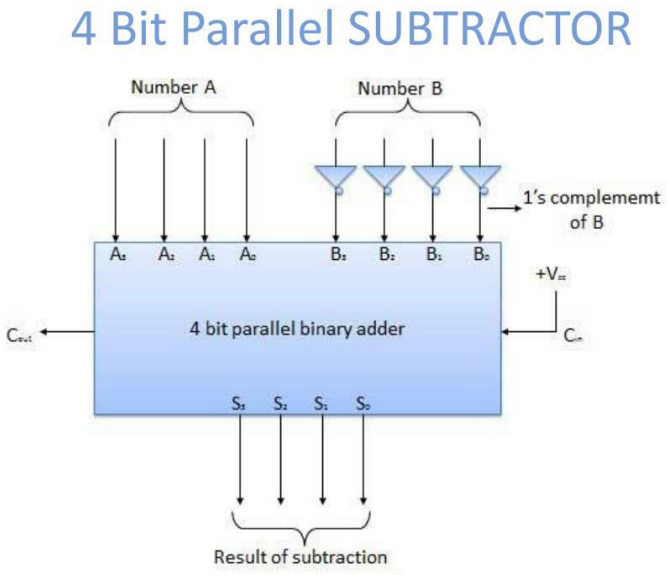
4-BIT PARALLEL SUBTRACTOR

A Parallel Subtractor is a digital circuit capable of finding the arithmetic difference of two binary numbers that is greater than one bit in length by operating on corresponding pairs of bits in parallel. The parallel subtractor can be designed in several ways including combination of half and full subtractors, all full subtractors or all full adders with subtrahend complement input.



RTL CODE:

```
module FA(input a,b,cin, output sum,cout);
  assign sum = a^b^cin;
  assign cout = (a&b) | (b&cin) | (cin&a);
endmodule

module sub(input [3:0] a,b, input cin,
                    output [3:0] sum, output cout);
  wire [2:0] w;
  FA f1(a[0],~b[0],cin,sum[0],w[0]);
  FA f2(a[1],~b[1],w[0],sum[1],w[1]);
  FA f3(a[2],~b[2],w[1],sum[2],w[2]);
  FA f4(a[3],~b[3],w[2],sum[3],cout);
```

```
endmodule
```

TESTBENCH:

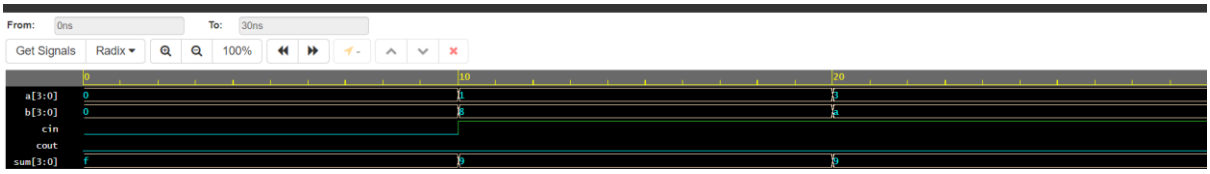
```
module testbench;
  reg [3:0]a=0,b=0;
  reg cin=0;
  wire [3:0] sum;
  wire cout;

  sub RCA1(a,b,cin,sum,cout);
  initial begin
    #10 a=4'b0001;b=4'b1000;cin=1'b1;
    #10 a=4'b0011;b=4'b1010;cin=1'b1;
  end


  initial begin
      $dumpfile("dump.vcd");
      $dumpvars(1);
    end

  initial #30 $finish();

endmodule
```



Note: To revert to EPWave opening in a new browser window, set that option on your user page.