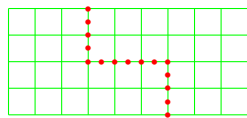
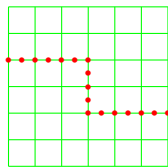


Carpetbaggers and landgrabbers feel numb-er !

Look at a rectangular piece of carpet which is 6 feet by 6 feet in dimensions. If we are asked to cut this piece into exactly two pieces which can be re-assembled to make a carpet which is 4 feet by 9 feet in dimensions, then the pictures here show how this can easily be accomplished.



A slightly more complicated problem is to cut a 8×8 carpet piece into two pieces so that these two pieces along with a third piece of size 1×2 can be reassembled to make up a 6 by 11 carpet. Try it !

Here are more problems :

- Given a piece of carpet of dimensions 8 feet by 8 feet and another piece of dimensions 1 foot by 6 feet, show how to cut up the 8 by 8 piece into exactly two pieces so that along with the 1 by 6 piece, one can make a 10 by 7 piece.
- Generalize this so as to make a $(2n-1) \times (2n+2)$ carpet from a $1 \times (2n-2)$ piece and two pieces of a $2n \times 2n$ carpet.
- Generalize this as much as you can !

This is for all those NICE people out there ! There are 20 MLA's who have gotten hold of 1000 documents, each guaranteeing ownership of 10 acres of land around Mysore Road. They decide to hold a meeting to distribute the documents among themselves. When someone proposes a distribution strategy, all of them (including the proposer !) vote on it, and a vote passes if it is okayed by at least 50 percent of them. If a proposal is rejected, the proposer gets thrown on Mysore Road for a waiting KSRTC to run over him/her. There is a hierarchy among them and the topmost first gets to propose distribution. Everyone enjoys throwing out his/her fellows but prefers getting some land. Of course, first each person is interested in his or her own safety. No sharing is permitted. Here are the questions :

- (a) *How do they distribute the documents?*
(b) *What if there are 500 MLA's and just 100 documents?*

Finally, one for those with a feeling for numbers to **feel** still **number** !

What are all the even numbers n which satisfy $n = \prod_{(p-1)|n} p$?

Note that this means n includes ALL possible primes p for which $p-1$ divides n . Thus, numbers like $n = 2, 6$ are ruled out.

Please submit your solutions by email to courses@isibang.ac.in or handover a hard copy to Ms. Mohana.

Last date for submission of solutions is 31st August, 2006.