2025 Digital IC Design Homework 1

	陳冠言						
Student ID P76134082							
Functional Simulation Result							
Stage 1 Pass/Fail		Stage 2	Pass/Fail	Stage 3	Pass/Fail	Stage 4	Pass/Fail
Stage 1							
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Stage 2							
# Stage2: MedianFinder_3num Pass !							
Stage 3							
# Stage3: MedianFinder_5num Pass ! #							
Stage 4							
# Stage4: MedianFinder_7num Pass !							
Description of your design							
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1. Dual-input Comparator2

兩個數值比較,小的為 min,大的為 max。

2. Three-input Median Finder

主要根據題目描述與 logic diagram, 進行三次 comparator 2 的比較, 先過濾掉 3 者中的最大值, 再比較剩下兩者即可找出中間值(即中位數 median)。

3. Five-input Median Finder

先挑出 4 個數值中的最小值和最大值,最後再將剛剛沒有比較的數值與其他兩者做 Three-input Median Finder 找出 3 者中的 median。

4. Seven-input Median Finder

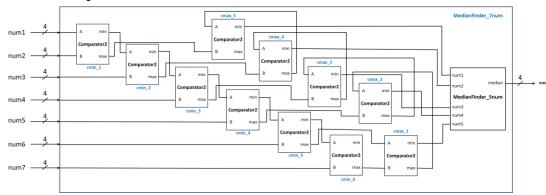


圖 1: Logic diagram of Seven-input Median Finder

其實7個數值的處理與上述雷同,我的主要概念為先挑出7個數值的最小值和最大值後就可以用剛剛設計好的 Five-input Median Finder 找出5個數值的 median,其也等同於7個數值的 median。

所以設計的電路主要先用 6 個 comparator 2 進行 6 次兩兩數值的比較,第一個比較完用他的 min 與下一個數值比較,迭代 6 次後可以得到最小值;反之,可以將剛剛 comparator 2 cmin_6 產生的 max 和 comparator 2 cmin_5 的 max 使用 comparator 2 進行比較,產生一個新的 max,再用此 max 與 cmin_4 的 max 進行比較,迭代 5 次後(因為 min 已經找到所以 7-1 個數值來比較)可以找到最大值。

最後,剩下五個數值就可以用剛剛設計好的 Five-input Median Finder 去找出 median。