The outputs of registers $R_0$, $R_1$, $R_2$, and $R_3$ are connected through 4-to-1 multiplexers to the inputs of a fifth register, $R_4$. Each register is 8 bits long. The required transfers, as dictated by four control variables are

- $C_0$: $R_4 \leftarrow R_0$
- $C_1$: $R_4 \leftarrow R_1$
- $C_2$: $R_4 \leftarrow R_2$
- $C_3$: $R_4 \leftarrow R_3$

The control variables are mutually exclusive (i.e. only one variable can be equal to 1 at any time) while the other three are equal to 0. Also, no transfer into $R_4$ is to occur for all control variables equal to 0.

(a) Using registers and a multiplexer, draw a detailed logic diagram of the hardware that implements a single bit of these register transfers.

(b) Draw a logic diagram of the simple logic that maps the control variables as inputs to three outputs: the two select variables for the multiplexer and the load signal for the register $R_4$. 
