



## Part 0: Multiplexer and Decoder

### 0.1 mux2to1.vhd

```
--MIPS Part_0
--Multiplexer 2 to 1
--24/05/2020, Konstantinos Gkousaris, 711171073, UniWA
--0.1_mux2to1.vhd
```

```
LIBRARY IEEE;
USE ieee.std_logic_1164.all;

--declare entity mux 2 to 1
ENTITY mip_mux2to1 IS PORT (
    a: IN STD_LOGIC;  --first input
    b: IN STD_LOGIC;  --second input
    s: IN STD_LOGIC;  --selection input
    d: OUT STD_LOGIC); --output
END mip_mux2to1;

ARCHITECTURE dataflow OF mip_mux2to1 IS
BEGIN
    d <= a when (s='0') else b;
END dataflow;
```

### 0.2 dec2to4.vhd

```
--MIPS Part_0
--Decoder 2 to 4
--24/05/2020, Konstantinos Gkousaris, 711171073, UniWA
--0.2_dec2to4.vhd
```

```
LIBRARY IEEE;
USE ieee.std_logic_1164.all;

ENTITY mips_dec2to4 IS PORT(
    a : IN STD_LOGIC_VECTOR(1 DOWNTO 0);
    d : OUT STD_LOGIC_VECTOR(3 DOWNTO 0));
END mips_dec2to4;

ARCHITECTURE behavioral OF mips_dec2to4 IS
BEGIN
    PROCESS(a)
    BEGIN
        IF ( a = "00" ) THEN
```

```

        d <= "0001" ;
    ELSIF ( a = "01" ) THEN
        d <= "0010" ;
    ELSIF ( a = "10" ) THEN
        d <= "0100";
    ELSE
        d <= "1000";
    END IF;
END PROCESS;
END ;

```

### 0.3 mux2to1gen.vhd

```

--MIPS Part_0
--Multiplexer 4 to 1
--24/05/2020, Konstantinos Gkousaris, 711171073, UniWA
--0.3_mux2to1gen.vhd
LIBRARY IEEE;
USE ieee.std_logic_1164.all;

ENTITY mips_mux2to1gen IS
    GENERIC (
        dw : natural := 4);
    PORT (
        a : IN STD_LOGIC_VECTOR(dw-1 DOWNT0 0);    --first input 4bit
        b : IN STD_LOGIC_VECTOR(dw-1 DOWNT0 0);    --second input 4bit
        s : IN STD_LOGIC;                          --selection input
        d : OUT STD_LOGIC_VECTOR(4 DOWNT0 1));      --output 4bit
END mips_mux2to1gen;

ARCHITECTURE dataflow OF mips_mux2to1gen IS
    BEGIN
        d <= a when (s='0') else b;
    END dataflow;

```

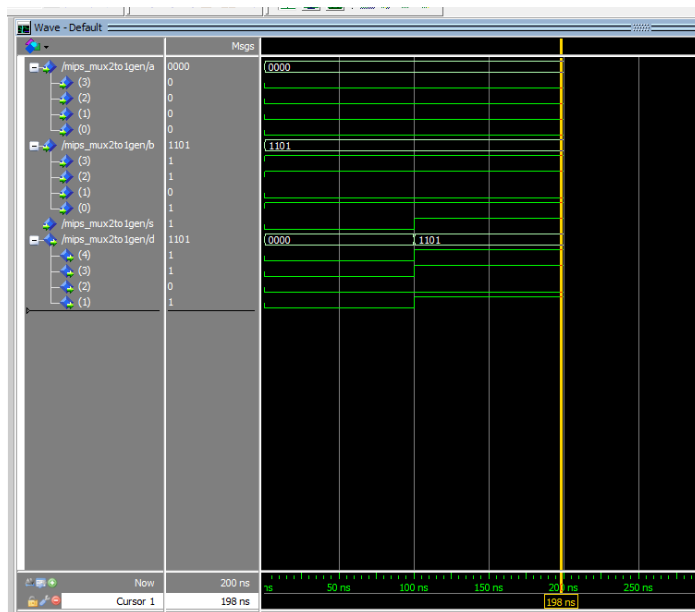
#### **\*Δοκιμή Πολυπλέκτη 4 σε 1, με εισοδο 4bit.**

Η δοκιμή υλοποιήθηκε με το command line του εργαλείου Modelsim, δεν δημιουργήθηκε test bench επειδή πρόκειται για μικρή δοκιμή και έτσι εκτελούνται οι παρακάτω εντολές :

```

force -freeze sim:/mips_mux2to1gen/a 4'h0 0
force -freeze sim:/mips_mux2to1gen/b 4'hd 0
force -freeze sim:/mips_mux2to1gen/s 0 0
run 100
force -freeze sim:/mips_mux2to1gen/s 1 0
run 100

```



A	B	S	C
0000	1101	0	0000
0000	1101	1	1101