

2020 Digital IC Design Homework 3: Approximate Average

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Simulation Result					
Functional simulation	Pass	Gate-level simulation	Pass	Gate-level simulation time	372930 (ns)
<pre># ----- # ----- # ----- # All data have been generated successfully! # -----PASS----- # ----- # ** Note: \$finish : C:/DIC/hw3/testfixture.v(122) # Time: 4008 ns Iteration: 2 Instance: /test</pre>			<pre> V\$IM 212> run -all # ----- # ----- # ----- # All data have been generated successfully! # -----PASS----- # ----- # ** Note: \$finish : C:/DIC/hw3/testfixture.v(122) # Time: 372930 ns Iteration: 2 Instance: /test</pre>		
Synthesis Result					
Total logic elements			583		
Total memory bit			0		
Embedded multiplier 9-bit element			0		
<div><div>Flow Summary</div><div><div>Flow Status</div><div>Successful - Tue Apr 28 22:22:35 2020</div></div><div><div>Quartus II Version</div><div>10.0 Build 262 08/18/2010 SP 1 SJ Full Version</div></div><div><div>Revision Name</div><div>CS</div></div><div><div>Top-level Entity Name</div><div>CS</div></div><div><div>Family</div><div>Cyclone II</div></div><div><div>Device</div><div>EP2C70F896C8</div></div><div><div>Timing Models</div><div>Final</div></div><div><div>Met timing requirements</div><div>No</div></div><div><div>Total logic elements</div><div>583 / 68,416 (< 1 %)</div></div><div><div>Total combinational functions</div><div>583 / 68,416 (< 1 %)</div></div><div><div>Dedicated logic registers</div><div>72 / 68,416 (< 1 %)</div></div><div><div>Total registers</div><div>72</div></div><div><div>Total pins</div><div>20 / 622 (3 %)</div></div><div><div>Total virtual pins</div><div>0</div></div><div><div>Total memory bits</div><div>0 / 1,152,000 (0 %)</div></div><div><div>Embedded Multiplier 9-bit elements</div><div>0 / 300 (0 %)</div></div><div><div>Total PLLs</div><div>0 / 4 (0 %)</div></div></div> <div>Min Cycle: 187</div>					
Description of your design					
<p>循序電路中 always@ (negedge clk)，使用延遲 clk 的方式，獲得 9 個 input。接下來進入組合電路，算出 9 個 input 的 sum 後，算出 avg，再透過第一個迴圈計算出那些 input 小於 avg，並存在[8:0] jmp 這個變數中，方便了解哪個 input 比較小，接下來透過第二個迴圈，算出小於 avg 中最接近的 input，接下來再用(sum+該 input*9)/8 即可得出正確 output。</p> <p>Scoring = (583 + 0 + 9*0) * 372930(ns) = 217418190(ns)</p>					

*Scoring = (Total logic elements + total memory bit + 9*embedded multiplier 9-bit element) × (gate-level simulation time in ns)*