Assigment 1

Date:

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"Number system and computer Arithmetic"

Question No 1

ii) Hexa decimal to binary,

2 in binary = 0010
A in binary = 1010
3 in binary = 0011
f in binary = 1111
combine all (2A3f) = (0010 1000 1111)
employes ID in hexadecimal to binary is

$(0010\ 1010\ 0011\ 1111)_2$

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(iii)

Hexa decmical to octal

to get octal convert the

binary into octal;

001 = 1

010 = 2

100 = 4

011 = 3

111 = 7

So,

$(273F)_{16} = (123477)_8$

(Question No 2)

Software application needs to perform arithmetic opereation using different No system.

convert binary $(110101)_2$ to decimal

$(110101)_2 = 1 \times 2^5 + 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0$

$= 32 + 16 + 0 + 4 + 0 + 1$

$=$

$(110101)_2 = (57)_8$

convert decimal 185 to octal

=> Divide by 8 : $185 \div 8 =$ 23 reminder 1

=> $23 \div 8 =$ 2 remiuder 7 => $2 \div 8 =$ reminder 2

So, $185_{10} = (271)_8$

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convert octal $(57)_8$ to binary

$5 = 101$ and $7 = 111$

So,

$(57)_8 = (101111)_2$

(Question No 3)

In an embaded system, data is recieved in octal format but must be displayed in hexadecimal for interpretation by mentoring software. Give the octal number $(725)_2$ to hexadecimal.

octal to binary

$7 = 111$

$2 = 010$

$5 = 101$

So,

$(725)_8 = (111010101)_2$

Binary to hexelecimal

0111 0101 0101

$0111 = 7$

$0101 = 5$

So,

$(725)_8 = (1D5)_{16}$

Date:

(Question No 4)

Binary Addition of $(1010101)_2$ and $(1100111)_2$:

$1010101 + 1100111 = 10101101$

Binary subtraction (2's complement) of 1100111 from 1010101;

1010101

0011001

1111111

$(1111111)_2$

(Question No 5)

Binery multiplication of $(1011)_2 \times (110)_2$

1011

$\times\ 110$

0000

$1011\times$

$1011\times\times$

1000010

$(1000010)_2$.

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(Question 6)

$$
\begin{array}{r}
101 \\
101 \overline{)\,110110} \\
101 \\
\hline
0011 \\
-\ 0 \\
\hline
111 \\
101 \\
\hline
100
\end{array}
$$

Quotient $(101)_{22}$, Remainder $(100)_2$

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(Question No 7)

Developing software for student for smart traffic light system based on sensor A and B, if sensor A sends $(101011)_2$ and sensor B sends $(110001)_2$ calculate result by subtracting B from A.

subtract $(110001)_2$ from $(101011)_2$ using the 2's complement method.

① find the 2's complement of 110001

2's complement 001110

Add 1: 001110 + 1 = 001111

② Add 101011 + 001111

101011 + 001111 = 111010

So,

$(1010111)_2 - (110001)_2 = (111010)_2$

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(Question No 8)

convert the following values to hexadecimal.

Red = $(120)_{10}$
Green = $(200)_{10}$
Blue = $(180)_{10}$

Red 120_{10} = 78_{16}
Green 200_{10} = $C8_{16}$
Blue 180_{10} = $B4_{16}$

So

The hexadecimal representation is #78C8B4

(Question No 9)

compressing large binary value $(11110110)_2$ into hexadecimal.

Group the binary digits in sets of four from the right.

11110110 = 0011 1110 1101 0 (adding leading 0)

convert each group to hexadecimal

0011 = 3
1110 = E
1101 = D
0 = A

So, $(11110110)_2$ = $(3EDA)_{16}$

Date:

Question No 10

Digital clak's represent time in binary system convert it into Hexadecimal.

(A) $(10011)_2$ for hours

$(111001)_2$ for min

$(10011)_2 = 1\times2^4 + 0\times2^3 + 0\times2^2 + 1\times2^1 + 1\times2^0$

$= 16 + 0 + 0 + 2 + 1$

$= 19$

$(10011)_2$ in decimal $= 19$ hours

$(111001)_2 = 1\times2^5 + 1\times2^4 + 1\times2^3 + 0\times2^2 + 0\times2^1 + 1\times2^2$

$= 32 + 16 + 8 + 0 + 0 + 1$

$= 57$

$(111001)_2$ in decimal $= 57$ mint

current time in decimal is 19 hours and 57 mints.

(1) $(10011)_2 = 19$ hours

(2) $(111001)_2 = 57$ minutes.

So

the times is 19:57,