Test Your Understanding: Week 8

1. Suppose that a_n is the sequence given by the recurrence relation $a_n=a_{n-1}+2a_{n-2}$, and the initial condition $a_0=1$, $a_2=2$. Find a_1, a_2, a_3, a_4 and a_5.

2. The sequence S_n represents the number of n bit strings not containing 01.
(a) Find S_1, S_2 and S_3.
(b) What is the meaning of S_{10}? What is the meaning of S_{20}?
(c) What is the name or label we give to the number of 50 bit strings not containing 01?

3. Factorise the following quadratics.
(a) x^2+3x+2
(b) x^2-x-2
(c) $x^2+8x+16$
(d) x^2-16

4. Solve the following simultaneous linear equations.
(a) $b+d=5$, $2b+4d=16$
(b) $b+2d=17$, $3b+5d=36$
(c) $b+d=1$, $2b-3d=17$

5. Find the following.
(a) $1+2+3+\ldots+n$
(b) $1+2+3+\ldots+i$
(c) $1^2+2^2+3^2+\ldots+n^2$
(d) $1^2+2^2+3^2+\ldots+i^2$

6. Use the algorithm for insertion sort to sort the following data.

G	C	F	P	L

F	C	G	L	p

F	C	G	L	P

P	L	G	F	C

In which of these cases did the letters have to be moved the furthest?