SRINIX COLLEGE OF ENGINEERING, BALASORE

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

ASSIGNMENT ON

DIGITAL LOGIC DESIGN

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ASSIGNMENT-I

1. a) Convert the following numbers (L5) (5M)

   i)$(41.6875)_{10}$ to Hexadecimal number ii)$(11001101.0101)_2$ to base-8 and base-4iii)$(4567)_{10}$ to base2

   b) Subtract $(111001)_2$ from (101011) using 1's complement? (L5) (5M)

2. a)Represent the decimal number 3452 in i)BCD ii)Excess- (L5)(3M)

   b) perform (-50)-(-10) in binary using the signed-2's complement (L5)(3M)

   c) Determine the value of base x if$(211)x=(152)_8$ (L5) (4M)

3. a)Convert the following numbers (L5) (3M)

   i) $(AB)_{16} = (\quad)_2$ ii)) $(1234)_8 = (\quad)_{16}$ iii)$(101110.01)_2=(\quad)_8$

   b) Convert the following to binary and then to gray code $(AB33)_{16}$ (L5) (3M)

   c) Perform the following Using BCD arithmetic $(7129)_{10} + (7711)_{10}$ (L5) (4M)

4. Simplify the Boolean expressions to minimum number of literals (L5) (10M)

   i) **(**A + B)(A + C')(B' + C')

   ii) AB + (AC)' + AB'C(AB + C)

   iii) (A+B)' (A'+B')'

5. Explain the Binary codes with examples? (L2) (10M)
6. Explain about complements with examples? (L2) (10M)
7. a)Simplify the Boolean expressions to minimum number of literals (L5) (5M)

   i) X' + XY + X Z' + XYZ' ii) (X+Y) (X+Y')

   b) Obtain the Complement of Boolean Expression (L5) (5M)

   i) A+B+A'B'C ii) AB + A (B +C) + B'(B+D)

8. Convert the following (L5) (10M)

   a)$(1AD)_{16}=(\ )_{10}$ b) $(453)_8=(\ )_{10}$ c) $(10110011)_2=(\ )_{10}$ d) $(5436)_{10}=(\ )_{16}$

9. a) The solution to the quadratic equation x^2-11x+22=0 is x=3 and x=6 what is the base of the numb

ASSIGNMENT-II

1. Simplify the following Boolean expression using K-MAP and implement using NAND gates. F(W,X,Y,Z) = XYZ+WXY+WYZ+WXZ (L5) (10M)
2. Simplify the Boolean expression using K-MAPF(A,B,C,D) = ∑m(1,2,3,8,9,10,11,14) +d(7,15) (L5) (10M)
3. Simplify the Boolean expression using K-map and implement using NAND gates

   F(A,B,C,D) = ∑m(0,2,3,8,10,11,12,14) (L5) (10M)
4. Reduce the expression f(x,y,z,w)= πM(0,2,7,8,9,10,11,15) .d (3,4) using K-Map?(L5) (10M)
5. Simplify the Boolean expression using K-map? (L5)(10M)
   F(A,B,C,D,E)= ∑m(0,1,4,5,16,17,21,25,29)
6. Obtain the minimal product of sums and design using NAND gates (L5)(10M)
   F(A,B,C,D)= = ∑m(0,2,3,6,7) +d(8,10,11,15)
7. Explain NAND- NOR implementations? (L5) (10M)
8. a) Design the circuit by Using NAND gates F= ABC'+ DE+ AB'D' (L5) (5M)

   b) Design the circuit by Using NOR gates F= (X+Y). (X'+Y'+Z') (L5) (5M)
9. Simplify the Boolean expression using K-MAP (L5) (10M)

F(A,B,C,D,E)= ∑m(0,2,4,6,9,11,13,15,17,21,25,27,29,31)

10. Simplify the Boolean expression using K-MAP (L5) (10M)

    F(A,B,C,D) = πM (3,5,6,7,11,13,14,15) .d(9,10,12)

ASSIGNMENT-III

1. Explain Carry Lookahead Generator ? (L5) (10M)
2. A)Implement the following Boolean function using 8:1 multiplexer (L5) (5M)

   F(A, B, C, D) = A’BD’ + ACD + A’C’ D +B’CD

   B) Explain about parallel adderAdder? (L2)(5M)
3. A) Explain Design Procedure of combinational circuits? (L2) (5M)

   B) Explain Fullbinarysubtractor in detail? (L2) (5M)
4. Design the combinational circuit binary to gray code? (L5) (10M)
5. A)Explain about Binary Half Adder? (L2) (5M)

   B)What is Full Adder? Design & Explain the operations of Full Adder ? (L2) (5M)
6. A)Implement the following Boolean function using 8:1 multiplexer (L5)(5M)

   F(A,B,C.D) = Σm (0,1,2,5,7,8,9,14,15)

   B) Explain about Decimal Adder? (L2) (5M)
7. A)Design a 4 bit adder-subtractor circuit and explain the operation in detail? (L5) (5M)

   B) Explain the functionality of a Multiplexer? (L2) (5M)
8. Implement BCD to 7-segment decoder for common anode using 4:16 decoder? (L5) (10M)
9. A)Design a 4 bit binary parallel subtractorand the explain operation in detail? (L5) (5M)

   B) Design the combinational circuit of Binary to Excess-3 code convertor? (L5) (5M)
10. A)What is combinational circuits and explain analysis and design procedure of combinational circuits ? (L2)(5M)

    B) Explain about Priority encoder? (L5) (5M)

ASSIGNMENT-IV

1. A) Explain the Logic diagram of JK flip-flop?
   B) Write difference between Combinational & Sequential circuits?

2. A) Explain the Logic diagram of SR flip-flop?

   B) Design and draw the 3 bit up-down synchronous counter?

3. A) Draw and explain the operation of D Flip-Flop?

   B) Explain about Shift Registers?

4. A) Draw and explain the operation of T Flip-Flop?

   B) Explain about Ring counter?

5.A) Explain about ripple counter?
   B) What is state assignment? Explain with a suitable example? (L2) (5M)

6. Explain the working of the following (L2 & L5) (10M)

   i) J-K flip-flop

   ii) S- R flip-flop

   iii) D flip-flop

7. Explain the design of a 4 bit binary counter with parallel load in detail? (L2) (10M)

8. What is race-around condition? How does it set eliminate is a Master –slave J-K flip-flop? (L2)(10M

9. A) Explain synchronous and ripple counters compare their merits and demerits? (L2) (5M)

   B) Design a 4 bit binary synchronous counters with D-flip flop? (L5) (5M)

10. a)Write the truth table of clocked T- Flip Flop? (L1)**(**3M**)**

   b) Write the differences between latches and flip flops? (L1)(4M)
   c) Write the differences between synchronous and asynchronous counters? (L1)(3M)

ASSIGNMENT-V

1. A) Write difference between PROM&PLA &PAL? (L4) (5M)

   B) Explain about Error correction & Detection Codes ? (L2) (5M)

2. Encode the 11-bit code 10111011101 into 15 bit information code? (L3)(10M)

3. Implement the following function using PLA (L5)(10M)

   $A(x,y,z)=\sum m(1,2,4,6)$ $B(x,y,z)=\sum m(0,1,6,7)$ $C(x,y,z)=\sum m(2,6)$

4. Design PAL for a combinational circuit that squares a 3 bit number? (L5)(10M)

5. What is memory decoding? Explain about the construction of 4 X 4 RAM ? (L2) (10M)

6. Construct the PROM using the conversion from BCD code to Excess-3 code? (L5)(10M)

7. Implement the following functions using PLA. (L5)(10M)

   $A(x,y,z) = \sum m(1,2,4,6)$ $B(x,y,z) = \sum m(0,1,6,7)$ $c(x,y,z) = \sum m(2,6)$

8. A)Construct the PLA using the conversion from BCD code to Excess-3 code? (L5)(10M)

9. A)Explain about Hamming Code with example? (L2)(5M)

B) Explain about memory decoding error detection and correction? (L2)(5M)

10. A)Explain different types of ROM? (L1) (5M)

B) Write a short notes on Programmable array Logic? (L1) (5M)