实验课 5：TIC-TAC-TOE 博弈游戏实验

一、实验大纲

1. LSL 脚本实习
   - 掌握粒子特效脚本方法
   - 掌握物体间通过对话框和记录本的交互处理机制
   - 掌握多 Agent 体之间 Link 互动同步处理机制
2. TIC-TAC-TOE 博弈游戏实验
   - TIC-TAC-TOE 博弈游戏规则
   - TIC-TAC-TOE 实验脚本框架
   - 实验实现基于多 Agent 同步互动的 TIC-TAC-TOE 游戏

二、LSL 脚本实习

2.1 LSL 粒子特效

Particles

Particles are generated, free-floating, non-object (sprites) visual effects that can simulate blood, dust, explosions, fire/flames, gas, smoke, sparks, spray, steam, waterfalls, waves, weather, etc. Particle generation is entirely client-side and does not contribute to sim load directly (although if particle functions are updated frequently, they will increase sim load--as will all functions, of course). Because clients are typically configured to render up to 4096 particles by default (configurable in preferences and increasable in settings.ini), care must be taken to generate a minimal number of particles in most situations. 10 objects generating 1000 particles per second would, for example, prevent others in the vicinity from using the particle system for their own builds.

llParticleSystem

`llParticleSystem(`list parameters`)`

示例脚本文件：

BasicParticle.lsl Bling.lsl Explode.lsl Leafs.lsl Smoke.lsl

2.2 LSL 对话框和记录本处理机制

对话框：llDialog

llDialog ：Shows the user specified by id a popup dialog box (in the upper right corner of their SecondLife window) containing message and buttons (and an "Ignore" button). Selecting any of the buttons will cause the avatar to say the text of that button on channel chat_channel.

llDialog(key id, string message, list buttons, integer chat_channel)

示例脚本文件：

0716_Using_llDialog.txt

记事本：Notecard

A notecard is a Second Life inventory item (basically a text file), and has a key that can be acquired manually by right-clicking a notecard and selecting "Copy UUID to clipboard". Notecards can contain any type and number of inventory items embedded into the text (objects, clothes, textures, other notecards, landmarks, etc.).Notecards are limited in size to 64KiB of text.

Functions

Function	Description
llGetNotecardLine	This function fetches line number of notecard name and returns the data through the dataserver event.
llGetNumberOfNotecardLines	Returns number of lines in the notecard name via the dataserver event.
llGiveInventory	Gives a notecard. The notecard's contents are displayed, and the user has the option to keep or discard the it by clicking buttons at the bottom of the notecard window. This is an easy way to create a popup text display.

示例脚本文件：

SlideShow.lsl　NotecardReader.lsl　NotecardSlideShow.lsl

0820_Reading_Each_Line_Of_A_Notecard.txt

2.3 LSL 多 Agent 体之间 Link 互动同步处理机制

Link 消息机制：llMessageLinked

llMessageLinked(integer linknum, integer num, string str, key id)

Sends num, str, and id to linknum (the specific prim in the linked set).
In objects with only 1 prim, linknum is 0. In objects with multiple prims, the linknum count starts at 1. (So in a 2-prim object, llGetLinkNumber would return 1 in the parent and 2 in the child.

Sender script:

```
default
{
    touch_start(integer total_number)
    {
        // Sends the message 0, "Touched.", NULL_KEY to all scripts in this prim,
        // that contain a link_message() event handler. That would _this_ script
        // if it has one.
        llMessageLinked(LINK_THIS, 0, "Touched.", NULL_KEY);
        // The 'LINK_THIS' constant makes llMessageLinked ONLY send the message
        // to the current prim.
        // It's the same as using 'llGetLinkNumber()' to return the current link number.
    }
}
```

Receiver script:

```
default
{
    // Waits for another script to send a link message
    link_message(integer sender_num, integer num, string str, key id)
    {
        llSay(0,str);
    }
}
```

三、 TIC-TAC-TOE 游戏实验

3.1 实验目的

本次实验为基础性实验，要求基于智能Agent感知-推理-行为机制，实验经典的TIC-TAC-TOE游戏，实验多Agent之间的通信和协同机制。

3.2 实验原理

3.2.1 TIC-TAC-TOE 游戏规则

TIC-TAC-TOE 游戏，是一种简单的九宫格游戏，玩法是使用 3×3 的九宫格，在九宫格里面画圈或叉，哪一方先在水平、垂直或对角线上有三个子则胜出。

3.3 实验步骤

实验步骤：

- 创建九宫格方块，通过脚本设置各面的圈或叉图像纹理 UUID，并创建响应游戏控制器控制命令，显示各面。（示例脚本，0821_TTT_Tile1.txt）
- 创建游戏控制器，添加游戏控制命令脚本，控制九宫格方块各面的显示（示例脚本 0822_TTT_Controller1.txt）；
- 复制九宫格方块，按下列规则排列

  0 1 2

  3 4 5

  6 7 8
- 将游戏控制器和 9 个九宫格链接成一个整体，游戏控制器为链接根元素；
- 实验游戏控制器与 9 宫格的命令互动（示例脚本 0823_TTT_Controler2.txt）；
- 修改游戏控制器，应用 TIC-TAC-TOE 游戏规则。（示例脚本 0824_TTT_Controller3.txt，修改 9 宫格各方块脚本，设定方块顺序和链接顺序的对应关系（示例脚本 0824_TTT_Tile3.txt）；
- 给游戏控制器脚本添加胜负判断函数，（示例脚本 0825_TTT_Winner_Detection.txt）。
- 游戏特效，给胜利者焰火效果，首先创建一个焰火物体，添加焰火粒子脚本（示例脚本 0826_Rezzed_Fireworks.txt）。将该焰火物体加到游戏控制器内容里，并修改游戏控制器脚本，添加释放焰火函数（示例脚本 0827_Launching_Fireworks.txt）。