Lab 1 Multifunction Barrel Shifter

Demo is due on 24th, Jan., report is due on 26th, Jan.

Consider an 8-bit shifting circuit that can perform rotating right or rotating left. An additional 1-bit control signal specifies the desired direction.

1) Design the circuit using one rotate-right circuit, one rotate-left circuit, and one 2-to-1 multiplexer to select the desired result. Derive the code. (Requirement: use instance instantiation structure, name the inputs, outputs ports with the name in default user constraint file)

2) Derive a testbench and use simulation to verify operation of the code.

3) Synthesize the circuit, program the FPGA, and verify the operation.

4) This circuit can also be implemented by one rotate-right shifter with pre- and post-reversing circuits. The reversing circuit either passes the original input or reverses the input bitwise (e.g. if an 8-bit input is ***abcdefgh***, the reversed result is ***hgfedcba***). Derive the code.

5) Repeat steps 2 and 3 for the circuit designed in step 4.

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