

Computer Mathematics

Week 5 Examples

1. Convert each binary number into Gray code, and then from Gray code back to binary.

<i>binary</i>	→	<i>Gray</i>	→	<i>binary</i>
00000000 ₂		_____		_____
11111111 ₂		_____		_____
11110000 ₂		_____		_____
10101010 ₂		_____		_____
00110011 ₂		_____		_____
00001111 ₂		_____		_____

2. Convert the following Unicode characters into UTF-8.

<i>Unicode</i>	→	<i>UTF-8</i>
U+2A		_____
U+C0		_____
U+FED		_____
U+8080		_____
U+12345		_____

3. Convert the following UTF-8 sequences into Unicode characters.

<i>UTF-8</i>	→	<i>Unicode</i>	
2A		U+_____	
DCBA		U+_____	
EF9876		U+_____	
F189AB		U+_____	
BABA		U+_____	Comment? _____
DCE1		U+_____	Comment? _____
F00DFACE		U+_____	Comment? _____

4. Construct a Huffman code for the following messages.

Message: b a n a n a r a m a

Encoding tree:

Encoded message:

b a n a n a r a m a

Compression ratio: _____

Message: p e t e r p i p e r p i c k e d

Encoding tree:

Encoded message:

p e t e r p i p e r p i c k e d

Compression ratio: _____