Tutorial

Day 2

1. Compute the following by Euler phi function:

a. $\varphi(10)$ b. $\varphi(13)$ c. $\varphi(49)$ d. $\varphi(240)$ e. $\varphi(777)$

2. Compute the following by Fermat's little theorem:

a. 5^{18} mod 19 b. 5^{19} mod 19 c. 5^{20} mod 19

d. 9^{794} mod 73 e. 8^{103} mod 103

3. If 3^{1000} is divided by 23, find its reminder

4. Solve: x^{86} congruent to 6 mod 29

5. Find the missing Check digit for an ISBN 10

a. 0 6 1 8 2 6 9 4 1 __ b. 0 8 7 3 5 8 8 2 8 __

6. Find the missing digit that is not the check digit

0 1 9 8 5 __ 8 0 3 0

7. Find the multiplicative inverse using extended Euclidean algorithm:

$$3 \bmod 19$$

8. A bit stream 1101011011 is transmitted using the standard CRC method. The generator polynomial is $x^4 + x + 1$. What is the actual bit string transmitted.

9. Suppose original message is 1001101 and the generator polynomial is $x^3 + 1$. Find the cyclic redundancy code for this message and also check wheather there have error or not

10. A bit 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$

a. What is the actual bit string transmitted?

b. Suppose the third bit from the left is inverted during transmission. How will receiver detect this error?

11. Below is a set of three 11 bit codes, lebelled as a,b,c

a. 00001111000
b. 10101010101
c. 01010010110

What is the hamming distance for this set and why?

12. Generate hamming code for the message 1110

13. A (7,4) hamming code is received as 1010111. Determine the correct code when even parity is there

14. Construct (7,4) hamming code for the message 1010 such that odd parity exists

15. Construct (7,4) hamming code for the message 1000 . Consider even parity only