HLS Project 2

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1 RTL

We run RTL on Catapult.

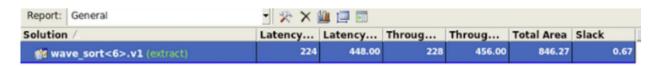


Figure 1: Table after RTL

1.1 Shedule

The images for shedule of "bubble 1", "bubble 2" and "wave sort" loops are presented below.

Bubble 1

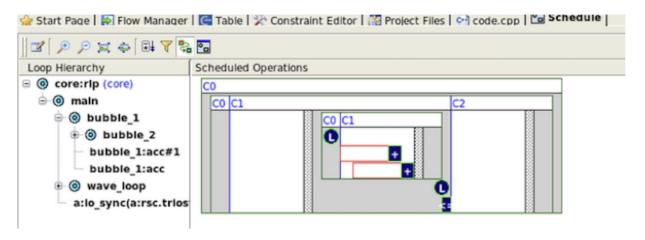


Figure 2: Shedule for "bubble 1" loop.

Bubble 2

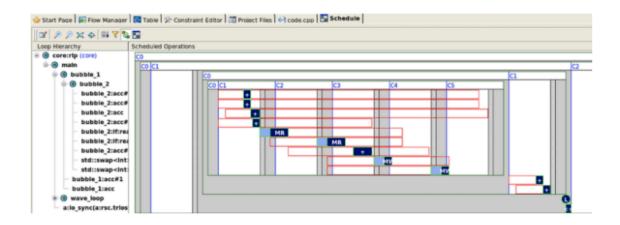


Figure 3: Shedule for "bubble 2" loop.

Wave sort

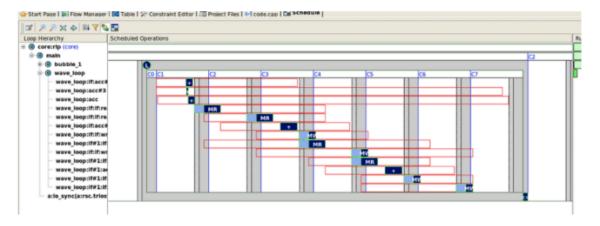


Figure 4: Shedule for "wave sort" loop.

2 RTL Loop Unroll

We run RTL after loop unroll. The modifications are shown in more detail in the image below.

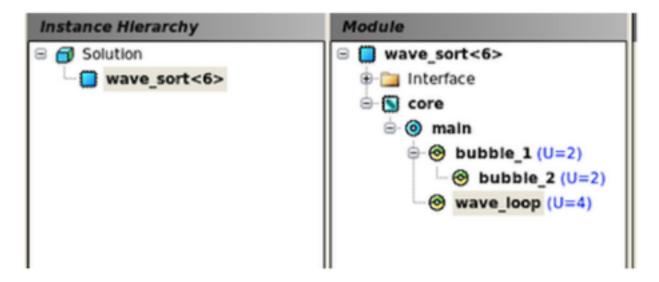


Figure 5: Loop Unroll



Figure 6: Table for loop unroll

2.1 Shedule

Bubble 1

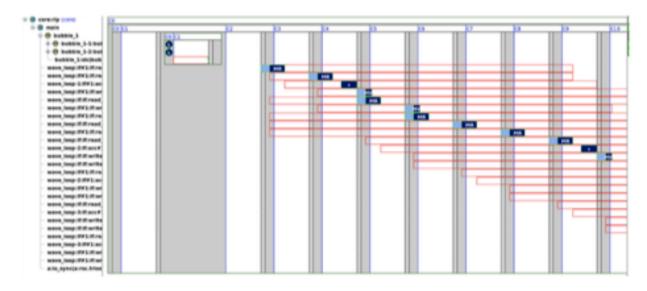


Figure 7: Shedule for "bubble 1" unrolled loop.

Bubble 2

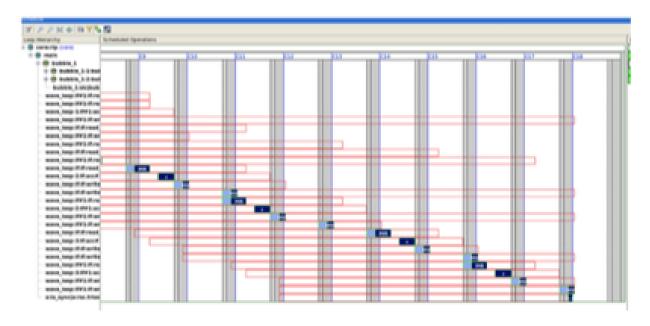


Figure 8: Shedule for "bubble 2" unrolled loop.

3 Questa Sim

We created a testbench in main function to make sure our final circuit is correct. This way we can monitor the correct mapping of the circuit's inputs to outputs.

```
## Info: His reset: TLS_rst active 0 0 s

## Sorted_wave Array :9 4 14 11 19 18 Sorted_wave Golden :9 4 14 11 19 18 --> MATCH

## Array :8 4 5 13 5 15 Golden :8 4 5 13 5 15 Sorted_wave Array :5 4 8 5 15 13 Sorted_wave Golden :5 4 8 5 15 13 --> MATCH

## Array :8 20 9 6 8 3 Golden :8 20 9 6 8 3 Sorted_wave Array :5 3 8 20 9 Sorted_wave Golden :6 3 8 20 9 --> MATCH

## Array :1 9 3 18 9 5 Golden :1 9 3 18 9 5 Sorted_wave Array :3 1 9 5 18 9 Sorted_wave Golden :3 1 9 5 18 9 --> MATCH

## Array :1 12 10 5 2 13 14 Golden :1 2 10 5 2 13 14 Sorted_wave Array :5 2 12 10 14 13 Sorted_wave Golden :5 2 12 10 14 13 --> MATCH

## Array :1 1 10 5 2 13 14 Golden :1 18 1 3 9 4 4 17 Sorted_wave Array :4 4 13 9 18 17 Sorted_wave Golden :4 4 13 9 18 17 --> MATCH

## Array :1 18 13 9 4 4 17 Golden :1 18 1 10 2 19 Sorted_wave Array :4 4 13 9 18 17 Sorted_wave Golden :2 1 15 10 19 18 --> MATCH

## Array :1 14 3 17 17 13 2 Golden :1 14 3 17 17 13 2 Sorted_wave Array :3 1 15 10 19 18 Sorted_wave Golden :3 2 14 13 17 17 --> MATCH

## Array :1 15 10 11 18 Golden :1 15 10 14 18 Sorted_wave Array :1 19 18 Sorted_wave Golden :1 19 18 14 --> MATCH

## Array :1 16 17 6 16 12 7 Golden :1 16 17 6 16 12 7 Sorted_wave Array :7 6 16 12 17 15 Sorted_wave Golden :7 6 16 12 17 16 --> MATCH

## Array :1 16 17 6 16 12 7 Golden :1 12 15 9 17 15 Sorted_wave Array :1 19 5 18 14 --> MATCH

## Array :1 16 18 19 10 Golden :1 12 15 5 9 12 Sorted_wave Array :1 19 5 18 14 Sorted_wave Golden :1 19 5 18 14 --> MATCH

## Array :1 16 17 6 16 12 7 Golden :1 12 15 5 9 12 Sorted_wave Array :1 19 5 18 15 Sorted_wave Golden :1 19 18 18 --> MATCH

## Array :1 16 17 6 16 12 7 Golden :1 12 15 5 9 15 5 Sorted_wave Array :1 19 5 18 15 Sorted_wave Golden :1 19 5 18 14 --> MATCH

## Array :1 16 17 6 16 12 7 13 17 Sorted_wave Array :1 19 5 18 15 Sorted_wave Golden :1 19 5 18 14 --> MATCH

## Array :1 16 17 6 18 12 7 13 17 Sorted_wave Array :1 19 5 18 10 Sorted_wave Golden :1 19 18 18 10 Sorted_wave Golden :1 19 18 18 --> MATCH

## Array :1 18 19 18 18 19 Sorted_wave Array :1 1
```

Figure 9: Co-simulation on Questa Sim