Assigment 1:

Snippets for the implemented code.

```systemverilog
module datatype;
    //------------My Inputs of Datatype-------------------------
    bit signed  [3:0] a;
    bit signed [7:0] b;
    shortint signed  c;
    bit[3:0] d;
    real r;
    string mystring="SV Assigment1";
    //--------------------Done inputs of DataType------------------


    //------------My struct------------------------------
        typedef struct
        {
          string name;
          int id;
          byte grade;
        }student_t;
    //---------------End Of my struct---------------------

    //-----------------MY UNION --------------------------
        typedef union{
          int i;
          byte b;
        }data_u;
    //--------------End of my UNION-----------------------

    //---------------Decleration-------------------------
    bit unpacked [4:0]='{1,2,3,4,5};

    bit [1:0] packed_array [3:0]='{default:2'b10};

    byte unpacked2 [3:0]='{10,20,30,40};

    student_t students[2:0];

    data_u data;
    //----------------------------INTIAL -BEGIN STATMENT-----------
    initial begin
        a=-3;
        b=250;
        c=-12345;
        d= 4'b 1101;
        r=3.14159;
        $display(" value to a as decimal: %d",a);
        $display(" value of b :%0d",b);
        $display("Value of c :%0d",c);
        #5
        $diplay("Assigned value of d:%b",d);
        #15
        $display("Value of c :%f",r);
        $display("My string,%s",mystring);
```

```
53      $display( My string,%5 ,mystring);
54      $display("---------------------------Arrays---------------------");
55
56      $display("my unpacked array is:%p",unpacked);
57
58      $display("my packed array is:%p",packed_array);
59
60      $display("my second unpacked array is:%p",unpacked2);
61
62
63
64      students[0] = {"Ali", 1, 85};
65      students[1] = {"Sara", 2, 90};
66      students[2] = {"Omar", 3, 78};
67      $display("----------------------- Students ---------------------");
68      for (int i = 0; i < 3; i++) begin
69          $display("Name: %s, ID: %0d, Grade: %0d", students[i].name, students[i].id, students[i].
70      end
71      $display("----------------------- UNION  ---------------------");
72
73      data.i=32'h12345678;
74      $display("First attempt of data i is:%h,First attempt of data b is:%h",data.i,data.b);
75      data.i=8'h12;
76      $display("Second attempt of data i is:%h,Second attempt of data b is:%h",data.i,data.b);
77
78      $display("DONNNNNNE SIMULATION YAYYYYYYYY");
79  end
80  endmodule : datatype
81
82
```

Snippets for the logs show the all printed values.

```
VSIM 2> run
#   value to a as decimal:   -3
#   value of b :-6
# Value of c :-12345
# ** Error (suppressible): (vsim-12023) Cannot execute undefined system task/function '$diplay'
#    Time: 5 ns  Iteration: 0  Process: /datatype/#INITIAL#40 File: D:/Summer 2025/Digital Electronics/Hassan-IC Verification/Assigment1-q1.sv Line: 50
# Value of c :3.141590
# My string,SV Assigment1
# ---------------------------Arrays---------------------
# my unpacked array is:'{1, 0, 1, 0, 1}
# my packed array is:'{2, 2, 2, 2}
# my second unpacked array is:'{10, 20, 30, 40}
# ----------------------- Students ---------------------
# Name: Ali, ID: 1, Grade: 85
# Name: Sara, ID: 2, Grade: 90
# Name: Omar, ID: 3, Grade: 78
# ----------------------- UNION  ---------------------
# First attempt of data i is:12345678,First attempt of data b is:78
# Second attempt of data i is:00000012,Second attempt of data b is:12
# DONNNNNNE SIMULATION YAYYYYYYYY
```

Snippet for the waveform shows the values for created variables