J. BASKARAN M.Sc., B.Ed. (C.S)
jbaskaran89@gmail.com

J. ILAKKIA M.Sc., M.Phil., B.Ed. (C.S)
jilakkia@gmail.com

COMPUTER APPLICATIONS

2. NUMBER SYSTEMS

SECTION – A

Choose the correct answer:

1. Which refers to the number of bits processed by a computer's CPU?

A) Byte B) Nibble C) **Word length** D) Bit

2. How many bytes does 1 Kilobyte contain?

A) 1000 B) 8 C) 4 D) **1024**

3. Expansion for ASCII

A) American School Code for Information Interchange

B) **American Standard Code for Information Interchange**

C) All Standard Code for Information Interchange

D) American Society Code for Information Interchange

4. 2^50 is referred as

A) Kilo B) Tera C) **Peta** D) Zetta

5. How many characters can be handled in Binary Coded Decimal System?

A) **64** B) 255 C) 256 D) 128

6. For 11012 what is the Hexadecimal equivalent?

A) F B) E C) **D** D) B

7. What is the 1's complement of 00100110?

A) 00100110 B) **11011001** C) 11010001 D) 00101001

8. Which amongst this is not an Octal number?

A) 645 B) 234 C) **876** D) 123

SECTION-B

Short Answers

1. What is data?

The term data comes from the word **datum**, which means a raw fact. The data is a fact about people, places or some objects.

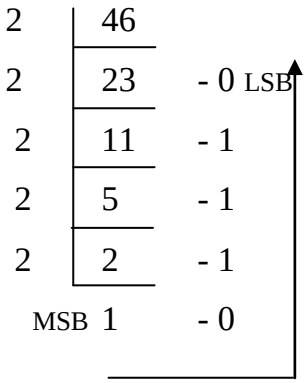
2. Write the 1's complement procedure.

Step 1: Convert given Decimal number into Binary

Step 2: Check if the binary number contains 8 bits , if less add 0 at the left most bit, to make it as 8 bits.

Step 3: Invert all bits (i.e. Change 1 as 0 and 0 as 1)

3. Convert $(46)_{10}$ into Binary number



$(46)_{10} = (101110)_2$

4. We cannot find 1's complement for $(28)_{10}$. State reason.

Reason : We cannot find 1's complement for $(28)_{10.}$ Because it is a positive number. 1's complement apply only with negative number.

5. List the encoding systems for characters in memory.

There are several encoding systems used for computer.

BCD – Binary Coded Decimal

EBCDIC – Extended Binary Coded Decimal Interchange Code

ASCII – American Standard Code for Information InterchangeUnicode

ISCII – Indian Standard Code for Information Interchange

SECTION-C

Explain in Brief

1. What is radix of a number system? Give example

* Each number system is uniquely identified by its base value or radix.

* Radix or base is the count of number of digits in each number system.

* Radix or base is the general idea behind positional numbering system.

* Radix or base is the general idea behind positional numbering system.

Example:

Binary Number System	-	Radix 2	$(1010)_2$
Octal Number System	-	Radix 8	$(457)_8$
Decimal Number System	-	Radix 10	$(312)_{10}$
Hexadecimal Number System	-	Radix 16	$(25F)_{16}$

2. Write note on binary number system.

* There are only two digits in the Binary system, namely, 0 and 1.

* The numbers in the binary system are represented to the base 2 and the positional multipliers are the powers of 2.

* The left most bit in the binary number is called as the Most Significant Bit (MSB)and it has the largest positional weight.

* The right most bit is the Least Significant Bit (LSB) and has the smallest positional weight.

3. Convert $(150)_{10}$ into Binary, then convert that Binary number to Octal

2	150		**Binary Number**
2	75	- 0	LSB
2	37	- 1	
2	18	- 1	
2	9	- 0	
2	4	- 1	
2	2	- 0	
MSB	1	- 0	

$(150)_{10} = (10010110)_2$

Binary Number to Octal

10010110 = ?

010	010	110
2	2	6

$(10010110)_2 = (226)_8$

4. Write short note on ISCII

* ISCII means Indian Standard Code for Information Interchange. Itis the system of handling the character of Indian local languages.

* This as a 8-bit coding system. Therefore it can handle 256 (2^8) characters.

* The department of Electronics in India in the year 1986- 88 and recognized by Bureau of Indian Standards (BIS).

5. Add a) $-22_{10}+15_{10}$

2	22	
2	11	- 0 LSB
2	5	- 1
2	2	- 1
MSB	1	- 0

The Binary equivalent of $22_{10} = (10110)_2$

Binary equivalent of +22	=	10110
8 bit format	=	00010110
1's complement	=	11101001
Add 1 bit	=	+1
2's complement −22	=	11101010

2	15	
2	7	- 1LSB
2	3	- 1
MSB	1	- 1

The Binary equivalent of $15_{10} = (111)_2$

The binary addition of −22 and 15

-22_{10}	=	11101010
$+15_{10}$	=	00001111
$\mathbf{-7}_{10}$	=	11111001

$\mathbf{-7}_{10} = (11111001)_2$

b) $20_{10}+25_{10}$

2	20	
2	10	- 0 LSB
2	5	- 0
2	2	- 1
MSB	1	- 0

The Binary equivalent of $20_{10} = (10100)_2$

2	25	
2	12	- 1LSB
2	6	- 0
2	3	- 0
MSB	1	- 1

The Binary equivalent of $25_{10} = (11001)_2$

8 bit format of 20_{10} = 00010100

8 bit format of 25_{10} = 00011001

45_{10} = 00101101

$45_{10} = (00101101)_2$

SECTION - D

Explain in detail

1. a) Write the procedure to convert fractional Decimal to Binary

The method of repeated multiplication by 2 has to be used to convert such kind of decimal fractions. The steps involved in the method of repeated multiplication by 2:

Step 1: Multiply the decimal fraction by 2 and note the integer part. The integer part is either 0 or 1.

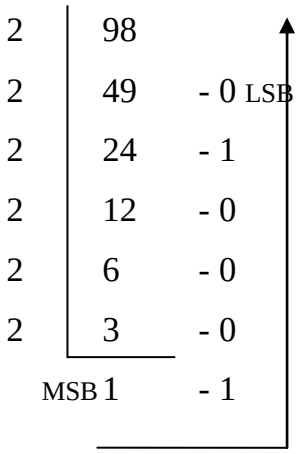
Step 2: Discard the integer part of the previous product. Multiply the fractional part of the previous product by 2. Repeat Step 1 until the same fraction repeats or terminates (0).

Step 3: The resulting integer part forms a sequence of 0s and 1s that become the binary equivalent of decimal fraction.

Step 4: The final answer is to be written from first integer part obtained till the last integer part obtained.

b) Convert $(98.46)_{10}$ to Binary

i) Integer Part



$98_{10} = (1100010)_2$

ii) Fraction Part

$0.46 \times 2 = 0.92 = 0$

$0.92 \times 2 = 1.\underline{8}4 = 1$

$0.84 \times 2 = 1.68 = 1$

$0.68 \times 2 = 1.36 = 1$

$0.36 \times 2 = 0.72 = 0$

$0.72 \times 2 = 1.44 = 1$

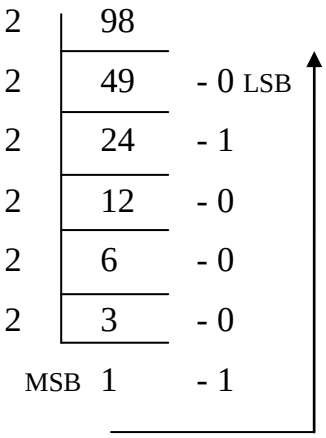
$0.44 \times 2 = 0.\underline{8}8 = 0$

$46_{10} = (0111010)_2$

$(98.46)_{10} = (1100010.\ 0111010\ldots.)_2$

2. Find 1's Complement and 2's Complement for the following Decimal number

a) -98



The Binary equivalent of $98_{10} = (1100010)_2$

Binary equivalent of +98 = 1100010

8 bit format = 01100010

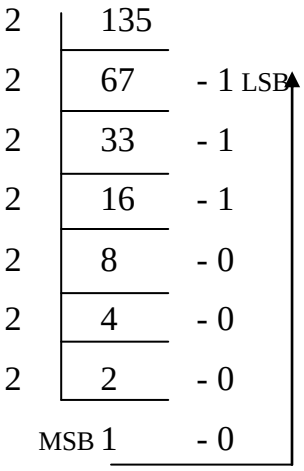
1's complement = 10011101

Add 1 bit = +1

2's complement −98 = 10011110

$-98 = (10011110)_2$

b) -135



The Binary equivalent of $135_{10} = (1000111)_2$

Binary equivalent of +135 = 10000111

8 bit format = 10000111

1's complement = 01111000

Add 1 bit = +1

2's complement −135 = 01111001

$-135 = (01111001)_2$

3. a) Add $1101010_2+101101_2$

	1	1	0	1	0	1	0
+		1	0	1	1	0	1
	1	0	0	1	0	1	1

$1101010_2 + 101101_2 = 10010111_2$

0 + 1 = 1

1 + 0 = 1

1 + 1 = 10

1 + 1 + 1 = 11

b) Subtract $1101011_2 - 111010_2$

	1	1	0	1	0	1	1
−		1	1	1	0	1	0
	0	1	1	0	0	0	1

1 – 0 = 1

1 – 1 = 0

10 – 1= 1

$1101011_2 - 111010_2 = 0110001_2$

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