

## **CSE 433 Embedded Systems Project 2**

**Due Date May 24, 2023 23:59 (Each day -20pts)**

### **Searcher**

In this assignment, you will design a FSM in Quartus that can sort an array and then performs binary search. The array input will come serially.

Your hardware will take a number to be searched for, an integer array and size of the array as three inputs. It will output 1 if the number is found and 0 otherwise.

Part A- Write a C code that takes an array and a number to be searched for. It first sorts that array and then performs binary search for the number. The algorithm will return 1 if it finds the number and return 0 if it is not found.

Part B- Design an FSM from your C program.

Part C- Design a datapath for your Searcher in Quartus using Verilog.

Part D- Design the control unit as an FSM.

Part E- Combine and test them using Modelsim/Questa.

Part F- (Bonus: 30pts) Find a way to upload and test your Searcher on a real FPGA.

Send report and all files as a zip file to MS Teams. There will be a demo afterwards.

If cannot perform searching, you can get still 75% grade if you can sort. Your design should work, otherwise you get 50 at most.