Exercise 1:

Write a Pintool (in JIT mode) that prints into a file called "**rtn-output.csv**" the information about the number of executed instructions in each routine (RTN).

The pintool should be named "**ex1.so"**.

The tool should emit the following information for every routine (RTN) which was executed at least once, in this exact format:

<image name of RTN_1> , 0x<image address of RTN_1>, <RTN_1 name> , 0x<RTN_1 address>, <instructions count of RTN_1>

<image name of RTN_2>, 0x<image address of RTN_2>, <RTN_2 name>, 0x<RTN_2 address>, <instructions count of RTN_2>

…

<image name of RTN_n >, 0x<image address of RTN_n>, <RTN_n name>, 0x<RTN_n address>, <instructions count of RTN_n>

The above routines list should be ordered according to highest instruction count, down to lowest instruction count.

You can assume that the total number of routines is no larger than 1000.

Your pintool should take no longer than 3 seconds to complete.
If it takes longer then seek ways to reduce its overhead.

Test your pintool:

In the moodle you'll find the input binary file called "**bzip2.gz**" along with an input file to give it called "**input.txt".**
Download the files to your T2 Linux account and uncompress the "**bzip2.gz**" executable using the **gunzip** command.
To run it simply type: $ **./bzip2 -k -f input.txt**
This will compress the file **input.txt** and generate a new file **input.txt.bz2** while maintaining the original **input.txt** file.

To test your pintool on the above **bzip2** binary file, simply type:
$ **<pindir>/pin -t ex1.so -- ./bzip2 -k -f input.txt**

You can measure the time it took your pintool to complete using the unix "**time**" command as follows:
$ **time <pindir>/pin -t ex1.so -- ./bzip2 -k -f input.txt**

For early testing, also attached is a simple test binary file called "**tst.gz**".
Download it to your linux account and unzip it using the "**gunzip**" command.
Test your pintool on it using the command: $ **time <pindir>/pin -t ex1.so -- ./tst**
The execution should complete immediately and generate the file "**rtn-output.csv**" which should be similar to the attached file "**rtn-output-tst.csv**" in the moodle link. (Expect some differences between the files).

Submission requirements:

The submission of this exercise is **NOT** in pairs.
Submit 1 compressed file called **ex1.zip** into the moodle exercise1 link containing the following files:

1. The binary of your pintool **ex1.so** (compiled, and tested by you).
2. The source files ex1.cpp (and any relevant .h files) of your pintool
3. The compilation files "**makefile**", "**makefile.rules",**
4. A **REDAME.txt** file that includes your **full name**, your **ID** and a **description of the compilation command and how to run the tool**.

Submission deadline:

Midnight Sunday May 8, 2022.