Shitty Fucking Useless Draft/Design

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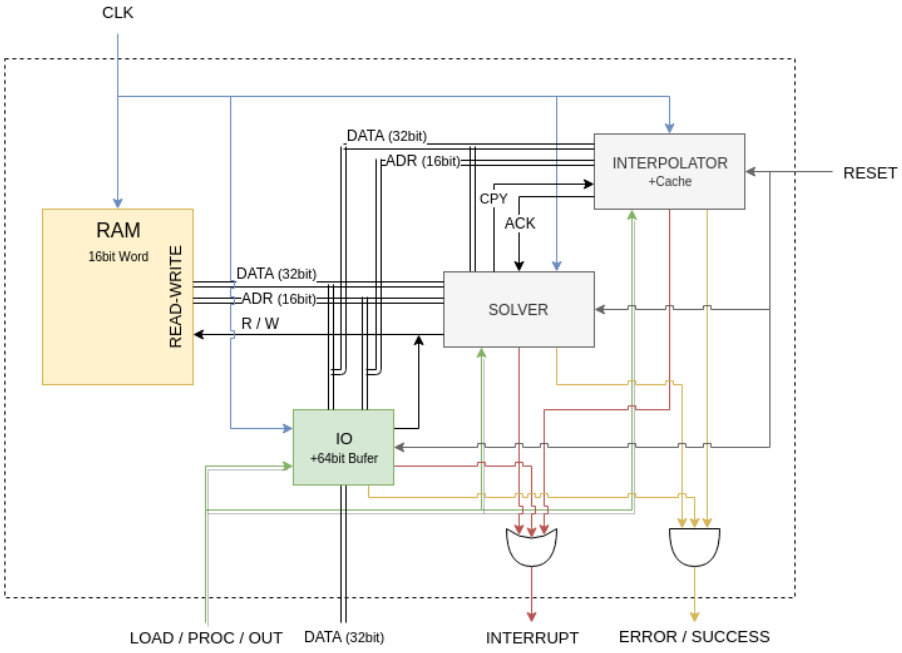

Figure 1: Overall Design

Interface:

This section summarizes the interfaces:

- CLK: IN
- RESET: IN
  - clears all internal states of all modules:
    - IO internal buffer

        * ERROR/SUCCESS of all modules resets to SUCCESS(1)
        * INTERRUP resets to zero
        * INTERPOLATOR invalidates all its cache, which means it needs to refill it from IO
        * SOVLER invalidates all its cache and registers, which means it needs to access the ram again
        * CPY from solver to interp, and ACK from interp to solver are both zeroed to stop any copy operations
    - RAM is NOT cleared
    - ASYNC
    - CPU is expected next clock to turn the `LOAD / PROC / OUT` into `LOAD` state and we will start loding input again.
- LOAD / PROC / OUT (2bit): IN
    - set the current major state of the machine
    - LOAD(0):
        * only IO, RAM, INTERPOLATOR work
        * IO receives *compressed* data from the CPU
        * IO decompresses data into buffer
        * buffer is written into RAM and/or INTERPOLATOR CACHE depending on internal counter
        * ends when IO flushes all buffer and raises INTERRUPT with either SUCCESS or ERROR
    - PROC(1):
        * only RAM, SOLVER, INTERPOLATOR work
        * SOLVER and INTERPOLATOR work concurrently to calculate their outputs
        * INTERPOLATOR waits for SOLVER CPY to copy its output then proceeds to calculating next output
        * ends when either SOLVER or INTERP raises INTERRUPT with either SUCCESS or ERROR
    - OUT(2):
        * only IO, RAM work
        * IO just copies final outputs to cpu from RAM
        * ends when IO raises INTERRUPT with either SUCCESS or ERROR
- DATA (32bit): INOUT
    - Data bus between cpu and io
- INTERRUPT: OUT
    - raised from 0 to 1 when some internal module (IO / SOLVER / INTERPOLATOR) finishes its task
    - if task finished with success the `ERROR / SUCCESS` is set to SUCCESS(1), otherwise it's ERROR(0)
- ERROR / SUCCESS: OUT
    - CPU should operate on this value only when `INTERRUPT` is 1
    - errros that could happen include: divide by zero, H $>$ 1, incomplete input