CS113/DISCRETE MATHEMATICS-SPRING 2024

Worksheet 31

Topic: Cryptography

Continuing our exploration of Crytography, we will learn RSA technique today which is a widely used public-key encryption technique in modern cryptography. Happy Learning!

Student's Name and ID: _____

Instructor's name: _____

1. Encrypt the message `ATTACK` using the RSA system with $n = 43 \cdot 59$ and $e = 13$, translating each letter into integers and grouping together pairs of integers.

2. Encrypt the message `UPLOAD` using the RSA system with $n = 53 \cdot 61$ and $e = 17$, translating each letter into integers and grouping together pairs of integers.

3. What is the original message encrypted using the RSA system with $n = 53 \cdot 61$ and $e = 17$, if the encrypted message is 3185 2038 2460 2550? (To decrypt, first find the decryption exponent d, which is the inverse of $e = 17$ modulo $52 \cdot 60$.)

4. What is the original message encrypted using the RSA system with $n = 43 \cdot 59$ and $e = 13$, if the encrypted message is 0667 1947 0671? (To decrypt, first find the decryption exponent d, which is the inverse of $e = 13$ modulo $42 \cdot 58$.)