










Hardware Simulator (2.5) - D:\Documents\nand2tetris\projects\01\Not.hdl

FileViewRunHelp



Animate:
No animation

Format:
Decimal

View:
Script

Chip Name: NotTime: 0

Input pins		Output pins	
Name	Value	Name	Value
in	1	out	0

HDL

```
// 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/Not.hdl

/**
 * Not gate:
 * out = not in
 */

CHIP Not {
    IN in;
    OUT out;
}
```

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/Not.tst

load Not.hdl,
output-file Not.out,
compare-to Not.cmp,
output-list in%B3.1.3 out%B3.1.3;

set in 0,
eval,
output;

set in 1,
eval,
output;
```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - D:\Documents\nand2tetris\projects\01\And.hdl

File View Run Help

Animate: No animation Format: Decimal View: Script

Chip Name: And Time: 0

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

Internal pins	
Name	Value
c	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/And.tst

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

set a 0,
set b 0,
eval,
output;

set a 0,
set b 1,
eval,
output;

set a 1,
set b 0,
eval,
output;

set a 1,
set b 1,
eval,
output;
```

End of script - Comparison ended successfully

Hardware Simulator (2.5) - D:\Documents\nand2tetris\projects\01\Or.hdl

File View Run Help

Slow Fast

Animate: No animation
Format: Decimal
View: Script

Chip Name: Or
Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a	1	out	1
b	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/Or.tst

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

set a 0,
set b 0,
eval,
output;

set a 0,
set b 1,
eval,
output;

set a 1,
set b 0,
eval,
output;

set a 1,
set b 1,
eval,
output;
```

HDL

```
// 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/Or.hdl

/**
 * Or gate:
 * out = 1 if (a == 1 or b == 1)
 *      0 otherwise
 */

CHIP Or {
    IN a, b;
    OUT out;
```

Internal pins

Name	Value
a1	0
b1	0

End of script - Comparison ended successfully

Hardware Simulator (2.5) - D:\Documents\nand2tetris\projects\01\Xor.hdl

File View Run Help

Animate: No animation Format: Decimal View: Script

Chip Name: Xor Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a	1	out	0
b	1		

Internal pins	
Name	Value
Mab	0
a1	1
b1	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/Xor.hdl

/**
 * Exclusive-or gate:
 * out = not (a == b)
 */

CHIP Xor {
    IN a, b;
    OUT out;

    set a 0,
    set b 0,
    eval,
    output;

    set a 1,
    set b 1,
    eval,
    output;

    set a 1,
    set b 0,
    eval,
    output;

    set a 0,
    set b 1,
    eval,
    output;
}
```

End of script - Comparison ended successfully

End of script - Comparison ended successfully

Hardware Simulator (2.5) - D:\Documents\nand2tetris\projects\01\DMux.hdl

File View Run Help

Animate:

Format:

View:

No animation

Decimal

Script

Chip Name: DMux Time: 0

Input pins

Name	Value
in	1
sel	1

Output pins

Name	Value
a	0
b	1

HDL

```
// 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.hdl

/**
 * Demultiplexor:
 * {a, b} = {in, 0} if sel == 0
 * {0, in} if sel == 1
 */

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

Internal pins

Name	Value
n sel	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) - D:\Documents\nand2tetris\projects\01\Not16.hdl

File View Run Help

Animate:

Format:

View:

No animation

Decimal

Script

Chip Name: Not16

Time: 0

Input pins

Name	Value
in[16]	4660

Output pins

Name	Value
out[16]	-4661

HDL

```
// 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.hdl

/**
 * 16-bit Not:
 * for i=0..15: out[i] = not in[i]
 */

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

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%B1.16.1 out%B1.16.1;

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) - D:\Documents\nand2tetris\projects\01\And16.hdl

File View Run Help

set b 01001101010101010101010101010101
eval,
output;

Animate: No animation Format: Decimal View: Script

Chip Name: And16 Time: 0

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

load And16.hdl,
output-file And16.out,
compare-to And16.cmp,
output-list a%B1.16.1 b%B1.16.1 out%B1.16.1;

set a %B00000000000000000000,
set b %B00000000000000000000,
eval,
output;

set a %B00000000000000000000,
set b %B11111111111111111111,
eval,
output;

set a %B11111111111111111111,
set b %B11111111111111111111,
eval,
output;

set a %B10101010101010101010,
set b %B01010101010101010101,
eval,
output;

set a %B0011110011000011,
set b %B00001111111110000,
eval,
output;

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

End of script - Comparison ended successfully

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

HDL		Internal pins	
		Name	Value
<pre>// 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/And16.hdl /** * 16-bit bitwise And: * for i = 0..15: out[i] = (a[i] & b[i]) */ CHIP And16 { IN a[16], b[16]; OUT out[16]; }</pre>			

Hardware Simulator (2.5) - D:\Documents\nand2tetris\projects\01\Or16.hdl

File View Run Help

Chip Name: Or16 Time: 0

Input pins

Name	Value
a[16]	4660
b[16]	-26506

Output pins

Name	Value
out[16]	-25994

HDL

```
// 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/Or16.hdl

/**
 * 16-bit bitwise Or:
 * for i = 0..15 out[i] = (a[i] | b[i])
 */

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

Internal pins

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

File name: projects/01/Or16.tst

```
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) - D:\Documents\nand2tetris\projects\01\Mux16.hdl

File View Run Help

set sel 1, eval, output;

Animate: No animation Format: Decimal View: Script

Chip Name: Mux16 Time: 0

Input pins		Output pins	
Name	Value	Name	Value
a[16]	-21846	out[16]	21845
b[16]	21845		
sel	1		

HDL

```
// 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/Mux16.hdl

/**
 * 16-bit multiplexor:
 * for i = 0..15 out[i] = a[i] if sel == 0
 *                    b[i] if sel == 1
 */

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

Internal pins

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

```
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) - D:\Documents\nand2tetris\projects\01\Or8Way.hdl

File View Run Help

Animate:

Format:

View:

No animation

Decimal

Script

Chip Name: Or8Way Time: 0

Input pins

Name	Value
in[0]	38

Output pins

Name	Value
out	1

HDL

```
// 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.hdl

/**
 * 8-way Or:
 * out = (in[0] or in[1] or ... in[7])
 */

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

Internal pins

Name	Value
o01	1
o23	1
o45	1
o67	0
o0123	1
o4567	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) - D:\Documents\nand2tetris\projects\01\Mux4Way16.hdl

File View Run Help

Animate:

No animation

Format:

Decimal

View:

Script

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

```
// 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/Mux4Way16.hdl

/**
 * 4-way 16-bit multiplexor:
 * out = a if sel == 00
 *     b if sel == 01
 *     c if sel == 10
 *     d if sel == 11
 */
CHIP Mux4Way16 {
    <
    >

```

Internal pins

Name	Value
m1[16]	-26506
m2[16]	21845

```

set d 0,
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) - D:\Documents\nand2tetris\projects\01\Mux8Way16.hdl

FileViewRunHelp



SlowFast

Animate:No animationFormat:DecimalView:Script

Chip Name: Mux8Way16Time: 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		

Internal pins	
Name	Value
m1[16]	17767
m2[16]	-30293

HDL

```
// 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/Mux8Way16.hdl

/**
 * 8-way 16-bit multiplexor:
 * out = a if sel == 000
 *     b if sel == 001
 *     etc.
 *     h if sel == 111
 */
CHIP Mux8Way16 {
    out[16] = a[16];
}
```

```
set d $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) - D:\Documents\nand2tetris\projects\01\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

```
// 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/DMux4Way.hdl

/**
 * 4-way demultiplexor:
 * {a, b, c, d} = {in, 0, 0, 0}
 * {0, in, 0, 0}
 * {0, 0, in, 0}
 * {0, 0, 0, in}
 */

CHIP DMux4Way {
    compare-to DMux4Way.cmp,
    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;
}
```

Internal pins

Name	Value
da	0
db	1

End of script - Comparison ended successfully

Hardware Simulator (2.5) - D:\Documents\nand2tetris\projects\01\DMux8Way.hdl

File View Run Help

set sel

eval

Left Arrow

Right Arrow

Alarm

Clock

Logic

Slider

Slow

Fast

Animate:

No animation

Format:

Decimal

View:

Script

Chip Name: DMux8Way Time: 0

Input pins

Name	Value
in	1
sel[3]	7

Output pins

Name	Value
a	0
b	0
c	0
d	0
e	0
f	0
g	0
h	1

HDL

```
// 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/DMux8Way.hdl

/**
 * 8-way demultiplexor:
 * {a, b, c, d, e, f, g, h} = {in < sel[3]}
 */
CHIP DMux8Way {

```

Internal pins

Name	Value
da	0
db	1

```

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