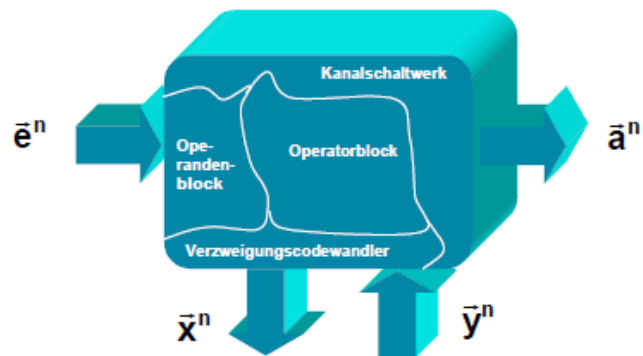


Electronics Design Automation B

Autumn Semester 2018



Project 3:

Arcsine Calculation

Project 3: Arcsine Calculation

Function Description

Develop a design for calculating the arc sine of a number. The input signal should be 1-bit reset and another 8-bit vector, and the output signal is 8 bits wide as well. After completion of the calculation, the calculation should be executed endlessly with the current input data.

$$\alpha = \arcsin(x) \quad x \in [-1,1], \alpha \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$$

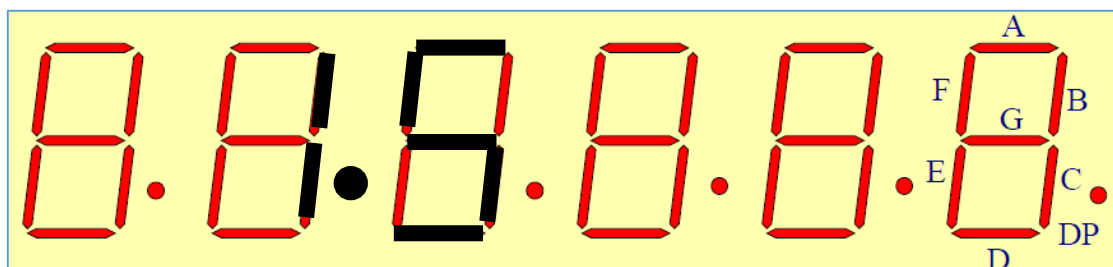
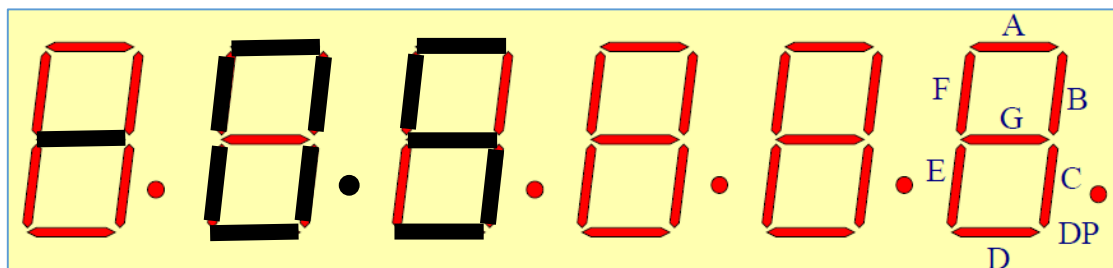
The format of the data should be 8-bit signed fixed point “XXX.XXXXX”.

- 00110000 = +01.10000 = +1.5
- 10110000 = -01.10000 = -1.5

Hardware-Platform

The XILINX Atrix-7 Board is used. Among the existed peripherals on board, the 8 switches (the input vector) and the 6 7-seg LEDs (display the calculation result) shall be used for this project. The 50MHz oscillator is used on the board as system clock. one push button is intended as system reset.

- First 7-seg LED display the symbol of result. Only show - instead of +
- Second 7-seg LED display the single digit of result ‘1’ or ‘0’ and the Decimal point
- The rest of 4 7-seg LEDs display the fraction of the result



Tasks

- Implement the required function using the CORDIC algorithm.
- Test your algorithm with an appropriate testbench in the simulation.
- Present the function of the algorithm.

Assessment Criteria

- Fulfillment of the function
- Understanding and clarity of the VHDL code
- Quality of testing