

AREA CALCULATION: DON'T MEASURE 01

Sir, I must say that I am a proud Punjabi, you know why? Punjab has become so popular despite being such a small state. See that's right it is a highlight of our country for a simple reason that you take any actor that matter in Bollywood, you take any outdoor sports you will see good number of Punjab's ok you go on enumerating good actors of our country good number of them will be from Punjab, I have been observing from this from decades look at the hockey team of India, cricket team of india Punjab is dominant, not dominant but there are good number of Punjabis in cricket team and hockey team and you name it. Right? I also wonder the same Punjab being such a small place it is generated a lot of celebrities so far right? So what was you are wondering given the size of Punjab how is it doing so well? Exactly I think it makes just less than one twentieths of India size. I doubt that so Punjab appears to be small it is not one twentieths even lesser than that a lot lesser than that, how do we even calculate this? OK that's a good question so given that we are talking about computing, let me ask you one question if I give you a following fact the size of india area of india is three million square kilometres roughly approximately ok and I will give you the map of india in that I will give you Punjab as well, ok is there any way you can compute the area of Punjab? Just by knowing these two facts fact number one, area of india is three million square kilometres and you are given a raw map of india with these two things can you compute? Sir I don't think so this doesn't make a difference, you think you think data insufficient that you probably can't even go close to computing what could be the area of Punjab right? So let me give you a fascinating idea in computer science called estimation, so in places where you cannot accurately compute something you can estimate rather approximate alright so let me tell you how exactly that is done. Let me use the board right now look at this. You see the you see a square here right and let me write down let me write a bigger one let me write a big square rectangle whatever anything is fine and it is easy for you to calculate the area of this. Right? It is very easy. Once you calculate the area of this don't you think it's easy to compute the area of this, why is that? What do you think is the area of this part simran? It's just the half of the, correct! It is pretty obvious; this will be half of the entire area of this rectangle correct? Yeah so far so good now what if I try to ask this question forget this region, what if I were to give you a random region given that you know what is the area of the rectangle can you compute the area of this region? How would you compute? This will be difficult to compute, ok for a for for someone who doesn't know the idea that I am gonna say they might even think this is quite impossible question to solve but here is a very nice way of solving this problem. What you do is assume you go there simran OK you needn't go just I am asking you to imagine that you go that side and then take a you have played a dart game yeah yeah where you throw arrows at a target yes yes, you go there and imagine this to be a dart put a dart here if possible and then keep shooting the arrows, the arrows will fall inside the squares it must fall inside the squares, now what you do if you estimate

those arrows that fall inside this region ok and those that fall outside this region that will give you a good estimate of what is the area of this region given this region so what I am trying to say, out india map here and try to close your eyes and try to put a dart on the india map and see how many times your random darts fall on Punjab and how many times it doesn't and that will give you a good estimate. So let me illustrate this to you I am closing my eyes and I am trying to put a dot here randomly you see my eyes are closed ok so on and so forth I keep putting dots ensuring that I am putting inside the square if I am putting outside don't worry so on and so forth now let's see so there are some points outside some points inside based on what is the area of this region you will have proportionate amount of dots inside and proportionate amount of dots outside, so here is a challenge for you, can you try simulating this on your computer? Can you try to see if you can write a program computes the area of random looking region like this, I can surely try good let's see.