P371 23

procedure *square*(n: nonnegative integer)

if n=0 **then return** 0

else return *square*(n-1)+2n-1

Let $P(n)$ denote that this algorithm is correctly computing n^2. We can use mathematical induction.

Basic step:

If the input is 0, using the **if** clause we can have $n^2=0$. $P(0)$ is true.

Inductive step:

Assume that $P(k)$ is true for any nonnegative integer k. If the input is k+1, using the **else** clause we can have $k^2+2(k+1)-1=k^2+2k+1=(k+1)^2$. Hence $P(k+1)$ is true. This completes the inductive step.

We can conclude that the algorithm is true.

P397 27

We can simply know that the result is 3^{50}.

So there are 3^{50} ways.

P397 45

We can simply know that the result is (6-1)!/2=60.

So there are 60 ways.

P405 9

Using the pigeonhole principle we can know the result is $99 \cdot 50+1=4951$.

So 4951 is the minimum number.

P406 35

Using the generalized pigeonhole principle we can have $677=17 \cdot 38+31$ and $17+1=18$.

So 18 rooms are needed.