

# Digital Design & Verilog – Beginner Assignment

## PART A: Digital Logic Warm-Up

- 1) 255.375 into
  - a) Binary : 11111111.011
  - b) Octal : 377.3
  - c) Hex : FF.6
- 2) 110101.101 into decimal : 53.625
- 3) Is 100111 divisible by 3?
  - a) Notice that every other power of two gives remainder of 1 or 2 with 3 ( $2^0 \% 3 = 1$ ,  $2^1 \% 3 = 2$ ,  $2^2 \% 3 = 1$ ,  $2^3 \% 3 = 2$ , etc)
  - b) Infer that if the number of powers that give 1 and the number of powers that give 2 are the same then number must be divisible by 3
  - c) As 100111 has the same number of 1s in even and odd place, this means that the number is divisible by 3
- 4) -23 in binary is 11101001
- 5)  $F = (A + B)(A' + C)(B + C')$ 
  - a) Expand first two brackets  $(AC + A'B + BC)(B + C')$
  - b) Expand again  $AC(B+C') + A'B(B+C') + BC(B+C')$
  - c) This leaves us with  $ABC + A'B + A'BC' + BC$
  - d) Considering that  $A'B$  and  $A'BC'$  are in OR condition and second term has exactly the same conditions as first except for  $C'$ , we can say that the result this setup is just the result of  $A'B$  therefore we can delete the second term
  - e) Same is done for  $BC + ABC$
  - f) This leaves us with final answer  $A'B + BC$
- 6) From the table we can see that the values of A and B do not matter, the only one that matters is C, therefore  $F = C$

A/BC	00	01	11	10
A=0	01	1	1	0
A=0	0	1	1	0