Indian Institute of Information Technology Vadodara

CS/IT 429

Parameter

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Introduction

What is parameter…?

Introduction

- parameter
- defparam
- localparam
- specparam
- genevar
- event

Parameter

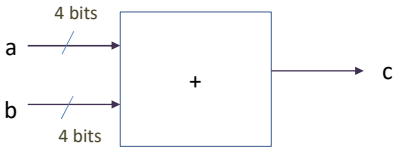
Syntax

```
parameter <parameter name> = <default value>;
```

Examples

```
parameter  word_size = 16;
parameter factor = word_size/2;
parameter [word_size-1 : 0]  bus;
parameter c = 3.0;
parameter d = 3.0e2;
parameter integer  f = 3;
parameter real  g = 3;
parameter message = “Hello World”;
```

Parameter



For the Block and Verilog HDL, assess it output…

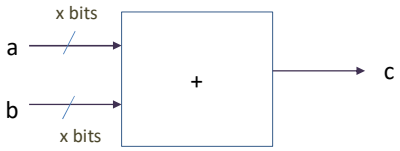
```
module logic1 (c, a, b);

input [3:0] a, b;
output [4:0] c;

assign  c = a + b;

endmodule
```


Parameter

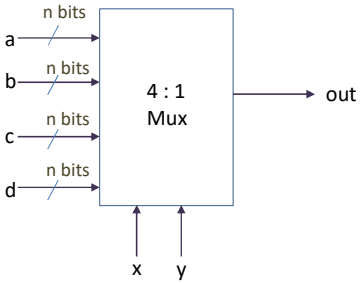


⇩

Check the same block implementation using Parameter, defparam, localparam

Parameter

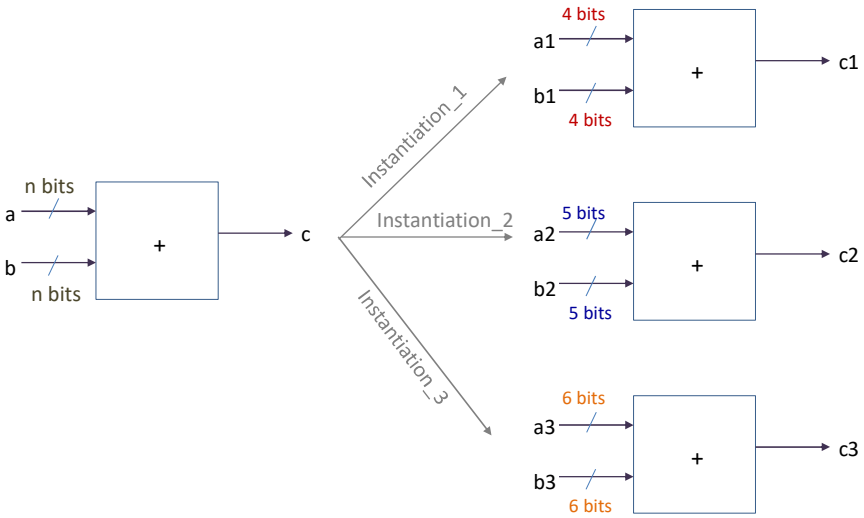
Implementation n-bit wide 4:1 Mux using Parameter



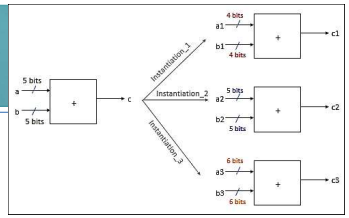
x	y	Out
0	0	a
0	1	b
1	0	c
1	1	d

Instantiation

Instantiation



Instantiation



1) Implementation without using parameter

Instantiation

```
module adder1 (c, a, b);
input [4:0] a, b;
output [5:0] c;
assign   c = a + b;
endmodule
```

```
module half_adder_tst1 ();
reg [3:0] a1, b1;
wire [4:0] c1;
reg [4:0] a2, b2;
wire [5:0] c2;
reg [5:0] a3, b3;
wire [6:0] c3;

adder1  inst1(c1, a1, b1);
adder1  inst2(c2, a2, b2);
adder1  inst3(c3, a3, b3);

endmodule
```

⇨ Identify the output values…!

Instantiation

Parameter Instantiation can be done using the following ways

- Instantiation parameter - Passing by Name
- Instantiation parameter - Passing by Order
- Instantiation parameter - Passing by Namelist

Instantiation

Parameter Instantiation

- Instantiation parameter - Passing by Name

Syntax

defparam <instance name>.<parameter name> = <value>;

Examples

```
reg [inst1.width : 0] a1, b1;
defparam inst1.width = 3;
```

Instantiation

Parameter Instantiation

- Instantiation parameter - Passing by Order

Syntax

<module called name> #(Sequential list of parameter values) <instance name> (list of variables);

Examples

reg [inst1.width : 0] a1, b1;

adder1 # (3) inst1 (c1, a1, b1);

Instantiation

Parameter Instantiation

- Instantiation parameter - Passing by Namelist

Syntax

<called module name> #(.parameter_name(parameter_value)) <instance name> (list of variables);

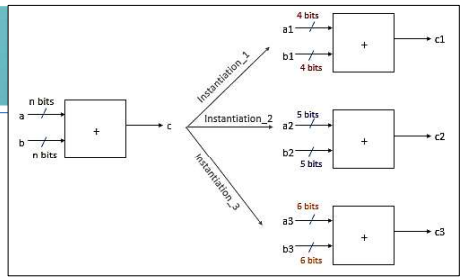
Examples

reg [inst1.width : 0] a1, b1;

adder1 # (.width(3)) inst1 (c1, a1, b1);

adder1 # (.width(3)) inst1 (.a(a1), .b(b1), .c(c1));

Instantiation




```
module adder1 (c, a, b);
parameter width = 4;
input [width:0] a, b;
output [width+1:0] c;
assign   c = a + b;
endmodule
```

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Instantiate the Module using Parameter
- Passing by Name
- Passing by Order
- Passing by NameList

I am available/approachable at

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