Question 1 (30 points):

You are working in a team that is writing a functional simulator for the MIPS architecture. One of the functions that needs to be written is called `BranchTarget`. It computes the target of a branch when the branch is taken.

Below are the specifications for the format of the `beq` and the `bne` instructions for the MIPS architecture. The operation of the `bne` instruction is described as follows:

PC $\leftarrow$ PC + 4
if rs $\neq$ rt then PC $\leftarrow$ PC + sign-extend(offset << 2)

Write the code for the `BranchTarget` subroutine that receives in `$a0` the address in which an instruction is fetched, and in `$a1` the 32-bit binary representation for the instruction. `BranchTarget` returns 0 if the fetched instruction is not a `bne` or a `beq` instruction. It returns the branch target, *i.e.* the value of the PC after the execution of the branch when the instruction is either a `bne` or a `beq` and the branch is taken. The code from `BranchTarget` must follow all the MIPS calling conventions.