Test Your Understanding: Week 7

1.(a) Write an algorithm, using a for loop, to add up all the members of the sequence S, of length n.
(b) Adjust this algorithm to find the average value.

2. Find a theta notation for the following, showing all your working out carefully.

(a) $f(n) = 300n^2 + 5*2^n$

(b) $g(n) = 2n*\lg(n) + 12n$

(c) $h(n) = 3n! + 5n^{10}$

3. Show that $n! = O(n^n)$.

4. Estimate the complexity of the following code fragments, ie find / estimate the number of operations involved in each code fragment. Give the theta notation for each one.

(a)
```
j=n
  while (j≥1) do
    begin
      x=x+1
      j=⌊j/2⌋j
    end
```

(b)
```
for i=1 to n do
  for j=1 to n do
    x=x+1
```

(c)
```
i=2
while (i≤n) do
  {
    x=x+1
    i=i²
  }
```