```
1   `timescale 1ns / 1ps
2   /**********************************************************************************
3    *
4    * Author:   Jesus Luciano
5    * Filename: MPY_32.v
6    * Date:     1/22/2019
7    * Version:  1.0
8    *
9    * Notes:    ALU module that multiples its 2 32-bit inputs and yields a single
10   *           64-bit output.
11   *
12   **********************************************************************************/
13
14  module MPY_32(S, T, Y_hi, Y_lo);
15
16       //delcare inputs and outputs
17       input      [31:0]  S, T;
18       output reg [31:0]  Y_hi, Y_lo;
19
20       //declare integers
21       integer int_S, int_T;
22
23       always @ (*) begin
24          //type cast 32 bit inputs to integers
25          int_S = S;
26          int_T = T;
27          //multiply integers to yield 64 bit result
28          {Y_hi, Y_lo} = int_S * int_T;
29       end
30
31  endmodule
32
```