## Intro to Assembly with RISC-V Simulator

In this lab, we will deal with several RISC-V assembly program files, each of which have a .s file extension. To run these, we will need to use a RISC-V simulator. The simulator is called **Venus** and can be found online <https://venus.cs61c.org/>.

### Assembly/Venus Basics

* Enter your RISC-V code in the “Editor” tab
* Programs start at the first line regardless of the label. That means that the main function must be put first.
* Programs end with an ecall with argument value 10. This signals for the program to exit. The ecall instructions are analogous to System Calls and allow us to do things such as print to the console or request chunks of memory from the heap.
* Labels end with a colon (:).
* Comments start with a pound sign (#).
* You CANNOT put more than one instruction per line.
* When you are done editing, click the “Simulator” tab to prepare for execution.

## Exercise : Familiarizing yourself with Venus

Getting started:

1. Paste the contents of ex1.s into the editor.
2. Click the “Simulator” tab. This will prepare the code you wrote for execution.
3. In the simulator, click “Assemble & Simulate from Editor”
4. In the simulator, to execute the next instruction, click the “step” button.
5. To undo an instruction, click the “prev” button.
6. To run the program to completion, click the “run” button.
7. To reset the program from the start, click the “reset” button.
8. The contents of all 32 registers are on the right-hand side, and the console output is at the bottom
9. To view the contents of memory, click the “Memory” tab on the right. You can navigate to different portions of your memory using the dropdown menu at the bottom.

使用RISC-V模拟器进行装配简介

在本实验中，我们将处理几个RISC-V汇编程序文件，每个文件都有.s文件扩展名。要运行这些，我们需要使用RISC-V模拟器。该模拟器被称为维纳斯，可以在网上找到https://venus.cs61c.org/。

装配/维纳斯基础知识

•在“编辑器”选项卡中输入RISC-V代码

•无论标签如何，程序都从第一行开始。这意味着必须首先放置主要功能。

•程序以参数值为10的ecall结束。这表示程序退出。 ecall指令类似于系统调用，允许我们执行诸如打印到控制台或从堆请求内存块之类的操作。

•标签以冒号（:)结尾。

•注释以井号（＃）开头。

•每行不能放置多条指令。

•完成编辑后，单击“模拟器”选项卡以准备执行。

练习：熟悉金星

入门：

1.将ex1.s的内容粘贴到编辑器中。

2.单击“模拟器”选项卡。这将准备您为执行而编写的代码。

3.在模拟器中，单击“从编辑器组装和模拟”

4.在模拟器中，要执行下一条指令，请单击“步骤”按钮。

5.要撤消指令，请单击“上一步”按钮。

6.要运行程序以完成，请单击“运行”按钮。

7.要从头开始重置程序，请单击“重置”按钮。

8.所有32个寄存器的内容位于右侧，控制台输出位于底部

9.要查看内存的内容，请单击右侧的“内存”选项卡。您可以使用底部的下拉菜单导航到内存的不同部分。