

Webber: A Game Template for PicoCTF 2018

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1. Standards and Limitations in this Game Design

- a) It should be attractive to middle/high school students and especially encourage them to keep playing.
- b) It should provide natural interface for players to solve question. In the other word, it should rationalize the existence of “questions”.
- c) It should make middle/high school students interested in Computer Security.
- d) It better fits the level structure, which is composed of around 7 levels, with each level having around 8 questions. (Details will be got from PPP on Jan 26th.) In each level, as soon as a team solves a certain number of questions, it will be enabled to enter the next level while they still can access the remaining questions in the original levels.
- e) Players should not pay much time in the gameplay other than question interface, which means the game should not have long-time cut scenes or other time-consuming parts.
- f) Players should focus on Computer Security area, which means the game should not excite players with other story factors too much.
- g) The competition is for all the middle/high school students. Shouldn't expect special love or traits from audience. Shouldn't rely on players' rich experience or deep understanding. Shouldn't only aim at certain audience groups (like explorers, killers, etc.).
- h) The game should be able to run even very old computers and browsers. So the performance matters.
- i) It better enables players to conveniently check their team's total progress (which level, how many questions solved, etc.).

2. The Template

Because of some reason, players want/need to enter some “districts” of Internet in the big city one by one. To do that, players connect to a “network node” to enter the “world wide web”, which may look like:

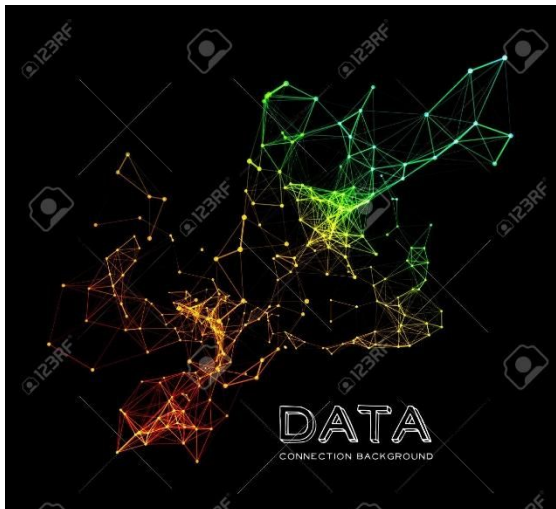




* From Google Image

Players may click on the “node” on the map to directly go to a certain place.

Each district has its unique color. And the districts can have themes. (For example, a district’s theme is virus, then the Internet connections there are in red, and viruses can be seen in objects.) A “map” shows the districts and nodes. For the “districts” or nodes that have not been accessible to players, they may be hidden from players.



*From Google Image

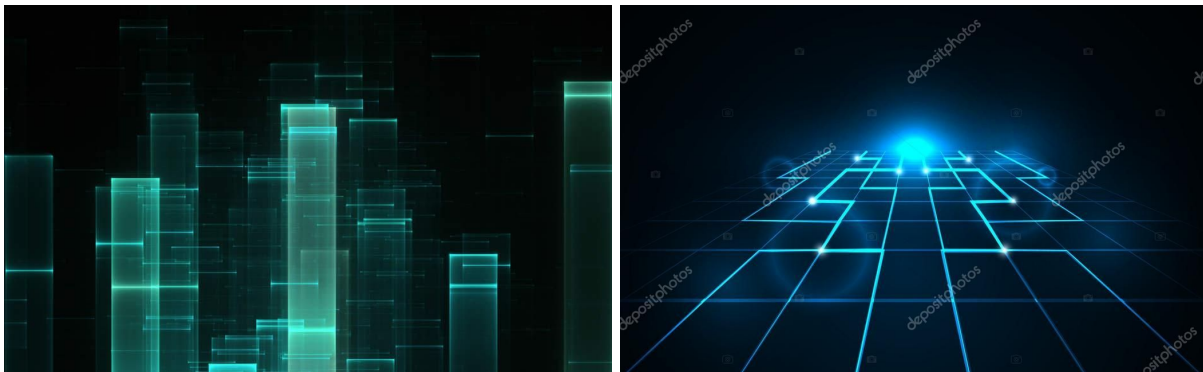
Within each “district”, players will meet several “barriers” which exists inside some objects in some places (nodes) and stop them from entering the next “district”. They are actually a question. (For example, if a question is about routing, it may stay in a router. Players need to click on the “bad” nod from the map, so then they will be transferred to the scene in which exists the router.) On the “map”, a “barrier” is marked with something obvious like a red “!”..

This is only a template. Backgrounds, stories and extensions can (and should) be added into this template to make a complete, interesting game. (See Section 4 & 5)

3. Strengths

The template fits all the Standards and Limitations above (See Section 1). Especially:

- a) It is cool and therefore attractive.
- b) The different themes of districts keep players curious, therefore encourage them to keep playing.
- c) It makes Computer Security look interesting. Questions are combined with themes and objects in scenes to show their charm. The Computer Security background together with the satisfaction provided in gameplay is a positive feedback for the beginners. It also points out the core attractions of Computer Security: explore the Internet world, get to know more, get more resources and power to accomplish the “duty”. This “duty” depends on the story, which can be flexibly designed. (See Section 4)
- d) Its gameplay is simple. It doesn’t take too much time to travel through questions. Neither does it possess extra gameplay to distract players from Computer Science.
- e) About Further Design: It is just a core mechanics. It is highly portable to various story backgrounds (Section 4), Variations (Section 5) and Extensions (Section 6).
- f) About Performance: It is portable to both 2D and 3D game style, both beautiful graphics effects and simple shapes. It is portable to optimization.
- g) About Programming: It is flexible and supports iterative development. Using this template, detailed designs can be set later than core development and they can be repeatedly tested and modified. Programmers can work on the “map” and “travelling among nodes” first, while the artist can work on concept art and some easy modelling of buildings.
- h) About Art: Compared with most other game design possibilities (like rich narrative, exploration, fighting...) it requires little work in art to achieve amazing gameplay experiences. In this template, only one room (“home”) of objects need real models. Objects in the city and/or containing questions only need simple profile/shape/outline. This will release much pressure from our solo artist.



*From Google Image

4. Possible Stories on this Template

There are a few possible story backgrounds using this template:

- a) AIs control the world. Only five human resisters remain, hiding in a tiny basement. It is their only chance, to get back controlled areas from the AI Government by hacking into their Internet, resetting programs in their machines/robots. But it is never easy. Each area is well defended (and better and better with their success).
- b) The team is an information company. The company wants to expand its business into the big city. This idea needs extra strong narrative design and funny events to support.
- c) The best friends of team members (NPC) quit school because that her personal information was divulged to some “bad people”, and these “bad people” used them to defame her on the Internet. To comfort the friend and make the public believe her, you decide to track and catch the “bad people” on the Internet, collect evidences and public them. In this process, the truth is gradually revealed.

5. Extensions

Many tiny interaction or story design can be added to this template to make it more interesting. For example:

- a) Interesting (short) NPC conversation after solving each question.
- b) Statistics board in “home” to show statistics like the areas under control, the number of questions solved/remaining.
- c) Multi-player version.
- d) A little knowledge about Computer Security waiting for players’ reading at spare nodes on the map.

6. Variations

Many details of the template can be modified while keeping the core mechanics and all (or most) the advantages. For example:

- a) Replace the “city” in the template with “world”.
- b) Replace the “districts” in the template with “levels”.
- c) Replace the “Internet” with other network, like transportation map, constellations...
- d) Multiple interfaces among districts. For example, in the “virus” themed district, the question interface is to fight against virus by answering questions.