UNDERGRADUATE PROBLEM SOLVING CONTEST

PROBLEM 3

Due February 5, 2012

A biologist watches a chameleon. The chameleon catches flies and rests after each catch. The biologists notices that:

- The first fly is caught after a resting period of one minute.
- The resting period before the $2m^{th}$ fly is caught is the same as the resting period before catching the mth fly and one minute shorter than the resting period before the $(2m + 1)^{st}$ fly.
- When the chameleon stops resting, he catches a fly instantly.

(a) How many flies were caught by the chameleon before his first resting period of 9 consecutive minutes?

(b)After how many minutes will the chameleon catch his 98th fly?

In the spirit of UPSC, you should not use the internet or look up the solution in a book. Please include your name, student ID number and email address on your solution.