3701 HW 1 Solutions

1 A)   V = A * [/(B*/C) + C*D]

2 A)   V = A * [/(B*/C) + C*D]

3 A)   V = A * [/(B*/C) + C*D]

4 A)   X = A*/B + A*C

5 (Solution with 7 gates)

chip1 -- 02 (BAND2 & NOR2, 3 gates)
chip2 -- 00 (BOR2 & NAND2, 4 gates)

4 C)

X = A*/B + A*C

1 B)   W = A*B*/C + /(A*B*C)

2 B)   W = A*B*/C + /(A*B*C)

3 B)   W = A*B*/C + /(A*B*C)

4 B)   X = A*/B + A*C

1 C)

XX = /(A*B + /C)

1 C)   U = /(A*B + /C)

2 C)   U = /(A*B + /C)

3 C)   U = /(A*B + /C)

4 C)   X = A*/B + A*C

1 D)   Y = /(A*B) * C

2 D)   Y = /(A*B) * C

3 D)   Y = /(A*B) * C

5 (Alternative solution with 8 gates)

chip1 -- 00 (BOR2 & NAND2, 4 gates)
chip2 -- 00 (BOR2 & NAND2, 4 gates)

chip1

1 C)

XX = /(A*B + /C)

1 E)   Z = (/A + /B) * /C

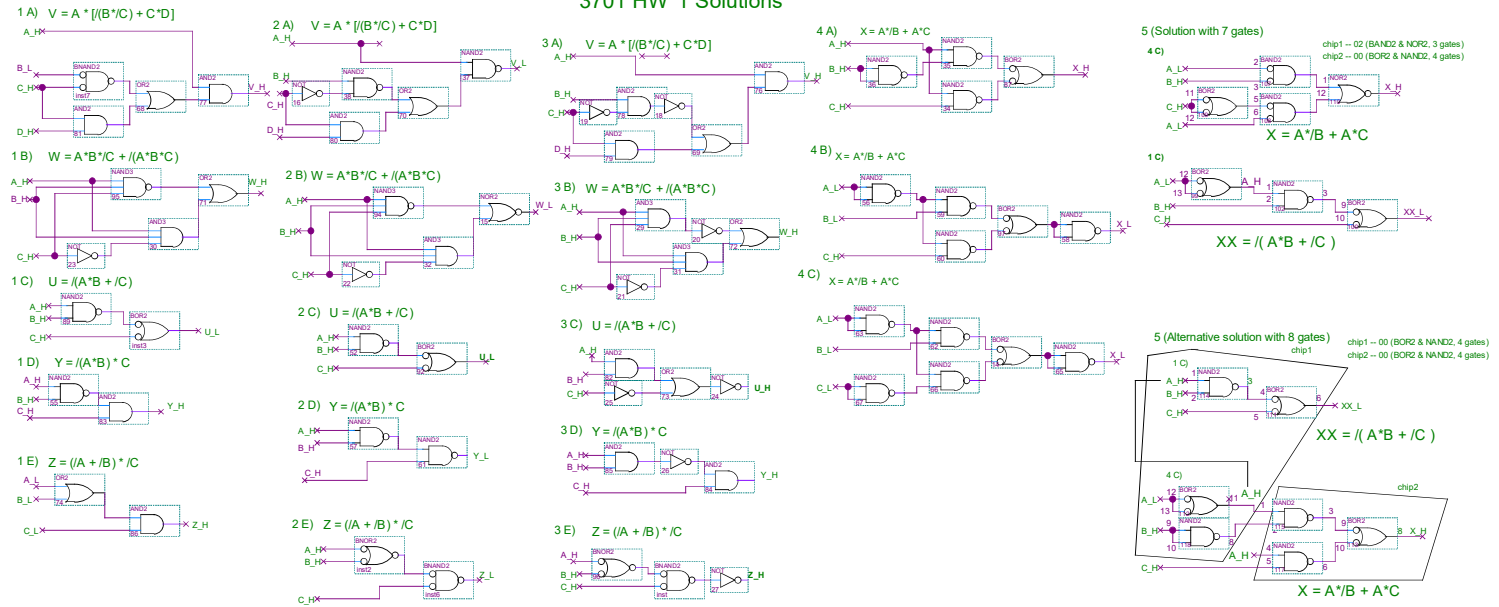2 E)   Z = (/A + /B) * /C

3 E)   Z = (/A + /B) * /C

4 C)

chip2

X = A*/B + A*C

Notes: Quartus has no Level Shifter with bubble on input side. The _H in inputs and outputs is NOT necessary.