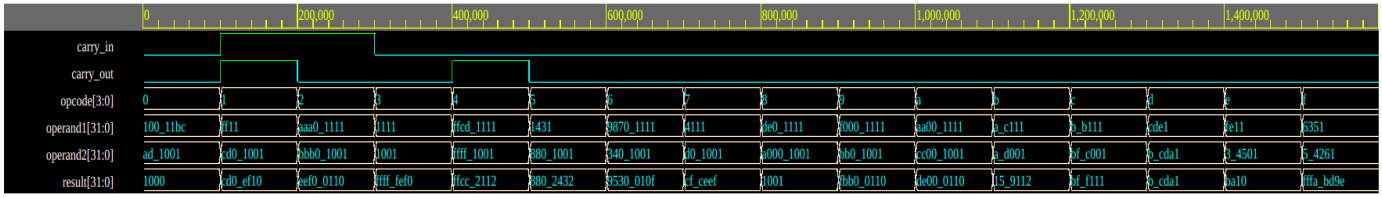
There are 8 files namely alu.vhd, register_file.vhd, data_memory.vhd, program_memory.vhd, testbench_alu.vhd, testbench_rf.vhd, testbench_dm.vhd and testbench_pm.vhd.

1. alu.vhd:

(a) EPWave

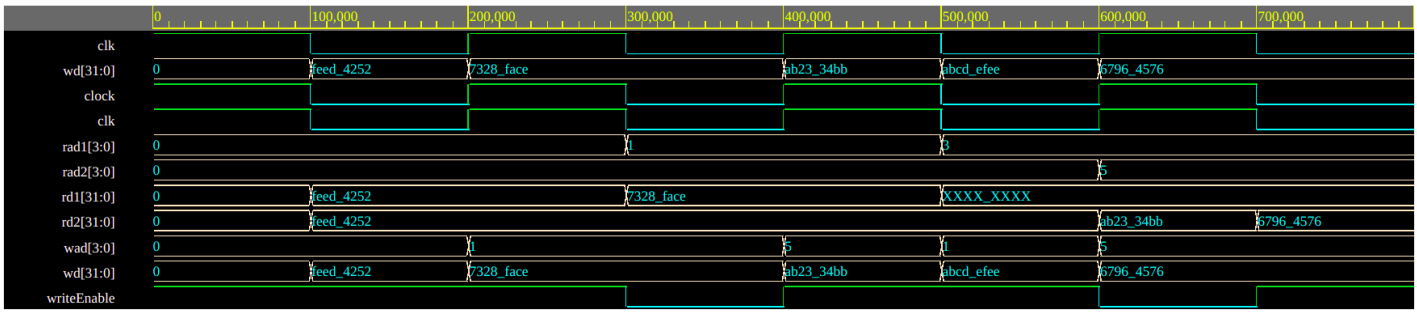


(b) Synthesis Results

```
# Info: Device Utilization for 7A100TCSG324
# Info: ***********************************************************
# Info: Resource                          Used    Avail   Utilization
# Info: -----------------------------------------------------------
# Info: IOs                               102     210      48.57%
# Info: Global Buffers                    0       32        0.00%
# Info: LUTs                              420     63400     0.66%
# Info: CLB Slices                        105     15850     0.66%
# Info: Dffs or Latches                   0       126800    0.00%
# Info: Block RAMs                        0       135       0.00%
# Info: DSP48E1s                          0       240       0.00%
# Info: -----------------------------------------------------------
# Info: ************************************************
# Info: Library: work    Cell: ALU    View: rtl
# Info: ************************************************
# Info:  Number of ports :                          102
# Info:  Number of nets :                           832
# Info:  Number of instances :                      763
# Info:  Number of references to this view :          0
# Info: Total accumulated area :
# Info:  Number of LUTs :                           420
# Info:  Number of Primitive LUTs :                 421
# Info:  Number of LUTs with LUTNM/HLUTNM :           2
# Info:  Number of MUX CARRYs :                     142
# Info:  Number of accumulated instances :          763
# Info: ****************************
# Info:  IO Register Mapping Report
# Info: ****************************
# Info: Design: work.ALU.rtl
```

2. register_file.vhd:

(a) EPWave

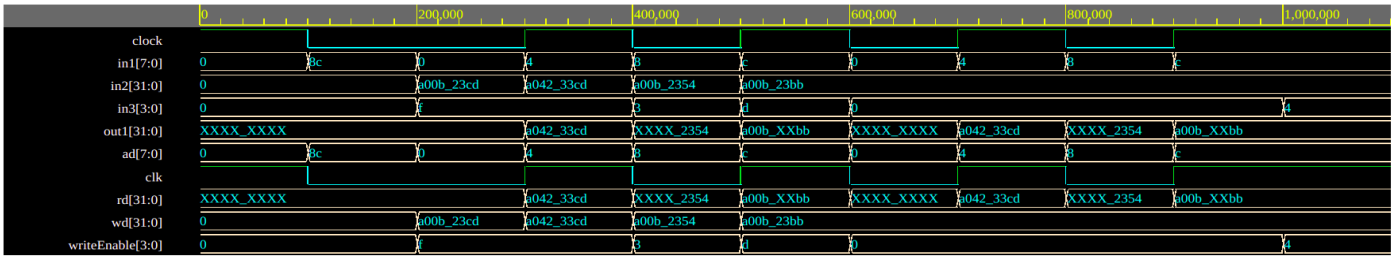


(b) Synthesis Results

```
# Info: Device Utilization for 7A100TCSG324
# Info: ***********************************************************
# Info: Resource                          Used    Avail   Utilization
# Info: -----------------------------------------------------------
# Info: IOs                               110     210      52.38%
# Info: Global Buffers                    1       32        3.12%
# Info: LUTs                              272     63400     0.43%
# Info: CLB Slices                        68      15850     0.43%
# Info: Dffs or Latches                   512     126800    0.40%
# Info: Block RAMs                        0       135       0.00%
# Info: DSP48E1s                          0       240       0.00%
# Info: -----------------------------------------------------------
# Info: ***************************************************************************
# Info: Library: work    Cell: Register_File_16x32    View: behavioral
# Info: ***************************************************************************
# Info:  Number of ports :                          110
# Info:  Number of nets :                           218
# Info:  Number of instances :                      110
# Info:  Number of references to this view :          0
# Info: Total accumulated area :
# Info:  Number of Dffs or Latches :                512
# Info:  Number of LUTs :                           272
# Info:  Number of Primitive LUTs :                 272
# Info:  Number of MUXF7 :                          128
# Info:  Number of MUXF8 :                           64
# Info:  Number of accumulated instances :         1086
# Info: ****************************
# Info:  IO Register Mapping Report
# Info: ****************************
# Info: Design: work.Register_File_16x32.behavioral
```

3. data_memory.vhd:

(a) EPWave

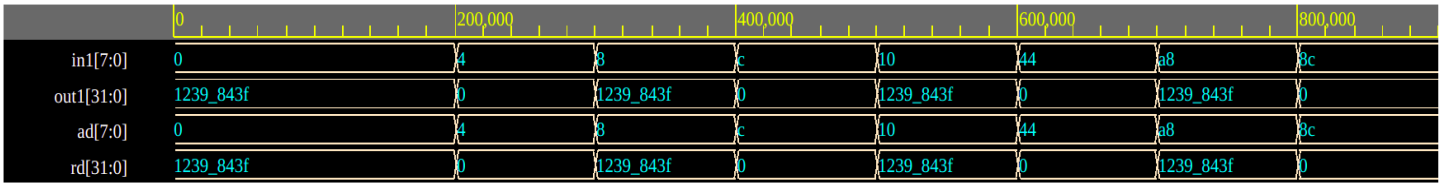


(b) Synthesis Results

```
# Info: Device Utilization for 7A100TCSG324
# Info: ***************************************************************
# Info: Resource                          Used    Avail   Utilization
# Info: ---------------------------------------------------------------
# Info: IOs                               77      210      36.67%
# Info: Global Buffers                    0       32        0.00%
# Info: LUTs                              898     63400     1.42%
# Info: CLB Slices                        256     15850     1.62%
# Info: Dffs or Latches                   2048    126800    1.62%
# Info: Block RAMs                        0       135       0.00%
# Info: DSP48E1s                          0       240       0.00%
# Info: ---------------------------------------------------------------
# Info: ***************************************************************************
# Info: Library: work    Cell: Data_Memory_64x32    View: behavioral
# Info: ***************************************************************************
# Info:  Number of ports :                          77
# Info:  Number of nets :                           148
# Info:  Number of instances :                      75
# Info:  Number of references to this view :        0
# Info: Total accumulated area :
# Info:  Number of Dffs or Latches :                2048
# Info:  Number of LUTs :                           898
# Info:  Number of Primitive LUTs :                 900
# Info:  Number of LUTs with LUTNM/HLUTNM :         4
# Info:  Number of MUXF7 :                          64
# Info:  Number of MUXF8 :                          32
# Info:  Number of accumulated instances :          3120
# Info: ****************************
# Info:  IO Register Mapping Report
# Info: ****************************
# Info: Design: work.Data_Memory_64x32.behavioral
```

4. program_memory.vhd:

(a) EPWave



(b) Synthesis Results

```
# Info: Device Utilization for 7A100TCSG324
# Info: ******************************************************************
# Info: Resource                          Used    Avail   Utilization
# Info: ------------------------------------------------------------------
# Info: IOs                               40      210      19.05%
# Info: Global Buffers                    0       32        0.00%
# Info: LUTs                              1       63400     0.00%
# Info: CLB Slices                        1       15850     0.01%
# Info: Dffs or Latches                   0       126800    0.00%
# Info: Block RAMs                        0       135       0.00%
# Info: DSP48E1s                          0       240       0.00%
# Info: ------------------------------------------------------------------
# Info: ********************************************************************************
# Info: Library: work    Cell: Program_Memory_64x32    View: behavioral
# Info: ********************************************************************************
# Info:  Number of ports :                            40
# Info:  Number of nets :                             36
# Info:  Number of instances :                        35
# Info:  Number of references to this view :           0
# Info: Total accumulated area :
# Info:  Number of LUTs :                              1
# Info:  Number of Primitive LUTs :                    1
# Info:  Number of accumulated instances :            35
# Info: ****************************
# Info:  IO Register Mapping Report
# Info: ****************************
# Info: Design: work.Program_Memory_64x32.behavioral
```