

CONTADOR MODULO 4 CON UP/DOWN

```

entity contador is
port (clk,up: in  bit;
      q:          out  integer range 0 to 15);
end contador;
architecture algoritmo of contador is
begin
  process (clk)
  variable temporal: integer range 0 to 15;
  begin
    if clk='1' and clk'event then
      if up='1' then
        temporal:=temporal + 1;
      else
        temporal:=temporal - 1;
      end if;
    end if;
    q<= temporal;
  end process;
end algoritmo;

```

PARA SIMULAR CREAMOS EL SIGUIENTE CIRCUITO

```

ENTITY testbench IS
END testbench;

```

```

ARCHITECTURE behavior OF testbench IS

```

```

  COMPONENT contador
  PORT(
    clk : IN bit;
    up  : IN bit;
    q   : OUT integer range 0 to 15
  );
  END COMPONENT;

```

```

  SIGNAL clk : bit;
  SIGNAL up  : bit;
  SIGNAL q   : integer range 0 to 15;

```

```

BEGIN

```

```

  uut: contador PORT MAP(
    clk => clk,
    up  => up,
    q   => q

```

```

);

clk<= (not clk) after 0.5 ms;

tb1 : PROCESS
BEGIN
  up<='1'; wait for 10 ms;
  up<='0'; wait for 10 ms;
  wait;
END PROCESS;
END;

```



Cambia a down recién el flanco de subida del reloj