Section 5, Chapter 24

worksheet – binary conversions

*1 Convert the following unsigned binary integer numbers to denary.*

a) 100 🡪 4 ✓

b) 1011🡪 11 ✓

c) 10001 🡪 17 ✓

d) 100111 🡪 39 ✓

e) 1010010 🡪 82 ✓

f) 10000101 🡪 133 ✓

*2 Convert the following denary numbers into binary.*

a) 23 🡪 0001 0111 ✓

b) 48 🡪 0011 0000 ✓

c) 178 🡪 1011 0010 ✓

d) 244 🡪 1111 0100 ✓

e) 257 🡪 0001 0000 0001 ✓

f) 366 🡪 0001 0110 1110 ✓

*3 How many different numbers can you represent using the following?*

a) 4 bits 🡪 24 / 16

b) 8 bits 🡪 28 / 256

c) 16 bits 🡪 216 / 65535

d) 20 bits 🡪 220 / 1048576

*4 What range of numbers can you represent with the following?*

a) 4 bits 🡪 0 – 15 unsigned / -8 – 7 signed

b) 16 bits 🡪 0 – 256 unsigned / -128 – 127 signed

*5 What is the purpose of ASCII and UNICODE and why are there two standards that apparently do the same thing?*

ASCII and UNICODE are all used to represent letters, numbers and other character using binary. The difference between the two is that ASCII uses only 7 bits to store its entire character set (in an 8-bit number) – this limits its possible range of characters to 128, so it only has letters, numbers and some basic punctuation. UNICODE, however, uses between 1 and 4 bytes per character (for UTF-8, the most common encoding), allowing 69904 different characters