CSC281: Discrete Math for Computer Science

Computer Science Department — First Semester 1442

King Saud University — Tutorial 6: Integer Representations and Algorithms

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Question 1. Convert each of the following integers from a binary expansion to octal and hexadecimal expansions.

a)$(11111)_2$

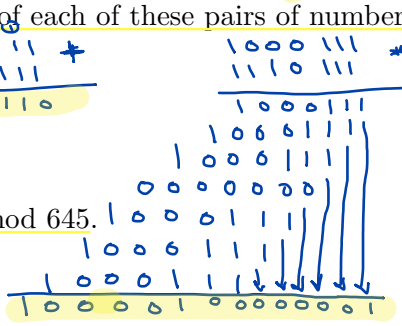
b)$(1000000001)_2$

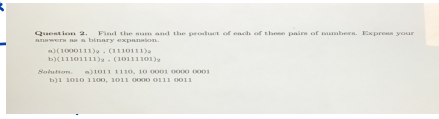
Question 2. Find the sum and the product of each of these pairs of numbers. Express your answers as a binary expansion.

a)$(1000111)_2$, $(1110111)_2$

b)$(11101111)_2$, $(10111101)_2$

Question 3. Use Algorithm 5 to find 7644 mod 645.





The las question solution is correct as the expansion should be done to the power not to the mod

So, 644= $(\underline{10\ 1000\ 0100})_2$

and the full trace is here:

When $a_i = 1$ then x is first multiplied by the power and reduced modulo 645.
Then on each iteration the power is multiplied by itself and reduced modulo 645.

i	ai	x	power
0	0	1	(7*7) mod 645= 49
1	0	1	(49*49) mod 645=466
2	1	(1*466) mod 645=466	466^2mod 645=436
3	0	466	436^2mod 645=466
4	0	466	466^2mod 645=436
5	0	466	466
6	0	466	436
7	1	(466*436) mod 645=1	466
8	0	1	436
9	1	436 mod 645	466

The final value of x is 436