Due: Wednesday, 30 OCT 13  2:00pm

**Part I: DES**

1. Consider the following 64 bit key:
   11110001100110110111000110100010101001101010101110100010100110011

   What is the value of the key used for the fifth round of the DES encryption algorithm?

2. Consider the following 48 bit string:
   101110010110101110011011010001011011100101011100

   If this string is input to the s boxes in the DES encryption algorithm, what string is output from the s boxes?

**Part II: Public Key**

1. What is the totient of 46? Defend your answer.

2. Use the superincreasing sequence \( S=\{3,7,13,27,51,102\} \) modulus \( n=207 \), and multiplier \( w=19 \) to generate a public key sequence \( H \) for Merkle-Hellman.

3. Assume that you received the ciphertext \( C=364 \) from someone using the public key generated in exercise 2. You are to decipher \( C \) and determine the message \( M \) that was used to generate \( C \).

4. Alice has chosen primes \( p=467 \) and \( q=479 \) and exponent \( e=70167 \) to use with the RSA algorithm. What does Alice publish as her public key?

5. Suppose Alice receives the following message from Bob, who used the public key from exercise 4 to encrypt it: \( 165369 \). Determine the plaintext that Alice obtains from this ciphertext.

**Part III: Digital Rights Management**

DRMBook Express

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https://github.com/cs177/DRMBook

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