



STRUCTURAL MODELING

VERILOG DESIGN STYLE

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TOPIC OUTLINE

Structural Modeling

- 2-bit and 4-bit Full-Adder
- 4-bit Subtractor

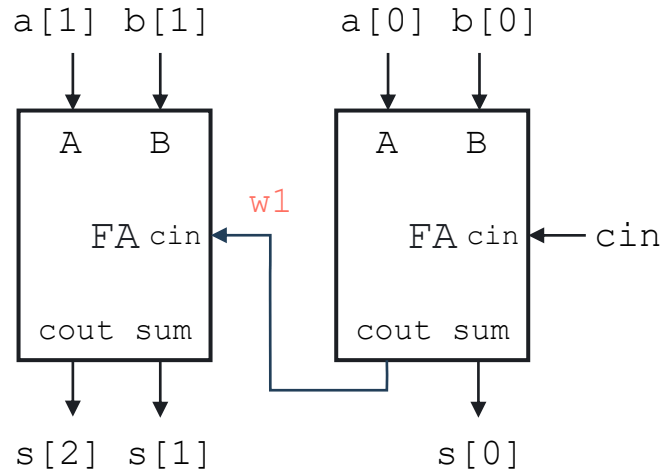


STRUCTURAL MODELING



2-BIT FULL-ADDER

Block level representation



Key features of structural modeling

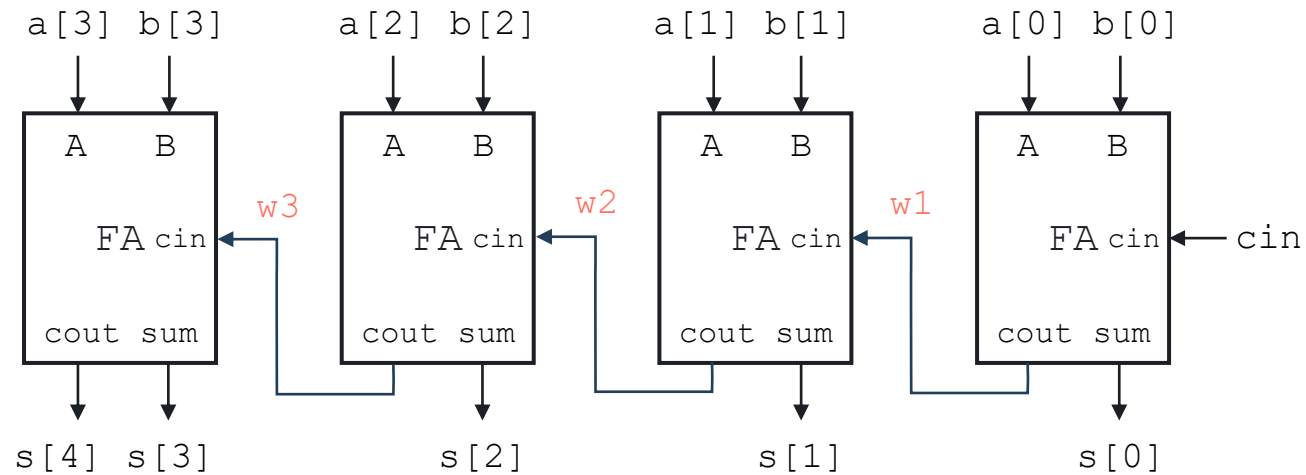
- Represents the hierarchy of the design.
- Uses **module instantiation** to build complex systems from smaller blocks.
- Emphasizes connectivity rather than functionality.

```
module 2b_adder(s,cout,a,b,cin) ;  
  
input [1:0] a,b;  
  
input cin;  
  
output [2:0]s;  
  
wire w1;  
  
full_adder fa1(s[0],w1,a[0],b[0],cin) ;  
  
full_adder fa2(s[1],s[2],a[1],b[1],w1) ;  
  
endmodule
```



4-BIT FULL-ADDER

Block level representation

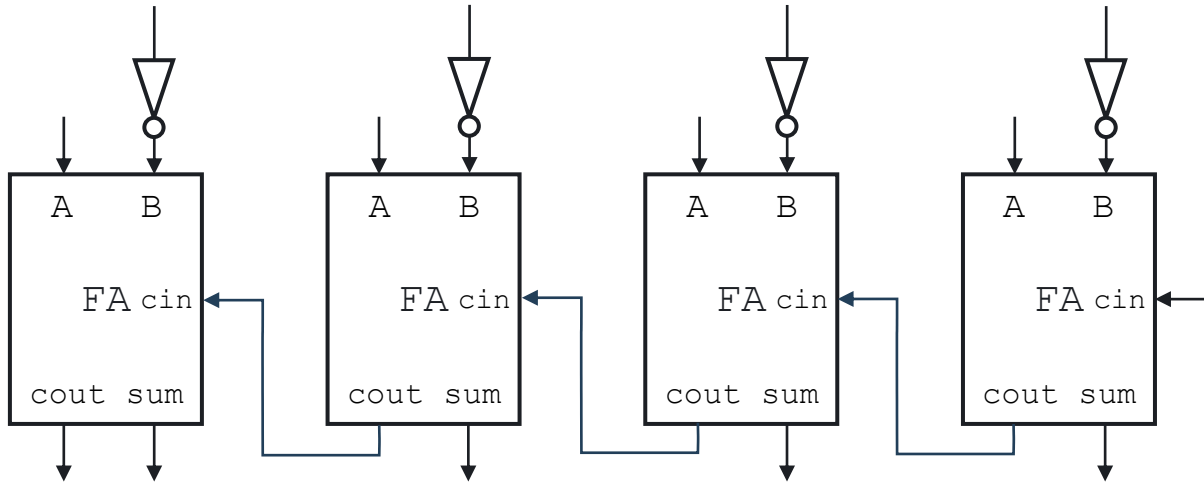


```
module 4b_adder(s,cout,a,b,cin) ;  
    input [3:0] a,b;  
    input cin;  
    output [4:0]s;  
    wire w1,w2,w3;  
  
    full_adder fa1(s[0],w1,a[0],b[0],cin) ;  
    full_adder fa2(s[1],w2,a[1],b[1],w1) ;  
    full_adder fa3(s[2],w3,a[2],b[2],w2) ;  
    full_adder fa4(s[3],s[4],a[3],b[3],w3) ;  
endmodule
```



4-BIT SUBTRACTOR

Block level representation



```
module 4b_subtractor();
```

```
// ports and nets
```

```
// subtractor blocks
```

```
endmodule
```



LABORATORY

