

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\Mux.hdl

File View Run Help

Chip Name: **Mux** Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a	1	out	1
b	1		
sel	1		

HDL

```
CHIP Mux {
  IN a, b, sel;
  OUT out;

  PARTS:
    Not(in=sel, out=notsel);
    And(a=notsel, b=a, out=sela);
    And(a=sel, b=b, out=selb);
    Or(a=sela, b=selb, out=out);
}
```

Internal pins	
Name	Value
notsel	0
sela	0
selb	1

a	b	sel	out
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\DMux.hdl

File View Run Help

Chip Name: **DMux** Time: 0

Input pins		Output pins	
Name	Value	Name	Value
in	1	a	0
sel	1	b	1

HDL

```
CHIP DMux {
  IN in, sel;
  OUT a, b;

  PARTS:
    Not(in=sel, out=notsel);
    And(a=notsel, b=in, out=a);
    And(a=sel, b=in, out=b);
}
```

Internal pins	
Name	Value
notsel	0

```
// This file is part of www.nand2tetris.org
// and the book "The Elements of Computing Systems"
// by Nisan and Schocken, MIT Press.
// File name: projects/01/DMux.tst

load DMux.hdl,
output-file DMux.out,
compare-to DMux.cmp,
output-list in%B3.1.3 sel%B3.1.3 a%B3.1.3 b%B3.1.3;

set in 0,
set sel 0,
eval,
output;

set sel 1,
eval,
output;

set in 1,
set sel 0,
eval,
output;

set sel 1,
eval,
output;
```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\Not16.hdl

File View Run Help

Chip Name: Not16 Time: 0

Input pins		Output pins	
Name	Value	Name	Value
in[16]	4660	out[16]	-4661

HDL

```
CHIP Not16 {
  IN in[16];
  OUT out[16];

  PARTS:
    Not(in=in[0], out=out[0]);
    Not(in=in[1], out=out[1]);
    Not(in=in[2], out=out[2]);
    Not(in=in[3], out=out[3]);
    Not(in=in[4], out=out[4]);
    Not(in=in[5], out=out[5]);
    Not(in=in[6], out=out[6]);
    Not(in=in[7], out=out[7]);
    Not(in=in[8], out=out[8]);
}
```

Internal pins

Name	Value
------	-------

```
// This file is part of www.nand2tetris.org
// and the book "The Elements of Computing Systems"
// by Nisan and Schocken, MIT Press.
// File name: projects/01/Not16.tst

load Not16.hdl,
output-file Not16.out,
compare-to Not16.cmp,
output-list in%BI.16.1 out%BI.16.1;

set in %B0000000000000000,
eval,
output;

set in %B1111111111111111,
eval,
output;

set in %B1010101010101010,
eval,
output;

set in %B0011110011000011,
eval,
output;

set in %B0001001000110100,
eval,
output;
```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\And16.hdl

File View Run Help

Chip Name: And16 Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a[16]	4660	out[16]	4148
b[16]	-26506		

HDL

```
CHIP And16 {
  IN a[16], b[16];
  OUT out[16];

  PARTS:
    And(a=a[0], b=b[0], out=out[0]);
    And(a=a[1], b=b[1], out=out[1]);
    And(a=a[2], b=b[2], out=out[2]);
    And(a=a[3], b=b[3], out=out[3]);
    And(a=a[4], b=b[4], out=out[4]);
    And(a=a[5], b=b[5], out=out[5]);
    And(a=a[6], b=b[6], out=out[6]);
    And(a=a[7], b=b[7], out=out[7]);
    And(a=a[8], b=b[8], out=out[8]);
}
```

Internal pins

Name	Value
------	-------

```
// File name: projects/01/And16.tst

load And16.hdl,
output-file And16.out,
compare-to And16.cmp,
output-list a%BI.16.1 b%BI.16.1 out%BI.16.1;

set a %B0000000000000000,
set b %B0000000000000000,
eval,
output;

set a %B0000000000000000,
set b %B1111111111111111,
eval,
output;

set a %B1111111111111111,
set b %B1111111111111111,
eval,
output;

set a %B1010101010101010,
set b %B0101010101010101,
eval,
output;

set a %B0011110011000011,
set b %B0000111111110000,
eval,
output;

set a %B0001001000110100,
set b %B10010000110110,
eval,
output;
```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\Or16.hdl

File View Run Help

Chip Name: **Or16** Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a[16]	4660	out[16]	-25994
b[16]	-26506		

HDL

```
CHIP Or16 {
  IN a[16], b[16];
  OUT out[16];

  PARTS:
    Or(a=a[0], b=b[0], out=out[0]);
    Or(a=a[1], b=b[1], out=out[1]);
    Or(a=a[2], b=b[2], out=out[2]);
    Or(a=a[3], b=b[3], out=out[3]);
    Or(a=a[4], b=b[4], out=out[4]);
    Or(a=a[5], b=b[5], out=out[5]);
    Or(a=a[6], b=b[6], out=out[6]);
    Or(a=a[7], b=b[7], out=out[7]);
    Or(a=a[8], b=b[8], out=out[8]);
}
```

Internal pins

Name	Value
------	-------

Script

```
// file name: projects/v1/or16.txt
load Or16.hdl,
output-file Or16.out,
compare-to Or16.cmp,
output-list a%B1.16.1 b%B1.16.1 out%B1.16.1;

set a %B0000000000000000,
set b %B0000000000000000,
eval,
output;

set a %B0000000000000000,
set b %B1111111111111111,
eval,
output;

set a %B1111111111111111,
set b %B1111111111111111,
eval,
output;

set a %B1010101010101010,
set b %B0101010101010101,
eval,
output;

set a %B0011110011000011,
set b %B0000111111110000,
eval,
output;

set a %B0001001000110100,
set b %B1001100001110110,
eval,
output;

```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\Mux16.hdl

File View Run Help

Chip Name: **Mux16** Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a[16]	-21946	out[16]	21845
b[16]	21845		
sel	1		

HDL

```
CHIP Mux16 {
  IN a[16], b[16], sel;
  OUT out[16];

  PARTS:
    Mux(a=a[0], b=b[0], sel=sel, out);
    Mux(a=a[1], b=b[1], sel=sel, out);
    Mux(a=a[2], b=b[2], sel=sel, out);
    Mux(a=a[3], b=b[3], sel=sel, out);
    Mux(a=a[4], b=b[4], sel=sel, out);
    Mux(a=a[5], b=b[5], sel=sel, out);
    Mux(a=a[6], b=b[6], sel=sel, out);
    Mux(a=a[7], b=b[7], sel=sel, out);
    Mux(a=a[8], b=b[8], sel=sel, out);
}
```

Internal pins

Name	Value
------	-------

Script

```
eval,
output;

set sel 1,
eval,
output;

set a %B0000000000000000,
set b %B0001001000110100,
set sel 0,
eval,
output;

set sel 1,
eval,
output;

set a %B1001100001110110,
set b %B0000000000000000,
set sel 0,
eval,
output;

set sel 1,
eval,
output;

set a %B1010101010101010,
set b %B0101010101010101,
set sel 0,
eval,
output;

set sel 1,
eval,
output;

```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\Or8Way.hdl

File View Run Help

Chip Name: Or8Way Time: 0

Input pins		Output pins	
Name	Value	Name	Value
in[8]	38	out	1

HDL

```
CHIP Or8Way {
  IN in[8];
  OUT out;

  PARTS:
    Or(a=in[0], b=in[1], out=out01);
    Or(a=in[2], b=in[3], out=out23);
    Or(a=in[4], b=in[5], out=out45);
    Or(a=in[6], b=in[7], out=out67);
    Or(a=out01, b=out23, out=out0123);
    Or(a=out45, b=out67, out=out4567);
    Or(a=out0123, b=out4567, out=out);
}
```

Internal pins

Name	Value
out01	1
out23	1
out45	1
out67	0
out0123	1
out4567	1

```
// This file is part of www.nand2tetris.org
// and the book "The Elements of Computing Systems"
// by Nisan and Schocken, MIT Press.
// File name: projects/01/Or8Way.tst

load Or8Way.hdl,
output-file Or8Way.out,
compare-to Or8Way.cmp,
output-list in%B2.8.2 out%B2.1.2;

set in %B00000000,
eval,
output;

set in %B11111111,
eval,
output;

set in %B00010000,
eval,
output;

set in %B00000001,
eval,
output;

set in %B00100110,
eval,
output;
```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\Mux4Way16.hdl

File View Run Help

Chip Name: Mux4Way16 Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a[16]	4660	out[16]	21845
b[16]	-26506		
c[16]	-21846		
d[16]	21845		
sel[2]	3		

HDL

```
CHIP Mux4Way16 {
  IN a[16], b[16], c[16], d[16], sel[2];
  OUT out[16];

  PARTS:
    Mux16(a=a, b=b, sel=sel[0], out=out0);
    Mux16(a=c, b=d, sel=sel[0], out=out1);
    Mux16(a=out0, b=out1, sel=sel[1], out=out);
}
```

Internal pins

Name	Value
outab[16]	-26506
outcd[16]	21845

```
set sel 0,
eval,
output;

set sel 1,
eval,
output;

set sel 2,
eval,
output;

set sel 3,
eval,
output;

set a %B0001001000110100,
set b %B1001100001110110,
set c %B1010101010101010,
set d %B0101010101010101,
set sel 0,
eval,
output;

set sel 1,
eval,
output;

set sel 2,
eval,
output;

set sel 3,
eval,
output;
```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\Mux8Way16.hdl

File View Run Help

Chip Name: Mux8Way16 Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a[16]	4660	out[16]	-30293
b[16]	9029		
c[16]	13398		
d[16]	17767		
e[16]	22136		
f[16]	26505		
g[16]	30874		
h[16]	-30293		
sel[3]	7		

HDL

```
CHIP Mux8Way16 {
  IN a[16], b[16], c[16], d[16], e[16], f[16], g[16], h[16];
  OUT out[16];

  PARTS:
    Mux4Way16(a=a, b=b, c=c, d=d, sel=sel[0], out=outabod);
    Mux4Way16(a=e, b=f, c=g, d=h, sel=sel[1], out=outdefg);
    Mux16(a=outabod, b=outdefg, sel=sel[2], out=out);
}
```

Internal pins

Name	Value
outabod[16]	17767
outdefg[16]	-30293

```
set u %B0100010101100111,
set e %B0101011001111000,
set f %B0110011110001001,
set g %B0111100010011010,
set h %B1000100110101011,
set sel 0,
eval,
output:

set sel 1,
eval,
output:

set sel 2,
eval,
output:

set sel 3,
eval,
output:

set sel 4,
eval,
output:

set sel 5,
eval,
output:

set sel 6,
eval,
output:

set sel 7,
eval,
output:

```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\DMux4Way.hdl

File View Run Help

Chip Name: DMux4Way Time: 0

Input pins		Output pins	
Name	Value	Name	Value
in	1	a	0
sel[2]	3	b	0
		c	0
		d	1

HDL

```
CHIP DMux4Way {
  IN in, sel[2];
  OUT a, b, c, d;

  PARTS:
    Not(in=sel[0], out=notsel0);
    Not(in=sel[1], out=notsel1);
    And(a=notsel0, b=notsel1, out=sel);
    And(a=sel, b=in, out=a);
    And(a=sel[0], b=notsel1, out=b);
    And(a=sel[1], b=in, out=c);
    And(a=notsel0, b=sel[1], out=d);
    And(a=selc, b=in, out=c);
    And(a=sel[0], b=sel[1], out=d);
}
```

Internal pins

Name	Value
notsel0	0
notsel1	0
sel	0
selc	0
sel	1

```
compare=0; DMux4Way;
output-list in%B2.1.2 sel%B2.2.2 a%B2.1.2 b%B2.1.2 c%B2.1.2 d%B2.1.2;

set in 0,
set sel %B00,
eval,
output:

set sel %B01,
eval,
output:

set sel %B10,
eval,
output:

set sel %B11,
eval,
output:

set in 1,
set sel %B00,
eval,
output:

set sel %B01,
eval,
output:

set sel %B10,
eval,
output:

set sel %B11,
eval,
output:

```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - C:\Users\dande\Documents\CS 220\HW02\DMux8Way.hdl

File View Run Help

Chip Name: DMux8Way Time: 0

Input pins		Output pins	
Name	Value	Name	Value
in	1	a	0
sel[3]	7	b	0
		c	0
		d	0
		e	0
		f	0
		g	0
		h	1

Internal pins	
Name	Value
notsel0	0
notsel1	0
notsel2	0
sel1a	0
sel1b	0
sel1c	0
sel1d	1
sel1e	0
sel1f	0
sel1g	0
sel1h	0

```
CHIP DMux8Way {
  IN in, sel[3];
  OUT a, b, c, d, e, f, g, h;

  PARTS:
    Not(in=sel[0], out=notsel0);
    Not(in=sel[1], out=notsel1);
    Not(in=sel[2], out=notsel2);
    And(a=notsel0, b=notsel1, out=sel1a);
    And(a=notsel0, b=notsel2, out=sel1b);
    And(a=notsel1, b=notsel2, out=sel1c);
    And(a=sel[0], b=in, out=sel1d);
    And(a=sel[0], b=notsel1, out=sel1e);
    And(a=sel[1], b=notsel2, out=sel1f);
    And(a=sel[2], b=in, out=sel1g);
    And(a=sel[3], b=in, out=sel1h);
}
```

```
set sel %B111,
eval,
output;

set in 1,
set sel %B000,
eval,
output;

set sel %B001,
eval,
output;

set sel %B010,
eval,
output;

set sel %B011,
eval,
output;

set sel %B100,
eval,
output;

set sel %B101,
eval,
output;

set sel %B110,
eval,
output;

set sel %B111,
eval,
output;
```

End of script - Comparison ended successfully