Announcements

- Exam #2 will be on Friday, July 12.
- Exam is over material from Chapters 7-9.
- An extra lab session will be offered from 2:30 – 5:00 on Thursday, July 11 in Faner 1032.
- A practice exam (no credit) will be available in My Labs Plus next week. Work on this after you finish the homework and practice quizzes which do count for credit.

1. Find the remainder in the division of 69 by 11.

A) 2

B) 3

C) 5

D) 6

2. Find the check digit for a UPC number if the first eleven digits are 8-25032-10023.

A) 2 B) 4 C) 6 D) 8

3. What is the distance between received words 1001010 and 1010010?

   A) 1
   B) 2
   C) 3
   D) 4

4. Find the sum [12] + [23] in Z_9:

A) [8]
B) [1]
C) [0]
D) [5]

5. Suppose that a linear code has codewords {000000, 001001, 010110, 011111, 100101, 101100, 110011, 111010}. Determine the maximum number of errors that can be detected.

A) 1

B) 2

C) 3

D) 6

6. Find the parity check digits for the binary message $m_1 m_2 m_3 m_4 = 1011$ given that the parity check equations are

   $c_1 = m_1 + m_2 + m_3$ and $c_2 = m_1 + m_3 + m_4$.

   A) $c_1 = 0, c_2 = 0$

   B) $c_1 = 0, c_2 = 1$

   C) $c_1 = 1, c_2 = 0$

   D) $c_1 = 1, c_2 = 1$

7. Suppose that the generator matrix for a (4,8)-code is

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 & 1 \end{bmatrix}$$

Find the codeword corresponding to 1001.

A) 10011111
B) 10010000
C) 10010110
D) 10011001

8. Suppose that the generator matrix for a matrix code is

$$\begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 1 \end{bmatrix}$$

Decode the word 0100101 if it is a codeword or differs from a codeword in a single digit.

A) 010
B) 110
C) 011
D) The word cannot be decoded.

9. A group of 12 students have to decide among three types of pizza: Sausage (S), Mushroom (M), and Beef (B). Their preference rankings are shown below. Which choice will the group make if they use the Plurality method?

Number of Votes	3	3	2	2	2
First choice	B	M	S	B	S
Second choice	M	B	M	S	B
Third choice	S	S	B	M	M

A) S B) B C) M D) No winner can be chosen

10. A group of 12 students have to decide among three types of pizza: Sausage (S), Mushroom (M), and Beef (B). Their preference rankings are shown below. Which choice will the group make if they use the Borda count?

Number of Votes	3	3	2	2	2
First choice	B	M	S	B	S
Second choice	M	B	M	S	B
Third choice	S	S	B	M	M

A) S B) M C) B D) No winner can be chosen

11. Suppose that a nine-member committee needs to elect one of the four alternatives. Their preference schedule is shown below. Which alternative is the head-to-head winner?

Number of Votes	4	3	2
First choice	A	B	C
Second choice	B	D	D
Third choice	C	A	B
Fourth choice	D	C	A

A) A B) B C) C D) D