Notes on 2020.1 Vivado HLS Tutorial – Chapter 6 19/06/2022

Completing Chapter 6 may take you two to three hours assuming you have set up your lab environment and have gained familiarity with the tools by completing the previously suggested tutorial exercises.

Ch. 6 presents a comprehensive study of the techniques used to reduce the interval and latency for a 2D discrete cosine transform. While it is a long tutorial chapter, it is well worth doing to reinforce the analysis techniques you have touched on to date and to be introduced to a few others.

Specific notes follow:

- As you only have a limited set of devices available in the WebPack version of Vivado HLS, modify the following 3 lines of the `run_hls.tcl` script before you begin:
  ```
  set_part  {xc7z020clg484-1}
  create_clock -period 12
  set_clock_uncertainty 1.5
  ```
  This will affect the absolute values for results, but the trends will be like those described in the tutorial documentation.
- Carefully note the comment regarding control states at the bottom of page 112 and continued at the top of page 113.
- Note that the line numbers of the C source code and the operations in the Schedule Viewer don't line up exactly at step 4.3 and at some other parts of the tutorial. This shouldn't be too problematic.
- It is highly worthwhile noting the observations on page 116 commencing with "You can choose to do…" and "When pipelining nested loops…"
- It is worth noting the first paragraph on page 122.
- It is worth noting the paragraph that reads "The eight reads…" on page 126. The paragraph below that (specifically the dot points) refer to the source file `dct.cpp`.
- It is worth comparing the alternative approaches discussed in the paragraph commencing: "One way to have…" on page 133. Which is the best approach when compared with the alternative you are asked to follow through with, namely to inline the `dct_2d` function? Which approach best balances resource usage and performance (latency and interval, here)?