Computer

CSE - 2010 → Paper II

5)(d) (i) Suppose a computer spends 60% of its time handling a particular type of computation when running a given program and its manufacturers make a change that improve its performance on that type of computation by a factor of 10. If the program takes 100 sec to execute. what will its execution time to after the change?

⇒ The execution time of program before change = 100 sec

it spends 60% of it's time, handling a particular type of computation = 60% of 100 sec = 60 sec.

so, Remaining time for execution = (100 - 60) = 40 sec.

Manufacturers improves its computation by a factor of 10 by some change ⇒ which increases its efficiency by a factor of 10 and hence decreases the computation time by factor of 10, i.e, $\frac{60}{10} = 6$ sec.

Now, Execution time after the change = 40 + 6 = 46 sec.

(ii) If $A \oplus B = AB' + A'B$, find the value of $x \oplus y \oplus z$.

$$\Rightarrow x \oplus y \oplus z = (xy' + x'y) \oplus z = xy' \oplus z + x'y \oplus z$$

$$= xy'z' + (xy')'z + x'yz' + (x'y)'z$$

$$= xy'z' + (y'' + x')z + x'yz' + (x'' + y')z$$

$$= z'(xy' + x'y) + z(y + x' + x + y') \quad [\because A'' = A]$$

$$= z'(xy' + x'y) + z\{(x + x') + (y + y')\}$$

$$= z'(xy' + x'y) + z(1 + 1) \quad [\because A + A' = 1]$$

$$= z'(xy' + x'y) + z \quad [\because 1 + 1 = 1]$$

$$\therefore x \oplus y \oplus z = z'(xy' + x'y) + z$$

7)(c) (i) Find the Hexadecimal equivalent of the decimal number $(587632)_{10}$.

⇒

16	587632	
16	36727	0
16	2295	7
16	143	7
	8	15

∴ 8 15 7 7 0
$= (8F770)_{16}$

So,
$(587632)_{10} = (8F770)_{16}$

7) (c) (ii) For the given set of data points $(x_1, f(x_1)), (x_2, f(x_2))$ ---- $(x_n, f(x_n))$ write an algorithm to find the value of Lagrange's interpolation formula.

⇒ Step 1. Start the program.

Step 2. Input number of terms n.

Step 3. Input the array ax.

Step 4. Input the array ay

Step 5. for i=0; i<n; i++

Step 6. nr = 1

Step 7. dr = 1

Step 8. for j=0; j<n; j++

Step 9. if j != i

a. nr = nr * (x - ax[j])

b. dr * (ax[i] - ax[j])

Step 10. End Loop j

Step 11. y+ = (nr/dr) * ay[i]

Step 12. End Loop i

Step 13. print output x, y.

Step 14. End of the program.

7(c) (iii) use Boolean algebra, simplify the following expressions

i) $a + a'b + a'b'c + a'b'c'd + \text{———}$

ii) $x'y'z + yz + xz$, where x' is complement of x

⇒ i) $y = a + a'b + a'b'c + a'b'c'd + \text{———}$

$= (a + a'b) + a'b'(c + c'd) + \text{———}$ $[\because A + A'B = A + B]$

$= (a + b) + a'b'(c + d) + \text{———}$

$= (a + a'b'c) + (b + a'b'd) + \text{———}$

$= (a + b'c) + (b + a'd) + \text{———}$

$= (a + a'd) + (b + b'c) + \text{———}$

$= a + d + b + c + \text{———}$

$= a + b + c + d + \text{———}$

ii) Given,

$A = x'y'z + yz + xz$

$= (x'y' + y)z + xz$

$= (x' + y)z + xz$ $[\because A'B + A = A + B]$

$= x'z + yz + xz$

$= yz + (x + x')z$

$= yz + z$ $[\because A + A' = 1]$

$= z(1 + y)$

$= z$ $[\because 1 + A = 1]$