**Experiment-1**

**Objective:** Introduction to data types and arrays.

1. Write the SystemVerilog code to:
2. Declare a 2-state array, my\_array, that holds four 12-bit values
3. Initialize my\_array so that:

my\_array[0] = 12'h012

my\_array[1] = 12’h345

my\_array[2] = 12'h678

my\_array[3] = 12’h9AB

1. Traverse my\_array and print out bits [5:4] of each 12-bit element
2. With a for loop
3. With a foreach loop
4. Write the SystemVerilog code to:
5. Declare a 2-state two dimensional array, array\_2d (4 rows and 3 columns), that holds 12 integer values.
6. Initialize my\_array so that:

array\_2d[0][0] = 0

array\_2d[0][1] = 1

array\_2d[0][2] = 2

array\_2d[1][0] = 3

array\_2d[1][1] = 4

array\_2d[1][2] = 5

array\_2d[2][0] = 6

array\_2d[2][1] = 7

array\_2d[2][2] = 8

array\_2d[3][0] = 19

array\_2d[3][1] = 20

array\_2d[3][2] = 21

1. Print out the values stored in array\_2d and verify them with initialized values. Hint: use foreach loop.

**Code 1:**

module test1;

bit [11:0] my\_array[4]; // Declared a 2-state array that hold 12bit values

initial begin

// initialise my\_array with the given values

    my\_array='{12'h012, 12'h345, 12'h678, 12'h9AB};

// Traverse my\_array and print out bits [5:4] of each 12-bit element

//using for loop

    $display("\n Using For loop");

    for(int i=0; i<$size(my\_array); i++) begin

        $displayh("my\_array(%0d)=%b,%b",i,my\_array[i], my\_array[i][5:4]);

    end

    //using foreach loop

    $display("\n Using Foreach loop");

    foreach(my\_array[i]) begin

      $displayh("my\_array(%0d)=%b,%b",i,my\_array[i], my\_array[i][5:4]);

    end

    $display("\n Adding 4 to the values");

    $display("\n Using For loop");

    for(int i=0; i<$size(my\_array); i++) begin

      my\_array[i] +=4;

      $displayh("my\_array(%0d)=%b,%b",i,my\_array[i]);

    End

    my\_array='{12'h012, 12'h345, 12'h678, 12'h9AB};

    $display("\n Using Foreach");

    foreach(my\_array[i]) begin

      my\_array[i] +=4;

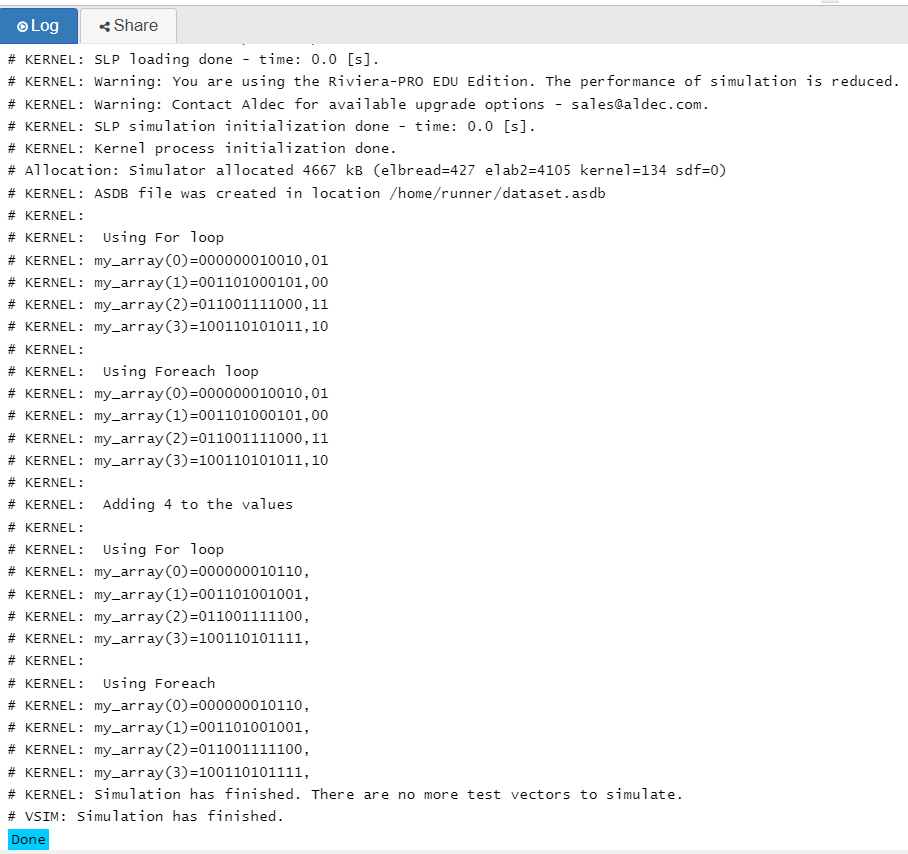
      $displayh("my\_array(%0d)=%b,%b",i,my\_array[i]);

    end

  end

endmodule

**Output 1:**

****

**Code 2:**

module test2;

int array\_2d[4][3]='{'{0,1,2},'{3,4,5}, '{6,7,8}, '{9,10,11}};

  initial begin

    // array\_2d='{'{0,1,2},'{3,4,5}, '{6,7,8}, '{19,20,21}};

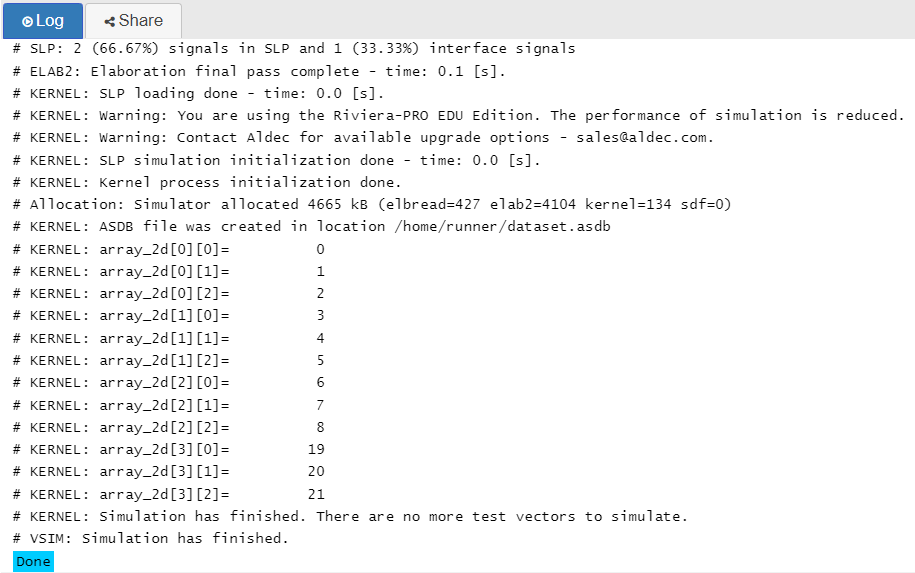
    foreach(array\_2d[i,j])

      $display("array\_2d[%0d][%0d]=%d",i,j,array\_2d[i][j]);

  end

endmodule

**Output 2:**

****