

Description of the pipelineRegister circuit files for Labs 8 –Pipeline CPU

The pipeline registers are designated by a number indicating which stages they bridge and a descriptor indicating the information stored at that stage.

- 1 indicates the IF/ID register
- 2 indicates the ID/EX registers
- 3 indicates the EX/Mem registers
- 4 indicate the Mem/WB registers

PC indicates the address information needed to compute branch and jump PC addresses

Ctrl indicate control lines

DP indicates the main data-path

Fn indicates the funct code

Reg indicates the destination register for write-back

The initial file is pipelineRegisters-start.circ. It includes the following completed pipeline registers which are used in PipelineCPU-start.circ.

PipeReg1 (only one pipeline register needed here)

PipeReg2PC (stores PC+4 and jump address from instruction)

PipeReg2Ctrl (stores all control values)

PipeReg2DP (stores data path values from A-reg, B-reg, and extended immediate)

PipeReg2FnReg (stores func code and possible destination registers – rt, rd)

You need to complete this file by creating the following pipeline registers.

PipeReg3PC (stores computed branch and jump addresses)

PipeReg3Ctrl (stores control values that need to pass to the Mem and WB stages)

PipeReg3DP (store the data values that pass from EX to Mem stages, namely zero line from ALU, ALU result, value from rt for possible sw instruction)

PipeReg3-4Reg (stores destination register number) Two copies of this register are used, one in the EX/Mem transfer and one in the Mem/WB transfer.

PipeReg4Ctrl (stores control values that need to pass to the WB stage)

PipeReg4DP (stores data values from ALU and memory)