

# Explanation Of Code

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The entity `helper_circuit_` in the code refers to the FSM which is used to refer to the circuit which gives output which is used to decide whether the circuit will perform smoothening or sharpening. Its output '01' if the image needs to be sharpened otherwise it needs to be smoothened.

The entity `final_circuit` in the code refers to the total circuit which is obtained by using components RAM, ROM, MAC and `helper_circuit` which writes the bit values to the suitable position on RAM using 9-bit multiplier. For this we will use the nested for-loops so that we can iterate through all possible bits of the image. The write to RAM saves the bits in RAM at suitable address i.e., it right shifts by 7 bits and stores the answer directly if it is positive or else it stores 0.