



**HANU**  
HANOI UNIVERSITY

FACULTY OF INFORMATION TECHNOLOGY  
DEPARTMENT OF COMPUTER SCIENCE

# **HOMEWORK**

## **Discrete Mathematics**

### **TUT-08: Problem Set 08**

### Problem 1

We received data through a transmission line with erasure error rate is 2 over 5 packages. The received packages are: {lost, 2, 1, lost, 3}. What is the corrected value of the error package?

### Problem 2

We received data through a transmission line with general error rate is 1 over 5 packages. The received packages are: {3, 1, 6, 0, 3}.

1. Which package has been changed?
2. What is the corrected value of the error package?

Knowing that the encryption employed polynomials over  $GF(7)$ .

### Problem 3

We received data through a transmission line with general error rate is 1 over 5 packages. The received packages are {0, 4, 1, 2, 0} and the encryption employs polynomials over  $GF(7)$ . What is the corrected value of the error package?

### Problem 4

We received data through a transmission line with general error rate is 1 over 5 packages. The received packages are {6, 4, 4, 6, 4} and the encryption employs polynomials over  $GF(7)$ . Fix the error package.

### Problem 5

We received data through a transmission line with general error rate is 1 over 5 packages. The received packages are {6, 6, 3, 3, 2} and the encryption employs polynomials over  $GF(7)$ . Fix the error package.

**NOTES:** Please use the inverse matrices here

- Problem 2:

$$\mathbf{A}^{-1} = \begin{pmatrix} 2 & -21/20 & -37/20 & -23/20 & 41/20 \\ -1 & 3/4 & 3/4 & 1/4 & -3/4 \\ -2 & 3/4 & 7/4 & 5/4 & -7/4 \\ 8 & -69/20 & -133/20 & -67/20 & 129/20 \\ -2 & 1 & 2 & 1 & -2 \end{pmatrix}$$

- Problem 3:

$$\mathbf{A}^{-1} = \begin{pmatrix} -7/80 & -1/160 & 19/80 & -17/160 & -3/80 \\ 1/16 & 7/32 & -5/16 & -9/32 & 5/16 \\ -3/16 & -5/32 & -1/16 & 11/32 & 1/16 \\ 97/80 & -9/160 & 11/80 & 7/160 & -27/80 \\ -1/4 & 1/8 & 1/4 & 1/8 & -1/4 \end{pmatrix}$$

- Problem 4:

$$\mathbf{A}^{-1} = \begin{pmatrix} 3/10 & -1/5 & -3/20 & -3/10 & 7/20 \\ 1/2 & 0 & -3/4 & -1/2 & 3/4 \\ -1/2 & 0 & 1/4 & 1/2 & -1/4 \\ -53/10 & 16/5 & 133/20 & 33/10 & -137/20 \\ 1 & -1/2 & -1 & -1/2 & 1 \end{pmatrix}$$

- Problem 5:

$$\mathbf{A}^{-1} = \begin{pmatrix} 2/5 & -1/4 & -1/4 & -7/20 & 9/20 \\ -1 & 3/4 & 3/4 & 1/4 & -3/4 \\ 2 & -5/4 & -9/4 & -3/4 & 9/4 \\ -62/5 & 27/4 & 55/4 & 137/20 & -279/20 \\ 2 & -1 & -2 & -1 & 2 \end{pmatrix}$$

## References

- [1] K. H. Rosen, *Discrete Mathematics and Its Applications*, McGraw-Hill, 8th edition, 2019.
  - [2] S. S. Epp, *Discrete Mathematics with Applications*, Cengage, 5th edition, 2020.
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