**Programming test**

**Objective:** Implement a R-type inspired side scrolling shoot-em-up style game using provided game engine library. Basic art assets are provided. More can be added manually if needed. The intention of this test is to gauge candidates programming skills, understanding of given tasks and creativity.

**References:**

<http://v.youku.com/v_show/id_XMTYwNjExMzEwNA==.html?spm=a2h0k.8191407.0.0&from=s1.8-1-1.2>

**Design:** You control a spaceship in 4 directions with the arrow keys and fire bullets with space key. The background is constantly moving making the spaceship appear to fly from left to right even though it stays on the screen at all time. You have 3 lives and will lose one life every time the ship collides with:

1. Objects in the background
2. Enemies
3. Enemy bullets

Enemies spawn from outside the screen (usually from the right side but not required). The enemies can either spawn in patterns or randomly but the game needs to be more difficult as it progresses. The game can either be infinite or reach an end, it’s optional.

The on-screen elements should include:

Space ship  
Enemies (2 or 3 types)  
Bullets (1 or 2 styles)  
Upgrades (2 or 3 types)  
Background elements (a few different ones)  
Lives remaining indicator  
Score (optional)

**Game flow:** When the game start up the player sees a start menu where he presses space to start a new game. Then the game will start and will end when the player loses all his lives. After defeat, the game will return to the start menu again.

**Technical considerations:** Please follow the coding convention from the provided header file. We encourage us of objective oriented programming, design patterns and use of STL where suitable. Remember that the test is in C++ so please use C++ features and conventions (inheritance/virtual/templates) as needed.

**Time:** There is no fixed time limitation but we expect the receive the returned test back within 1 week after receiving. We expect most people will spend roughly 4 to 8 hours implementing this game, but individual candidates may take shorter or longer time as they require.

Good luck!