HALF ADDER

Code for half adder:

```
1 // code your testbench here
2 // or browse Examples
3 module tb_HA;
4   reg a,b;
5   wire sum,carry;
6   HA u1(.sum(sum),.carry(carry),.a(a),.b(b));
7   initial
8     begin
9       a=0;b=0;
10      #10;a=0;b=1;
11      #10;a=1;b=0;
12      #10;a=1;b=1;
13      #10;a=0;b=0;$finish;
14    end
15  initial
16    begin
17      $monitor("a=%0b,b=%0b,sum=%0b,carry=%0b",a,b,sum,carry);
18    end
19  initial
20    begin
21      $dumpfile("waveforms.vcd");
22      $dumpvars(0,tb_HA);
23    end
24  endmodule
```

```
1 // Code for HALFADDER
2 module HA(a,b,sum,carry);
3   input a,b;
4   output sum,carry;
5   assign sum=a^b;
6   assign carry=a&b;
7 endmodule
8
9
```

Output:

```
KERNEL: a=0,b=0,sum=0,carry=0
KERNEL: a=0,b=1,sum=1,carry=0
KERNEL: a=1,b=0,sum=1,carry=0
KERNEL: a=1,b=1,sum=0,carry=1
RUNTIME: Info: RUNTIME_0068 to
```

Waveforms: