Quiz 9
Friday, April 20th.

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1. Remember that the check-digit for an ISBN number $a_1 a_2 \ldots a_{10}$ is chosen in such a way that $10a_1 + 9a_2 + 8a_3 + 7a_4 + 6a_5 + 5a_6 + 4a_7 + 3a_8 + 2a_9 + a_{10}$ is evenly divisible by 11. Is the number $0 - 2435 - 6411 - 3$ a correct ISBN number?

2. The check-digit a_{10} for a nine-digit ZIP+4 code $a_1 a_2 \ldots a_9$ is chosen in such a way that $a_1 + a_2 + a_3 + a_4 + a_5 + a_6 + a_7 + a_8 + a_9 + a_{10}$ ends with a 0.
(a) Find the check-digit for the ZIP+4 code $55811 - 2742$.

(b) Is the ZIP+4 code (including its check-digit) 54312-7500-1 correct (explain)? If not, can you correct it? If you know that only the third digit is incorrect, can you recover the correct code?

3.(a) Find the code words for the binary messages 0100, 0101, 0011 and 1101 obtained by adding three check digits using the parity-check sums $a_2 + a_3 + a_4$, $a_2 + a_4$, and $a_1 + a_2 + a_3$.

(b) If you were asked to find the code words for all binary messages of length 4 using the above method, how many code words would you have to compute?

4. (a) Use the Venn diagram method to determine the code word of message 1010.

(b) Use the Venn diagram method to decode each of the following received words (if there is an error in the message, say so; say if you can correct the error or not)
1101101

1011010

1100100