

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc DEGREE PROGRAMME: LEVEL 04
CLOSED BOOK TEST: 2010
CSU 2178: DIGITAL COMPUTER FUNDAMENTALS
DURATION: ONE AND HALF HOURS (1 ½ HOURS)



Date: 26th April, 2010

Time: 4.00 pm – 5.30 pm

Answer ALL questions.

Q1.

- a) "The associative law of algebra does not always hold in computers." Do you agree with this statement? Explain briefly.
- b) Following diagram shows ASCII character map.

Ctrl	Dec	Hex	Char	Code	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
^@	0	00		NUL	32	20	!	64	40	@	96	60	'
^A	1	01		SOH	33	21	!	65	41	A	97	61	a
^B	2	02		STX	34	22	..	66	42	B	98	62	b
^C	3	03		ETX	35	23	#	67	43	C	99	63	c
^D	4	04		EOT	36	24	\$	68	44	D	100	64	d
^E	5	05		ENQ	37	25	%	69	45	E	101	65	e
^F	6	06		ACK	38	26	&	70	46	F	102	66	f
^G	7	07		BEL	39	27	,	71	47	G	103	67	g
^H	8	08		BS	40	28	(	72	48	H	104	68	h
^I	9	09		HT	41	29	)	73	49	I	105	69	i
^J	10	0A		LF	42	2A	*	74	4A	J	106	6A	j
^K	11	0B		VT	43	2B	+	75	4B	K	107	6B	k
^L	12	0C		FF	44	2C	,	76	4C	L	108	6C	l
^M	13	0D		CR	45	2D	-	77	4D	M	109	6D	m
^N	14	0E		SO	46	2E	.	78	4E	N	110	6E	n
^O	15	0F		SI	47	2F	/	79	4F	O	111	6F	o
^P	16	10		DLE	48	30	0	80	50	P	112	70	p
^Q	17	11		DC1	49	31	1	81	51	Q	113	71	q
^R	18	12		DC2	50	32	2	82	52	R	114	72	r
^S	19	13		DC3	51	33	3	83	53	S	115	73	s
^T	20	14		DC4	52	34	4	84	54	T	116	74	t
^U	21	15		NAK	53	35	5	85	55	U	117	75	u
^V	22	16		SYN	54	36	6	86	56	V	118	76	v
^W	23	17		ETB	55	37	7	87	57	W	119	77	w
^X	24	18		CAN	56	38	8	88	58	X	120	78	x
^Y	25	19		EM	57	39	9	89	59	Y	121	79	y
^Z	26	1A		SUB	58	3A	:	90	5A	Z	122	7A	z

- i. What are the differences between ASCII and UNICODE?
- ii. Write the binary encoding of the word "CSu2178" in ASCII values.

- c) Convert the following numbers into Octal(Base 8) and Hexadecimal(Base 16)
- 35_{10}
 - 101010_2
- d) By using 8 bit registers, store the above values.
- e) Use Two's Complement addition to perform the following calculations.
- $35_{10} + 42_{10}$
 - $35_{10} - 42_{10}$
 - $42_{10} - 35_{10}$

Q2.

- a) Briefly explain the following terms.
- Von Neumann model
 - Levels of machines
 - Fetch-execute cycle
- b) What are the tasks of the following instructions?
- orcc
 - sethi
 - call
- c) Consider the following Assembly language program
- ```

mvp: .begin
 id [data1], %myd1
 id [data2], %myd2
 addcc %myd1, %myd2, %myd3
 set %myd3, [data3]
 .end

```
- What is the task of the above Assembly language program?
  - What are the commands and registers used in the above Assembly program?

## Q3.

- a) Briefly explain the following terms.
- Direct Memory Access (DMA)
  - Disk File System
  - Associated Mapped Cache
- b) What are the three factors that depend on the data transfer speed of a hard disk?
- c) Design a full adder circuit, using basic logic gates.
- d) Design an addition/ subtraction unit by using full adders and suitable gates.

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