



FIGURE e4.14.16 Clock cycles 3 and 4 of the instruction sequence on page 4.13-26. The bold lines are those active in a clock cycle, and the italicized register numbers in color indicate a hazard. The forwarding unit is highlighted by shading it when it is forwarding data to the ALU. The instructions before `sub` are shown as inactive just to emphasize what occurs for the four instructions in the example. Operand names are used in EX for control of forwarding; thus they are included in the instruction label for EX. Operand names are not needed in MEM or WB, so ... is used. Compare this with Figures e4.14.12 through e4.14.15, which show the datapath without forwarding where ID is the last stage to need operand information.