1S3 (Timoney) Tutorial sheet 1
[October 23– November 3, 2006]

Name: Solutions

1. Fill in the numbers 1–4, 7, 8, 9, 15, 16 in octal, binary and hexadecimal.

Base 10	1	2	3	4	7	8	9	15	16
Octal	1	2	3	4	7	10	11	17	20
Binary	1	10	11	100	111	1000	1001	1111	10000
Hexadecimal	1	2	3	4	7	8	9	f	10

2. Fill in the numbers 24, 31, 32, 40 in octal and hexadecimal.

Base 10	24	31	32	40
Octal	30	37	40	50
Hexadecimal	18	1f	20	28

3. Find the mantissa and exponent (both in binary) for the binary floating point number $(101011.0111)_2$ when it is converted to (binary) scientific notation.

   Solution:

   $$(101011.0111)_2 = (1.010110111)_2 \times 2^5$$

   The mantissa is 1.010110111 and the exponent is 5, which is 101 in binary.

4. With the aid of the following table, show how the integers 13 and -14 would be converted to a bit pattern (zeros and ones) in a computer with 32 bit integers.

13	0	0	...	0	0	1	1	0	1
-14	1	1	...	1	1	0	0	1	0
Bit position:	1	2	...	27	28	29	30	31	32