Binary Instrumentation with PIN

Definition: In this homework, you are going to do some experiments with X68 ISA, which is the instruction set in your computers. For this task, you will use PIN Binary Instrumentation Tool:

- https://software.intel.com/en-us/articles/pin-a-dynamic-binary-instrumentation-tool

Task1: Measure the accuracy of branch prediction. How many of the branches are predicted correctly?

Task2: Measure the total size of memory operations. Also, among memory operations, measure the ratio of read operations.

Task 3: Here is the list of registers and their purposes in X86.

RAX: Accumulator
RBX: Base index (for use with arrays)
RCX: Counter (for use with loops and strings)
RDX: Extend the precision of the accumulator
RSI: Source index for string operations.
RDI: Destination index for string operations.
RSP: Stack pointer for top address of the stack.
RBP: Stack base pointer for holding the address of the current stack frame.
R8-R15: general purposed registers

Calculate the frequency of usage of each register as a destination register.