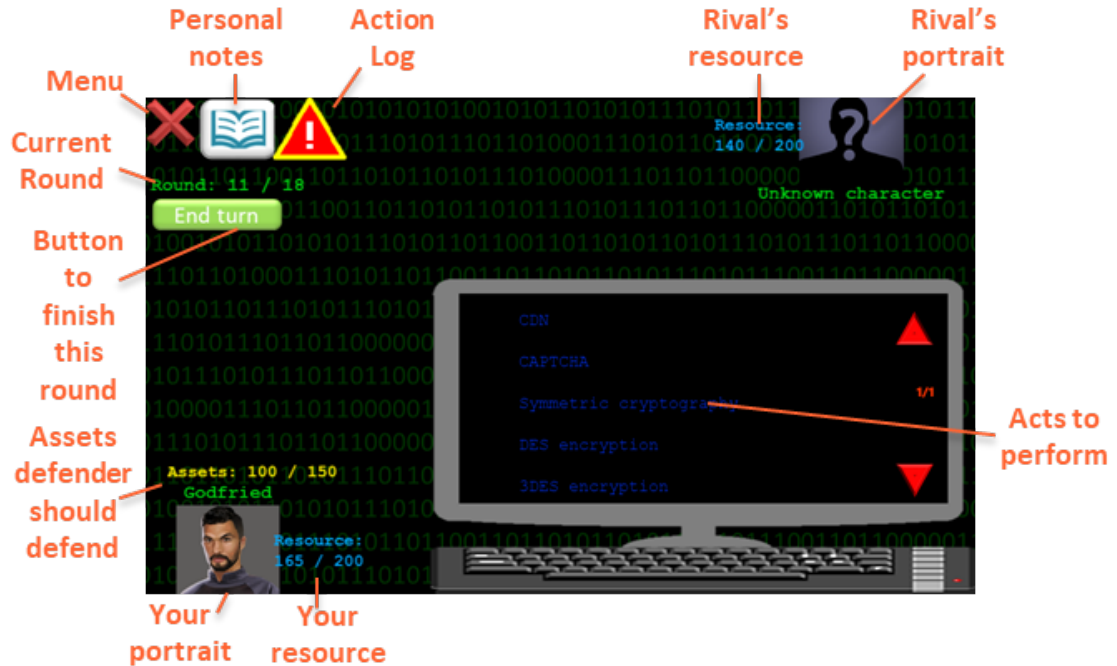
Action log

Figure 1.3.   Scenario Selection

The other place to refer to is action log. It can be opened by clicking on the exclamatory-mark-sign on the top-left corner of the screen, just adjacent to personal notes. The action log is actually a log of the history. It notes down the acts performed by the characters, as well as whether they succeeds. This allows the player to refer to past rival acts when he/she just missed it. Whereas, the most important value of this action log is when an act fails. The reason of why the act failed will be of great value to the player, especially the new comer who cannot remember things well. The reasons of the failure contains the presence or absence of necessary buffs, as well as the lack of luck: not all acts can be performed with 100% success rate. By clicking on one entry, the player can see the reason why the act failed. And, by clicking on the name of the act (called as Act pattern) specifically, the player can read its explanation in the personal notes.

1.7   Score and review

When the cyber battle ends, the outro scene will be shown, where the player's score will be calculated, mainly based on the performance noted in action log. The calculation formula is listed in figure 1.4. The fomulas tells that the intruder should strike fast and strike fierce. The defender, however, should concentrate on building a invincible defence, no others.

The review is more or less the same as action log that the player is able to refer in the cyberspace. Whereas, the review scene gives the player one more chance to revise how he/she has done during the scenario. If the scenario failed, review is an exellent place to know what is wrong, and brace oneself and prepare for one more trial.

Events	Change to intruder's score
Each successful act at his round	+100
Each round defender survives (including round 1)	-40
Each damage to the assets	+4

Events	Change to defender's score
Each failed act at intruder's round	+100
Each round he survives (including round 1)	+40
Each damage to the assets	-4

Figure 1.4.   score calculation formulas for the intruder and the defender