EGR 270
Fundamentals of Computer Engineering
File: N270O1

Test #1 Overview

Related Homework Assignments: Homework #1 - 3
Textbook material: Ch 1 & 2 in Logic and Computer Design Fundamentals, 5th Edition, by Mano (omit sections 2.7-2.10)
Note: ***No calculators of any type will be allowed on the test***

Ch. 1 - Number Systems and Binary Codes

Bases, conversions, fractional numbers
Complements: r's and (r-1)'s
Signed numbers
Direct arithmetic operations in any base
Binary codes

- General information, number of bits needed
- BCD code
- Parity
- ASCII code
  - Table 1-5 provided
- Other codes given if needed (excess-3, Gray, etc)
- Unicode
  - Table 1-6 will be provided
  - Given a ***code point*** such as U+03B1 or given a table of codes, use Table 1-6 to express the UTF-8 code in either binary (11001110 10110001) or hexadecimal format (CE B1)

Ch. 2 - Combinational Logic

Boolean algebra

- Theorem and postulate names are unimportant, but be able to use them to minimize expressions
- Some test problems will ***require*** the use of Boolean algebra.

Truth tables, complements, minterms, maxterms
Canonical forms

- Sum of minterms
- Product of maxterms

Standard forms

- Sum of Products (SOP
- Product of Sums (POS)

Non-standard forms
Expressing a function as a sum of minterms, product of maxterms, SOP, or POS
Logic gates

- Truth tables and symbols for AND, OR, NOT, NAND, NOR, XOR, and EQUIVALENCE
- Determining output expressions for circuits using the basic logic gates listed above
- Implementing Boolean expressions using AND, OR, and NOT gates

Karnaugh Maps

- General structure, minterm ordering, 2 - 5 variables
- Finding minimal SOP and minimal POS expressions using Kmaps
- Prime implicants and essential prime implicants
- Don't care conditions
- XOR expressions using Kmaps

Cost Criteria - evaluating efficiency of designs using

- Number of gates
- Literal cost
- Gate input cost
- Number of gate delays

Other (anything covered in class could appear on the test)

TABLE 1-5
American Standard Code for Information Interchange (ASCII)

	$B_7B_6B_5$							
$B_4B_3B_2B_1$	000	001	010	011	100	101	110	111
0000	NULL	DLE	SP	0	@	P	`	p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	"	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EOT	DC4	$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	'	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	|
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	_	o	DEL

TABLE 1-6
UTF-8 Encoding for Unicode Code Points

Code point range (hexadecimal)	UTF-8 encoding (binary, where bit positions with x are the bits of the code point value)
U+0000 0000 to U+0000 007F	0xxxxxxx
U+0000 0080 to U+0000 07FF	110xxxxx 10xxxxxx
U+0000 0800 to U+0000 FFFF	1110xxxx 10xxxxxx 10xxxxxx
U+0001 0000 to U+0010 FFFF	11110xxx 10xxxxxx 10xxxxxx 10xxxxxx