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-- Company:  
-- Engineer:  
--  
-- Create Date: 02/01/2024 02:05:09 PM  
-- Design Name:  
-- Module Name: compunit - Behavioral  
-- Project Name:  
-- Target Devices:  
-- Tool Versions:  
-- Description:  
--  
-- Dependencies:  
--  
-- Revision:  
-- Revision 0.01 - File Created  
-- Additional Comments:  
--  
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library IEEE;  
use IEEE.STD_LOGIC_1164.ALL;  
  
-- Uncomment the following library declaration if using  
-- arithmetic functions with Signed or Unsigned values  
use IEEE.std_logic_unsigned.ALL;  
USE IEEE.numeric_std.ALL;  
  
--use IEEE.std_logic_unsigned.all;  
-- Uncomment the following library declaration if instantiating  
-- any Xilinx leaf cells in this code.  
--library UNISIM;  
--use UNISIM.VComponents.all;
```

```

entity compunit is
generic( dw: integer:=4);
Port (a,b:in std_logic_vector(dw-1 downto 0);
      s: in std_logic_vector(dw downto 0);
      o:out std_logic_vector(dw-1 downto 0));
end compunit;

```

architecture Behavioral of compunit is

```

begin

```

```

process (A,B,s)

```

```

begin

```

```

case s is

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when"00000"=>o<=A and B;

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when"00001"=>o<=A or B;

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when"00010"=>o<=A nand B;

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when"00011"=>o<=A nor B;

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when"00100"=>o<=A xor B;

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```

when"00101"=>o<=A xnor B;

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when"00110"=>o<=A + B;

```

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when"00111"=>o<=A - B;

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when"01000"=>o<=

```

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std_logic_vector(to_unsigned(to_integer(unsigned(a)) *

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to_integer(unsigned(b)),4));

```

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when"01001"=> if(A > B) then o <= (others => '1'); else o <=
(others => '0');end if;

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when"01010"=> if(A < B) then o <= (others => '1'); else o <=
(others => '0');end if;

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when"01011"=> if(A = B) then o <= (others => '1'); else o <=
(others => '0');end if;

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when"01100"=> if(A >= B) then o <= (others => '1'); else o <=
(others => '0');end if;

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when"01101"=> if(A <= B) then o <= (others => '1'); else o <=
(others => '0');end if;

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when"01110"=> if(A /= B) then o <=(others => '1'); else o <=
(others => '0');end if;
when"01111"=> o <=(others => '0');
when "10000" => o <= to_stdlogicvector(to_bitvector (a) sla
TO_INTEGER(unsigned( b)));
when "10001" => o <= to_stdlogicvector(to_bitvector (a) sra
TO_INTEGER(unsigned( b)));
when "10010" => o <= to_stdlogicvector(to_bitvector (a) srl
TO_INTEGER(unsigned( b)));
when "10011" => o <= to_stdlogicvector(to_bitvector (a) sll
TO_INTEGER(unsigned( b)));
when "10100" => o <= to_stdlogicvector(to_bitvector (a) ror
TO_INTEGER(unsigned( b)));
when "10101" => o <= to_stdlogicvector(to_bitvector (a) rol
TO_INTEGER(unsigned( b)));
when others => o <= (others => '0');
end case;

end process;
end Behavioral;

```