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EECS 361 Computer Architecture

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Quiz #4

1) How does the Booth's algorithm treat the positive and negative numbers differently?

Booth's algorithm treats positive and negative numbers the same. There is no need to perform and sign conversion.

2) What is the CPI of a single-cycle processor?

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3) Does the single-cycle control lie on the critical path of the processor?

In our design, control logic does not lie on the critical path, because register file access is assumed to take longer.

In general, the answer depends on the relative latency of the register file access and control circuit. The control logic is accessed in parallel with the register file; hence if the control logic has a smaller latency than that of the register file, it does not lie on the critical path. On the other hand, if it's latency is larger than that of the register file, it will lie on the critical path.

4) What operations does an extender perform?

Zero extension and signed extension. Specifically, extender takes in a 16-bit value and extends it to a 32-bit value by setting the most significant 16 bits to either zero or one according to the extension type: zero in the case of zero extension and the most-significant bit of the 16-bit value in the case of signed extension.