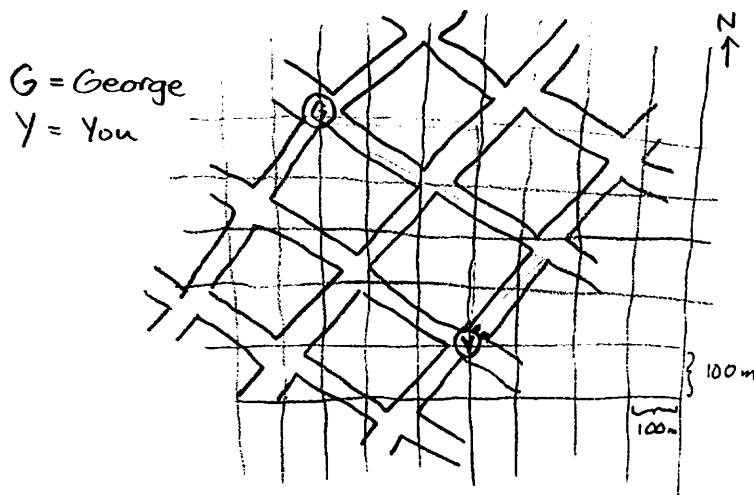


The Hamster Recipe Caper

Chapter 1

You are walking in Manhattan with your pet rock, George. Somehow, George wanders off and what with all the bandits and rock-eating sewer-rats around, you get yourself into quite a panic. But it's alright, since as a smart Brown student, you've attached a GPS device to George and so you whip out your GPS receiver and it informs you that George is exactly 400 metres north and 300 metres west of your current position. Phew.

So you begin to walk north, but you get a nasty surprise as you walk straight into the wall of the Bank of Turkmenistan, which you don't remember having a branch in Manhattan. The surly security guard picks you up, straightens your nose and tells you to look where you're going. What happened? You can't walk due north in Manhattan; instead you need to follow the streets, which are at a bit of an angle, like this:



You = center of universe (origin)

$$\vec{\text{George}} = \begin{pmatrix} 400 \\ -300 \end{pmatrix}_{\text{NE}} \quad \text{in NORTH/EAST coordinate system}$$

$$\vec{\text{George}} = \begin{pmatrix} 1 \\ -2 \end{pmatrix}_B \quad \text{in BLOCKS-FORWARD/RIGHT coordinate system}$$

So, whipping out your map, you determine that 400 metres north and 300 metres west corresponds to one block forward and two blocks left.

You head off to get George, but unbeknownst to you, as you are walking, your arch enemy Dr. Echelon has tapped into your GPS and is hoping to kidnap George by getting there first! However, all he got when he tapped in was the numbers "400" and "-300". Whipping out his map of Manhattan, he walks 400 blocks forward and 300 blocks to the left and falls into the water. What happened? He wasn't using the right *basis*. He used the coordinates given in the NORTH/EAST basis as if they were coordinates in the BLOCKS-FORWARD/RIGHT basis. Stupid Dr. Echelon!

Chapter 2

Now, as it turns out, you are a hamster tycoon. You have the most successful hamster farm in the continental US, and if it weren't for that guy in Mexico, you'd have the most successful one in North America. The secret to your success is a recipe for hamster food. The main ingredients in hamster food are pineapples, elderly math professors and MSG.

Everyone knows this, but only you know the proper proportion of these ingredients to get fast growing, healthy, juicy hamsters.

You've written your secret recipe on the bottom of George, which seemed like a safe place to keep it. But this is what Dr. Echelon, your evil competition in the hamsterburger business, was after.

So there you are walking along toward George when all of a sudden, Dr. Echelon, having figured out his mistake, swoops down in his flying hamster machine and grabs George! Oh, no!

Now he has the secret recipe, which reads:

60
30
20

But you aren't panicking yet. Because you know Dr. Echelon is going to go home and cook up a giant pot with 60 pineapples, 30 elderly math professors, and 20 cans of MSG. And if he feeds **that** to his hamsters, they'll all die.

No! You, having taken Math 52, are a lot smarter than that! The secret recipe was actually given in terms of three OTHER "ingredient-coordinates", which you designed like this:

60 elderly math professors who have eaten two pineapples each
30 bags of "magic powder" (which is a ground up 2:1 mix of pineapples and cans of MSG)
20 elderly math professors who have eaten a can of MSG each

So your REAL secret recipe consists of how many pineapples, professors and cans of MSG?