

# INTERVIEW QUESTIONS For GUESSTIMATES



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## GUESSTIMATES

**Q. Estimate the quantity of chocolate (in all its forms) used in Delhi in a day.**

### Step 1: The Umbrella

**There are multiple approaches to this problem:**

1. Estimate the consumption side: end customer, grams per person etc.
2. Estimate the production side: bakeries, chocolate factories in Delhi or the estimated consumption of chocolates in the country and extrapolate the consumption of Delhi by allocating it an appropriating share based on the population, income etc with respect to the rest of the country.

Which umbrella do you choose? The answer should depend upon how easy you think it is to guess/obtain the amount for the parameter by general observation. The goal is NOT to reach the exact answer. The goal is to develop the approach to such problems. However, there exists a dilemma here:

- Use assumed parameters? (eg : consumption per person)
- Use realistic parameters that are possible to obtain? (eg : consumption of chocolate in the country)

From a competition perspective, the first approach would be more advisable. A three-level classification is usually considered good enough and this approach gives you plenty of room to do just the same. The second approach makes more sense in case you're doing it for research purposes.

### Step 2: The Assumptions

So far, so good. The next step is simply to divide these categories further and allocate them appropriate numbers. We can break down the 'End Customer' in the following ways:

1. Age Group
2. Heavy/Medium/Light consumers
3. Diabetic and Non-diabetic and so on.

Remember that each of the above would have further classifications which could be any of the others.

### Step 3 : The Numbers

After you've chosen your Umbrella and your Assumptions, it is time to start the guesswork. Apply your general awareness of the environment you're dealing with to come up with numbers. The golden rule is to use beautiful numbers. Sure, you may get the exact population of Delhi as 18,686,902 with a simple Google search but it sure doesn't sound as pretty as 20,000,000. How many people to assign to different age groups? Work in percentages. We're a young country, so the maximum weightage goes the 15–40 year group. Pretty simple, right?

**Fermi paradox :** the apparent contradiction between the lack of evidence and high probability estimates

## Q. What is the best approach to solve guesstimates?

### 1. First Way:

#### Approach 1 - Simple Maths approach

This approach is essentially used when the number to guesstimate is a ratio of some sorts. The task is to then find the numerator and denominator and we are done!

##### Example - What is the number of tennis balls that can fill this room?

In this case, numerator is the volume of the room and denominator is the volume of a tennis ball. For accuracy and realistic answer, the volume of room is adjusted by deducting items present in the room like furniture, people etc. Similarly, the volume of tennis ball should include a packing factor with it.

#### Approach 2 - Per capita approach

This approach is used when the number to guess can be thought of a consumption item at an individual, household or population level within a geography.

##### Example - Number of mobile phones in a country

In this case, mobile phone is a consumable item at an individual level. The approach would require to break the overall population in to difference clusters where the consumption per capita would vary. example - mobile phone per person is different if we cluster the population by income and age groups. Consider 4 different age groups and 3 different income groups. Put an assumption on number of mobile phone per person in each of the 12 buckets, roll up the numbers and you have a guesstimate.

This approach can be used in cases like mobile phone, refrigerator, microwaves, tablets, PCs, Cars, ATMs, Bank Branches, Restaurant branches, petrol pumps etc.

#### Approach 3 - Supply & Demand approach

This approach requires to think of the guesstimate number from either the supply or the demand (or both) angle of the item.

##### Example - Toilet paper used annually in Canada

In this case, demand approach is to find avg consumption per head and then rolling it up the population. Supply would be to find out number of companies manufacturing, their capacities of manufacturing etc (Supply approach is tougher one).

### 2. Another Way: Generally speaking, you can approach guesstimates in one of two ways:

Top-down method

Bottom-up method

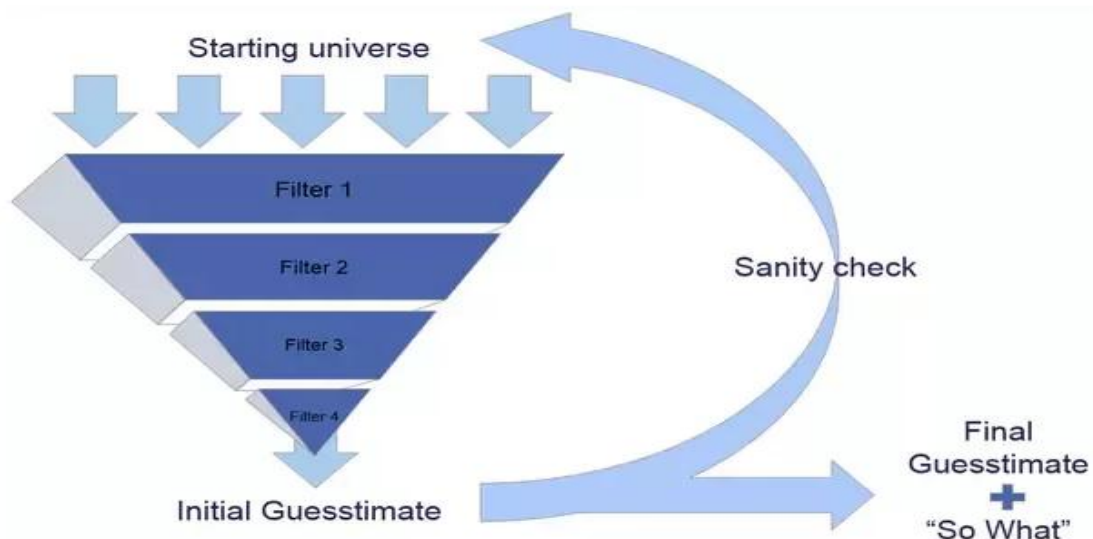
In the top down, you start with the broadest possible universe, of which your guesstimate is a fraction of. You can think of it as an inverted pyramid (picture below) with the broadest base at the top. To this universe, you then keep applying a set of conditions or filters (however you want to put it) that reduce the number from the universe to a number that is appropriate for your guesstimate.

**They key to the top-down estimation process lies in:**

- Correctly identifying the starting universe
- Correctly identifying as many of the relevant conditions/filters and segments that apply to your guesstimation problem.

**Segments:** Often times, you will have to first segment the universe into buckets and apply different filters to each segment. Some popular method of segmenting are:

- demographics (age, sex, income, ethnicity etc.)
- psychographics (attitudes, behaviors, values, e.g. chocolate lovers, vs. neutral to chocolate, vs. chocolate haters)
- geography (city/country/continent, urban vs. rural etc.)
- channels (offline vs. online, TV vs. radio etc.)



### Step-by-step Approach of Solving Guesstimate Questions using A Top-Down Framework

Generally, I have found the top-down estimate to be much more user-friendly and easier to conceptualize than the bottom-up approach. I also like this approach more than the bottom-up approach as it forces me to think of the “big-picture” first and then progressively drill-down in the details of the problem.

Let us take the example in the original question above to illustrate this point:

**Q: What is the amount of toilet paper used in Canada per year?**

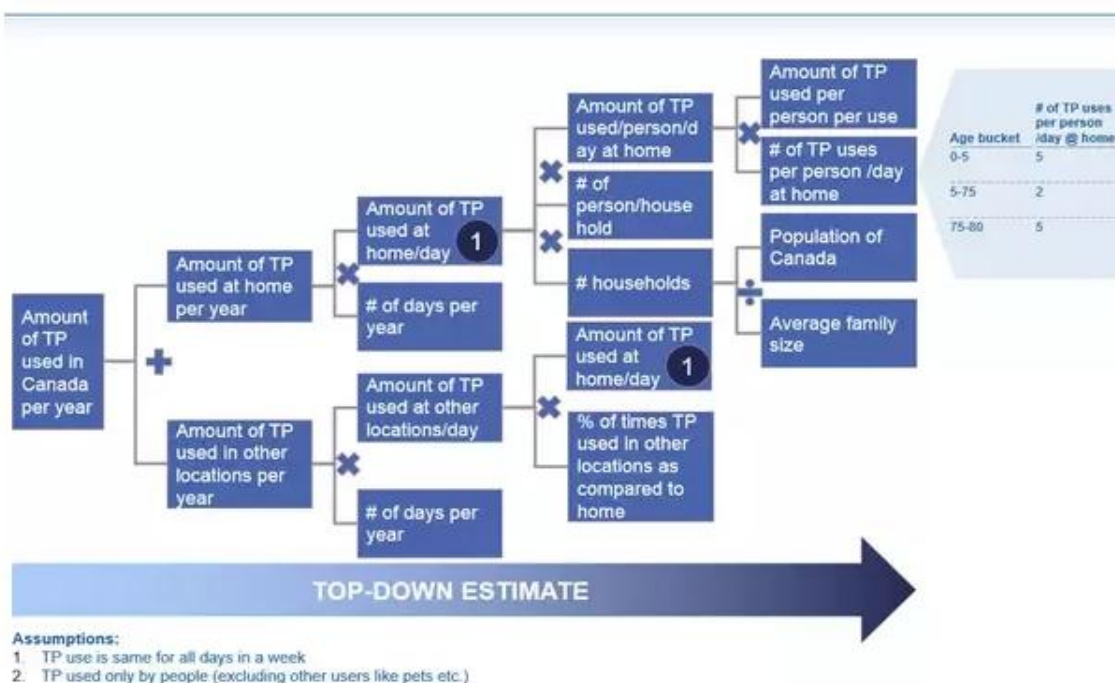
**Ans: Universe: # of people in Canada**

**Key segments:** Demographics (age) - children under age of 5 and over age of 75 may use more toilet paper than others;

- Location: Home, Work and leisure places (office, malls, cafes etc.)

An useful way to solve a guesstimate problem is by drawing the issue tree for the problem. A sample issue-tree for the above problem could be as follows:

### Guesstimate example: Amount of toilet-paper used in Canada per year



### How can you improve your guesstimation accuracy?

- Practice creating issue trees and in-general, practice structuring problems using a top-down approach. There are many sources of problems that you can practice structuring on the Internet.
- Sanity check your numbers after you calculate your answer! This is super-important. It is not important to be exact in your estimate - far from it. But if you cannot demonstrate that you can sanity check your numbers and point out if the final estimate looks ridiculous, then you would probably lose some serious points.
- Know some basic facts (numbers) to begin with, e.g. key demographic facts, financial facts, etc. You can review the list of basic facts that you can remember for improving your accuracy using the link below:

### 5 Must-Know Facts To Improve Your Market Sizing Accuracy

**Other considerations for doing well:**

**Presentation:** Additional brownie points if you can do your calculations and present your numbers cleanly to the interviewer. I always find it helpful to represent my calculations and numbers in a tabular format for this purpose.

**Exposition:** Think out loud! The interviewer can't magically hear your thought process unless you speak as you are thinking. Not understanding how you think = a missed opportunity to demonstrate to the interviewer your awesome analytical skills.

**Business acumen:** If the guesstimation is part of a bigger business case, always think of the so-what! So what 100 million tons of toilet paper is used in Canada per year? So what 5 billion items line the shelves of all US retailers per year? Why should you care? Why should anyone care?

**Calculations & accuracy:** Always round whenever you have an opportunity. Ask the interviewer if it's OK to round and in 95% of the cases, the interviewer will be fine with it. Round some numbers up and some down to balance the effect. Use mental math to gain additional brownie points, but use pen and paper by all means if mental math is not your thing - no points should be deducted for that.

### Q. What Not to Do in Guesstimates?

**Ans:** The Coke Edition

For the second guesstimate, let's look at what you'd call a bad solution for a competition. The context is quite old but the 'umbrella' points required to reach a more comprehensive answer are all taken care of. Find the list of faults and their possible corrections at the end after going through the solution and try to pick them out on your own. Did I miss a few?

### While solving the question, remember the below:

You're explaining this to someone who's not in your head. The solution isn't for you.

At the same time, remember to not turn each aspect into an entirely new guesstimate itself! It's easy to get swayed by your own intelligence and analytical abilities. Focus on the question. Heard of analysis-paralysis?

Q. Guesstimate the inventory of Coke Zero cans required within the first two weeks of its introduction in the Indian market.

The promotional activities taken up by Coca Cola to promote Coke Zero for the first two weeks of its introduction (Promotional Period)

Tie up with Amazon

Subway + Reliance Retail + INOX theatres tie-up

Promotional event by Farhan Akhtar etc.

Amazon

Ran for 2 weeks

Sold in packs of 4

Yardstick — 1700 orders in 4 hours (initially)

Assuming that the initial four hours saw huge rush, we will cut it down to about 200 per hour for week 1. For week 2, we will decrease the sale to 150 orders per hour.

We have assumed the time to be 14 hours per day since the volume of orders made during the night will be negligible. Any orders made will automatically be accounted for in the number of orders during the day of 14 hours. Multiple orders are also accounted for in the same amount of orders.

|                                      | Per hour rate | Exceptions             | Calculations                                     | Total           |
|--------------------------------------|---------------|------------------------|--|-----------------|
| Week 1                               | 200           | 1700 for first 4 hours | $200 \times 6 \times 14 + 200 \times 10 + 1,700$ | 20,500          |
| Week 2                               | 150           | --                     | $150 \times 7 \times 14$                         | 14,700          |
| <b>Total cans (Total orders X 4)</b> |               |                        |  | <b>1,40,800</b> |

## 2. Subway, Reliance Retail and INOX theatres

| Chain          | Number of Stores | Stock kept  |          |
|----------------|------------------|---|----------|
| Subway         | 500              | Number of people ordering zero coke per hour = 3 ; open hours = 10; |          |
|                |                  | $= 3 \times 10 \times 14 \times 500$                                | 2,10,000 |
| Reliance Fresh | 450              | Number of people ordering zero coke per hour = 2 ; open hours = 10  |          |
|                |                  | $= 2 \times 10 \times 14 \text{ days} \times 450$                   | 1,26,000 |
| INOX           | 100              | Number of people ordering coke zero per hour = 5                    |          |
|                |                  | $= 5 \times 12 \text{ hours} \times 14 \text{ days} \times 100$     | 84,000   |
| Total Cans     |                  |   | 4,20,000 |

## 3. Promotional screening by Farhan Akhtar and others

Assuming 200 cans were consumed during the entire event.

Therefore, the total inventory of Coke Zero cans for the promotional period of 2 weeks is  $140,800 + 420,000 + 200 = 5,61,000$

The Misses

Amazon:

The number of Amazon orders is unexplained. 1700 for the initial orders, 200 for week 1 and 150 for week 2 are arbitrary number to consider or at least they seem to be so. Remember, the solution isn't about the numbers, it's about the approach used to reach the numbers. At the same time, the approach has to be clearly explained.

To substantiate these figures, we could have used the historic figures available for a similar campaign. How about Burger King selling its burgers on eBay ahead of its launch? Similar brand power, so I think we can go with it. That gives us a figure of about 2000 for first two days.

For the subsequent days, it is explained that the rush will see a decline and hence, cutting the sales by about 50% (to inculcate the trend for the entire week) makes sense. And a further increase of 60% for week 2. And we reach quite a different figure.

|                                      | Exceptions            | Calculations    | Total         |
|--------------------------------------|-----------------------|-----------------|---------------|
| Week 1                               | 2000 for first 2 days | $2000 + 500(5)$ | 4,500         |
| Week 2                               | --                    | $300 \times 7$  | 2,100         |
| <b>Total cans (Total orders X 4)</b> |                       |                 | <b>26,400</b> |

Subway, Reliance Retail and INOX theatres

This one is just full of loopholes! The better approach would be to list the number of stores in India for each of these. Take an average of the number of customers in a day for easier calculations for all of these stores. How? Let's look at Subway. Think of a popular store and a 'sad' store. Assume numbers for each of these according to the time. What do we note? Lunch > breakfast or dinner. 600 for popular and 100 for sad? We have the average at 350 per day.

Assume about 60% take drinks with their order and about 50% of those are willing to try Coke Zero because of being prompted or being generally excited about Coke Zero (or maybe even by default!). This brings us to 105 per day, which is 1470 for two weeks per store. Phew!

Similarly, do the same for the others. Chances of analysis-paralysis are high here, so stick to a limited number of parameters and assume the rest!

Launch event

The number is quite close to the possible number here. The fault? It's not lucid. Just break it down to the possible attendees of a launch event (a celeb or two, their entourage, company representatives, media persons, retail representatives etc) and assign two samples each.

That's it for now! Do share it with someone who's about to give an interview! The green heart below lets me know you liked it.

**Q. What was the revenue for flat screen Televisions sold in Australia in the past 12 months?**

**Ans:**

Your first thought might be, "Why Australia? I am not applying for the Sydney Office of McKinsey!" Interestingly, more and more questions have a global component as Consulting becomes more global in nature (for example, advising firms on entering or performance in foreign markets, or working directly with foreign clients). While you will not be expected to know Australia's population, your estimate will say something about your ability to think and your logic.

Start by clarifying the question, then identify the variables to apply to this problem.



- **Population of Australia:** Approximately 23 million people. (Editor's note: I once received a Case Study question involving this figure and my estimate was far too high, but I still did well on the case because my thought process was transparent and otherwise accurate.)
- **Assume that the average household is 3 people.** It is worth noting that families probably have more than 3 people, but this is balanced out by people living alone, such as students and young professionals. Here is a good example of rounding: you can say 8 million households (which is a little more than  $23 \text{ million} \div 3$ ).
- **Assume households replace their televisions every 4 years.** The interviewer might say that "seems reasonable" or "you should try a higher/lower number." You might also note that you believe there was nothing special about last year in terms of television sales—no major product innovations, sluggish but growing economy, etc.
- **Assume an average of 1 flat screen television per household.** Some households might not have any, but others may have 2 or even 3.
- Therefore,  $(8 \text{ million households}) \times (1 \text{ TV per household}) \div (4 \text{ years/purchase}) = 2 \text{ million}$  televisions purchased in the past year.
- **Assume an average sale price of \$600.** Again, the interviewer might say that "seems reasonable" or "you should try a higher/lower number." He or she may even ask you to break this down into groups, such as "high-end flat screens" and "smaller flat screens" with different average prices. However, \$600 seems like a reasonable average across higher-end TVs, which might cost more than \$1,000, and smaller flat screen TVs, which can sell for \$200 or even lower.
- Therefore,  $2 \text{ million} \times \$600 = \underline{\$1.2 \text{ billion annual Revenue}}$  for television sales in Australia.
- To show your creativity and business thinking you could have also discussed the market for resold used televisions and the Revenue that comes from that (this might reduce your estimate of the market size by reducing the average sale price; if the interviewer insists that the question should only include new televisions, then keep the average sale price constant but reduce the number of purchasing households each year).
- The interviewer might then ask you a follow-up question, such as "discuss your thoughts about trends in television sales," just to see how you think on the spot.

#### Q. How many iPhones are currently being used in China?

**Ans:** Start by clarifying the question. In this case you might want to confirm whether the question is how many iPhones are in operation, or how many are being used at that this current moment. (The interviewer would probably explain that he or she means "in operation".) Once the question is clarified, identify the variables to apply to this problem.

- **Population of China:** Approximately 1.4 billion people.
- There are several different approaches from this point; one approach is to make assumptions around the number of people that can afford iPhones rather than considering the number of households.
- Based on very basic knowledge of China, even though the country is experiencing extraordinary economic growth, you might assume that the majority of the population is still very low-income and cannot afford an iPhone. Thus, you might estimate that **20% of the population could afford an iPhone.**
- Therefore, the total potential market size is  $20\% \times 1.4 \text{ billion} = 280 \text{ million}$  iPhones.

- What percent of this total market size is penetrated? There are many competing products that are cheaper, but perhaps you've read that the Chinese are very brand-focused and that Apple has an extremely trusted and desirable brand in China. Therefore you **estimate that 20% of this segment is currently using an iPhone.**
- Using these estimates,  $20\% \times 280 \text{ million} = \underline{\text{56 million iPhones}}$  are currently being used in China.
- A follow-up question might be something along the lines of "Are there are more iPhones in operation in the U.S. or in China?" We'll leave you to try and figure that one out yourself.
- Another follow-up question might be how you would check the accuracy of your assumptions and response (in this case, perhaps by reviewing the Apple annual report or telecom industry reports).

**Q. What is the Revenue of Peugeot's sold in France per year?**

**Ans:** Start by clarifying the question, then identify the variables to apply to this problem.

- **Population of France:** Approximately 60 million people.
- **Assume an average household is 3 people.** This leads to 20 million households ( $60 \text{ million} \div 3$ ).
- **Assume 20% of households have no car**, as they are in urban cities such as Paris or Lyon.
- Of the remaining households, **assume an average of 1.5 cars per household.**
- Therefore, there are approximately  $80\% \times 1.5 \times 20 \text{ million households} = 24 \text{ million cars}$  in France.
- **Assuming a replacement rate of every 6 years**, there will be  $(24 \div 6) = 4 \text{ million cars}$  replaced per year.
- Of these 4 million, how many are Peugeot brand? You could suggest that the French are quite patriotic, so **perhaps 20% of the 4 million cars purchased each year are Peugeot.**
- Therefore, you estimate that  $(20 \times 4 \text{ million}) = 800,000$  Peugeot cars are purchased in France per year.
- Of the 800,000, **assume 70% are new cars and 30% are used cars.**
- **Assume that the average price is \$30,000 for new cars, and used is \$10,000 for used cars** (this is assuming similar pricing, currency-adjusted, to that of U.S. cars).
- Using these assumptions,  $(560,000 \times \$30,000) + (240,000 \times \$10,000) = \$16.8 \text{ Billion} + \$2.4 \text{ Billion} = \$19.2 \text{ Billion}$ .
- Therefore, total Revenue of Peugeot cars sold in France per year is **approximately \$20 Billion.**

**Q. What is the Revenue for the Board Game Monopoly sold in India per year?**

**Ans:**

Start by clarifying the question. In this case, intelligent questions might be:

- Is there an Indian version of Monopoly®? (*Interviewer: "Yes."*)
- If yes, how long has it been on the market in India? (*Interviewer: "The Indian version has been on the market since 2006. Prior to that, the British version was sold in India."*)

- From this, perhaps the interviewer might further explain that in India there is a children's version and the regular version, and she would like you to estimate the revenue of the children version, which targets 8-15 year old children.
- Once the question is clarified, identify the variables to apply to this problem.
- **Population of India:** Approximately 1.2 billion people.
- **Percent of population that is aged 8-15 in India:** Assume 15%.
- **Total population of 8-15 year old children:** 180 million.
- **Assumed percent living in areas where the board game is available for sale:** 50%
- **Assumed percent of such children playing board games:** 20%
- **Assumed number of board games purchased per child in this age range per year:** 2
- A potential question at this point for the interviewer: How popular is Monopoly compared to other games? (Interviewer: It is gaining a lot of interest and is a popular board game with an estimated 10% share.)
- **Average price for Monopoly®:** Assume Rs 600 (The interviewer will probably provide the number; otherwise, you might need to estimate based on U.S. prices and dollar-rupee exchange rates)
- Using these estimates, the annual Monopoly® sales in India are as follows:  $180 \text{ million} \times 50\% \times 20\% \times 2 \times 10\% \times \text{Rs } 600 = \text{Rs } 2.16 \text{ billion annual Revenue.}$
- Interviewer: If the exchange rate is U.S. \$1 to 60 Rupees, how many dollars is that?
- $2.16 \text{ billion} \div 60 = \text{\$36 million.}$
- Total Revenue for the children's version of Monopoly® in India per year appears to be **approximately \$36 million**. Note that because of the large chain of assumptions made, this estimate could be off significantly; in particular, the estimate is highly sensitive to the percentage breakdown assumptions for the relevant demographic (percent of 8-15 year olds living where the game is available; percent of those individuals who play board games; number of board games purchased by those customers annually; etc.)

## Guesstimate — Area of India

### Solving Area & Volume Related Questions

Sometimes, we'll be asked a guesstimate that seems to be completely fact-based. As soon as a guesstimate is posed which has an actual answer out in the public domain, we tend to think that getting the wrong answer to this is going to land us in hot soup. Not true.

**Let's recall the objectives of a guesstimate question:**

1. To understand your ability of understanding a situation.
2. To understand the extent of your ability to connect things to reach an answer.
3. To understand your ability to prioritize and dismiss different parameters.
4. To understand how well you work with limited information.

While solving this guesstimate, we'll tackle the second and the fourth objectives specifically. We'll also understand the approach to solving volume and area related questions.

Let's dive right in.

**Q. Guesstimate the area of India.**

Stop reading. Take a minute and think of your own answer.

The first thing to come to your mind should be the map of India. Look at it carefully:



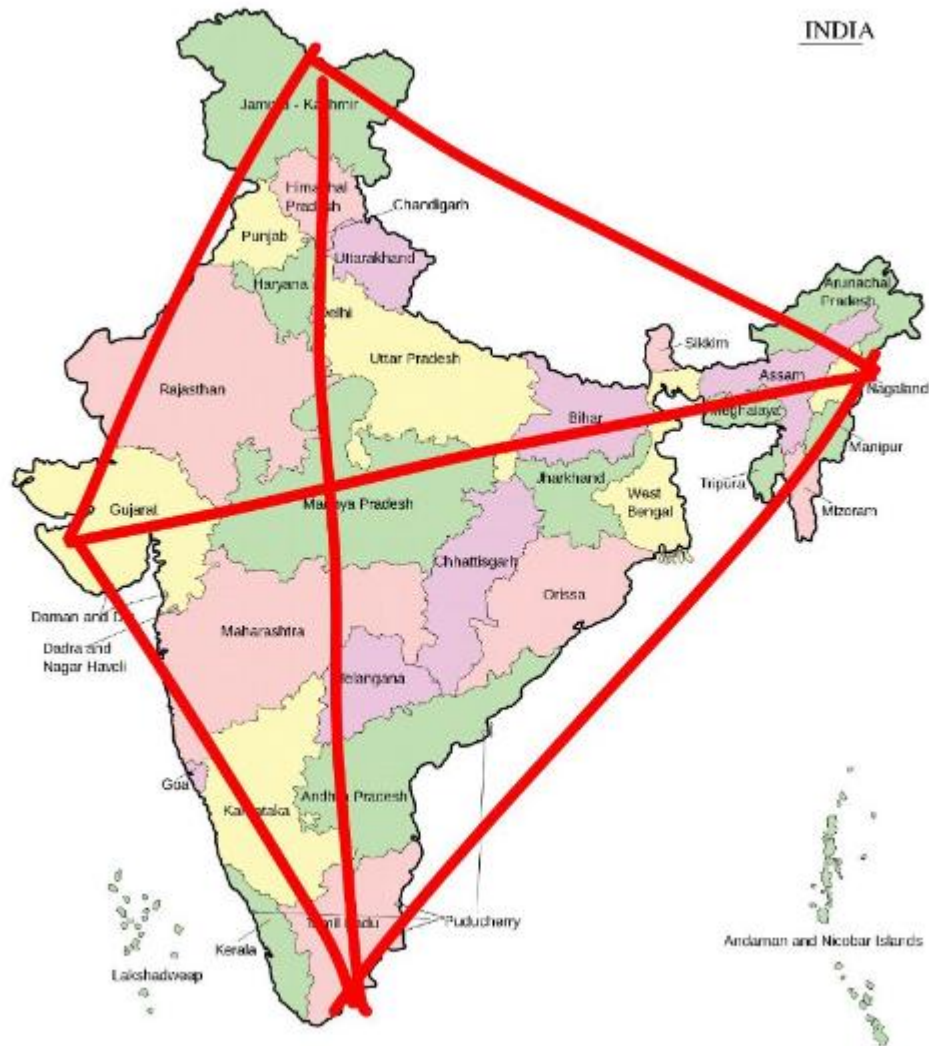
Looks like a rhombus, doesn't it?

Area of a rhombus = (product of diagonals)/2

Exclusion: Area of the islands is considered to be insignificant

If you don't know the area of a rhombus, divide it into four triangles and use area of triangle = (base x height)/2

Let's plot the diagonals.



Since we need the diagonals for the area, we need to calculate the distance between northernmost & the southernmost points and easternmost and westernmost points.

The best case scenario is that you know these values. If you don't, fret not, you have a way out.

Distance = speed x time

We simply need to find out something that involves speed and time — a mode of transport. You can pick what you like — road, rail or air. Since I have mostly traveled in trains and am fairly familiar with the Railways, I'll go ahead with trains.

The average speed of trains in India can be taken as 50 km/h.

(Yep. They move at about 60–80 km/h and then consider all the unnecessary stoppages. Also, ease of calculation with 50.)



$$\times 2500) / 2 = (7,500,000 / 2)$$

Time taken to travel by trains  
from:

#### North to South

Jammu to Delhi = 10 hours

Delhi to Kanyakumari = 50  
hours

Total = 60 hours

Distance =  $50 \times 60 = 3000$  km

#### West to East

Ahemadabad to Delhi = 10  
hours

Delhi to Itanagar = 40 hours

Total = 50 hours

Distance =  $50 \times 50 = 2500$  km

Therefore, area of India =  $(3000$

The guesstimated area of India is 3.750 million km sq.

The actual area of India = 3.287 million km sq.

And this 14% error is completely acceptable.

What was important is that:

1. We broke down the problem into simpler, easily understandable parts, ie, connecting India's shape to a rhombus and using general mathematical knowledge.
2. We worked with the limited information we had, without needing to resort to external sources, ie, the map of India and travel times.



## Useful Numbers and Formulae for Guesstimates & Market Sizing

### Part 1: Population and Demographics

During interviews and competitions while solving guesstimates and case studies, it is recommended to use and know some of the basic figures from credible sources to ensure better accuracy and demonstrate awareness. Below, I have studied the latest available data by UNDESA (2015), Indian Ministry of Home Affairs (2011) and Pew Global Reports (2011) to reach approximations and conclude the only basic figures you need to know.

The only population data you need to remember is the total world population and percentages for demographics as shown in the tables. You'd note that we typically only need 5% and 10% of the total figures to calculate the population of any demographic.

Total World Population: 7.3 billion

Total India Population: 1.3 billion (18% of World)

Average Household size in India: 4.5

| World            |               |              |
|------------------|---------------|--------------|
| Total Population | 7,300,000,000 | 7.3 billion  |
| Gender           |               |              |
| Male             | 50%           | 3.65 billion |
| Female           | 50%           | 3.65 billion |
| Continents       |               |              |
| Asia             | 60%           | 4.3 billion  |
| Africa           | 15%           | 1.09 billion |
| Europe           | 10%           | 730 million  |
| Latin America    | 10%           | 730 million  |
| North America    | 5%            | 365 million  |
| Age Groups       |               |              |
| 0-5              | 10%           | 730 million  |
| 6-14             | 20%           | 1.46 billion |
| 15-35            | 40%           | 2.9 billion  |
| 36-60            | 20%           | 1.46 billion |
| Above 60         | 10%           | 730 million  |
| Income Group     |               |              |
| Poor             | 15%           | 1.09 billion |
| Low              | 55%           | 4 billion    |
| Middle           | 15%           | 1.09 billion |
| Upper Middle     | 10%           | 730 million  |
| High             | 5%            | 365 million  |

| India              |               |             |
|--------------------|---------------|-------------|
| Total Population   | 1,300,000,000 | 1.3 billion |
| Gender             |               |             |
| Male               | 50%           | 650 million |
| Female             | 50%           | 650 million |
| Rural Urban Divide |               |             |
| Rural              | 70%           | 910 million |
| Urban              | 30%           | 390 million |
| Major Cities       |               |             |
| Delhi              | 1%            | 13 million  |
| Mumbai             | 1%            | 13 million  |
| Age Group          |               |             |
| 0-14               | 30%           | 390 million |
| 15-35              | 40%           | 520 million |
| 35-60              | 25%           | 325 million |
| Above 60           | 5%            | 65 million  |
| Marital Status     |               |             |
| Married/Others     | 50%           | 650 million |
| Never Married      | 50%           | 650 million |
| Income Group       |               |             |
| Poor               | 20%           | 260 million |
| Low                | 75%           | 975 million |
| Middle             | 3.50%         | 45 million  |
| Upper Middle       | 1%            | 13 million  |
| High               | 0.50%         | 6.5 million |

**Example:** To calculate the never married male population of Delhi between 35–60 years of age, use 1.3 billion (total) X 0.01 (Delhi) X 0.5 (males) X 0.25 (36–60) X 0.5 (never married) = 1.3 billion X .0025 = 3.25 million X 1/4 = 0.81 million. Easy if you know some basic math!

2. The income groups are defined as per the amount they live on per day:

Poor: \$2 or less

Low income: \$2.01–\$10

Middle income: \$10.01–\$20

Upper-middle income: \$20.01–\$50

High income: More than \$50

## Cost of painting the pillars of the metro lines in Delhi

Let's start the guesstimates with a fairly simple question with the focus being on the clarity of the approach and presenting the same in a coherent manner.

Q. Guess + Estimate the cost of painting the pillars of the metro lines in Delhi as of today. Also, every pillar consists of an advertisement sized 4X4 feet on each side of the pillar. Thus, every team is required to find the estimated net expenditure. (Cost of painting pillar — Revenue received from the advertiser).

### Solution-

This question is pretty straightforward. All you're required to do is estimate the number of pillars, assume values for the cost of painting and revenue earned per pillar. Please note that there are many more parameters that could've been considered. We'll limit it to the below assumptions for simplicity's sake.

The crucial step here is to estimate the number of pillars. We try to visualize how any metro line looks like. It starts from a station and ends at another. There are turns, splits and intermediary stations. The line itself may be underground, on-ground or above the ground. Let's assign the number of pillars for each of these situations, taking care to choose simple numbers (multiples of 2, 5 or 10):

Since the underground/ground level stations will not have any pillars, we will assume the number of pillars for them to be zero. The connections to the preceding and subsequent stations, however, will be taken into account.

The station itself, will have more number of pillars, owing to the extra strength required for the stability of the station premises, therefore, we will assume 8 pillars for each station above ground level.

The number of pillars increases for every turn/split (like the one after Yamuna Bank) in the tracks. We will assume the increase on the basis of the length of the track.

For every 100m, there is a pillar. Therefore, there are 10 pillars in each km.

Basis the above assumptions, the length of the various Metro Lines, and subsequently, distance between two stations is assumed to be as follows:



| Line   | Length (L) (in km) | Number of stations (S) | Number of Underground /Ground Level stations (U) | Number of stations above ground level (A) | Distance between two stations (L/S) (in km) | Distance to be considered (A X L/S) |
|--------|--------------------|------------------------|--|---|---|-------------------------------------|
| Blue   | 52                 | 44                     | 4  | 40  | 1.2   | 48                                  |
| Red    | 25                 | 21                     | 4  | 17  | 1.2   | 20.4                                |
| Yellow | 45                 | 34                     | 25   | 9   | 1.3   | 11.7                                |
| Orange | 22                 | 7                      | 5  | 4   | 3.1   | 12.4                                |
| Violet | 23                 | 18                     | 6  | 12  | 1.3   | 15.6                                |
| Green  | 20                 | 17                     | 0  | 17  | 1.2   | 20.4                                |

Data taken from official DMRC website

Though the data above has been taken from the official website, it is not necessary to do so. You may assume whole numbers by general knowledge. For instance, you may already know that the blue line is the longest followed by yellow. Assign say, 50 and 45 to each respectively.

| Line        | Number of pillars for each station above ground level (8 X A) | Increase in pillars due to turns/splits | Number of pillars for the distance to be considered (10 X A X L/S) | Total number of pillars |
|-------------|---|---|--|-------------------------|
| Blue        | 320   | 20                                      | 480  | 880                     |
| Red         | 136   | 12                                      | 204  | 352                     |
| Yellow      | 72  | 0                                       | 117  | 189                     |
| Orange      | 32  | 0                                       | 124  | 156                     |
| Violet      | 96  | 8                                       | 156  | 260                     |
| Green       | 136   | 8                                       | 204  | 348                     |
| GRAND TOTAL |   |   |  | 2185                    |

Now, once the number of pillars are calculated, we can estimate the cost of painting the pillars as well as the revenue. The following figures have been taken arbitrarily //not a recommended approach:

Assume the cost of painting each pillar to be Rs 1200.

Assume the revenue from each advertisement placed to be 2500.

| Number of pillars              | Total cost of painting (1500 per pillar) | Revenue earned (2500 per pillar) | Total expenditure |
|--------------------------------|--|----------------------------------|-------------------|
| 2185                           | Rs. 32,77,500                            | Rs. 54,62,500                    | (Rs. 21,85,000)   |
| NET EXPENDITURE (FINAL ANSWER) |  |                                  | (Rs. 21,85,000)   |

The total expenditure, therefore, is Rs. (21,85,000).

The total expenditure, therefore, is Rs. (21,85,000).

In this example, we may have used the following parameters as well:

Assigning a higher revenue to popular areas (Cost of advertising would be higher) and lesser revenue for those less popular.

The above step would lead to the segregation of the metro line's distance into densely populated/less populated areas. Alternatively, we may also choose to list the most well-known stations where the advertising cost is bound to be higher.

Inculcate the metro lines still in construction and their pillars.

We could have also assumed specific dimensions for the diameter and the height of the pillars, subsequently arriving at its area and multiplying the same with the cost of painting per square unit area.

## Tackling Guesstimates in Interviews

### What to do when you only have 5 minutes

#### 1. Take a step back and think

So you've been asked a question which sounds like something the interviewer made up to on the fly, say, how many buttons do we have in this building? (Seriously)

Resist the urge to answer immediately, they're looking for a Batman and not Flash. Request the interviewers to give you some time, perhaps 30 seconds, if you can't think in 5. Pausing for 5 without such a request is also acceptable. Create a mind map of the exhaustive list of parameters you can consider. You may ask for a sheet of paper if you think it may be helpful and the request will be heeded. Let's do that for this random question -

**Buttons:** Colors, Sizes, Decorative, Elevator, Telephones, Computers, Emergency

**Building:** Floors, People, Purpose of building

#### 2. Clarify the Doubts

So you've thought of all the parameters that came to your mind. Now go on and clarify what has been asked. This helps the interviewer judge your ability to go beyond the obvious and look at the bigger picture.

Did the interviewer only refer to buttons on clothes and not electronic buttons? Great, you don't think have to estimate the elevator doors, computer and emergency buttons anymore. Less work!

What time are we talking about? Is it a special day like a festival that invites people to that building? Are you in an office complex and it's a weekend?

Not only do you showcase that you try to be exhaustive with your assumptions, you also limit the scope of your own solution. With the number of variables possible in a guesstimate, this improves your chances of giving a structured, unconvoluted approach which is easier to follow and critique.

### 3. Voice Your Thoughts

You're considering the parameters in your head and are a complete pro at mental calculations but the interviewer can't get into your head. The panel has to know how you think to give you the job. The numbers by themselves aren't as important as the approach is. So speak it out loud, structured. You may even have more questions as you solve, and they'll know what makes you ask the right questions. Some examples of things you should definitely mention:

If you're unsure about a figure and are taking fictitious numbers, you lack the knowledge to make an informed decision about Y and hence, you will assume they're X on the basis of Z.

The formula that you're using. (Total population x Age group % x Income Group %)

The reason for considering a parameter and how it is going to be used.

## Guesstimate — Number of Whatsapp Messages Sent in NCR each Day

This guesstimate had the capability of making you go too much into detail or not prodding deep enough, the balance of which is necessary to keep the guesstimate both interesting and analytical.

**Q. A startup based out of Delhi is considering selling adverts on WhatsApp. Guesstimate the number of messages sent in NCR everyday so they may estimate the total market volume.**

**Assumptions:**

The population of NCR is 30 million.

A message is counted as one message when the user presses the send button or hits 'enter' regardless of the length of the message.

The population of Delhi has been divided into 4 age groups. Further, these age groups have been divided into Heavy, Medium and Light users as per their messaging habits.

#### 15-25

- People who form the maximum percentage of the population and who use Whatsapp most heavily.
- School and college students and young professionals. Generally use Whatsapp for regular communication with their classmates/friends and have multiple groups on whatsapp for societies/classes/friends etc.
- Proportion of heavy users of Whatsapp will be considerably more than the Medium and Light users given the age group. Medium users will be comparable to the heavy users in other groups.

#### 25-35:

- working population majorly who use Whatsapp heavily but have lesser time to devote to their app because of their work timings.
- Proportion of Heavy users will be more than that of Medium and Light users, but the difference between the three categories will be lesser.

#### 35-50:

- This demographic generally has a reduced usage of Whatsapp because of family commitments and work pressure.
- Active on Whatsapp groups made of family, friends and colleagues. Moreover, the proportion of Medium users will be more than that of Heavy and Light users.

#### 50-60

- This demographic uses Whatsapp the least, mostly to stay in touch with family members on family groups and some friends.
- Proportion of light users will be much more than Heavy and Medium users.

**Table 3.1 — Description of each age group**

| Age Group | % Share in Total Whatsapp User Population | % Population share in number of messages |        |     |
|-----------|---|--|--------|-----|
|           |   | High                                     | Medium | Low |
| 15-24     | 50  | 70                                       | 20     | 10  |
| 25-35     | 25  | 50                                       | 30     | 20  |
| 35-50     | 15  | 30                                       | 50     | 20  |
| 50-60     | 10  | 10                                       | 30     | 60  |

Table 3.2 — Column 2: Distribution of Age groups of people in total Whatsapp using population. Columns 3 to 5: Distribution of the respective age groups in high, medium and low frequency of messaging basis table 3.1.

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4. The number of users of the app is arrived at by dividing the above population into three income groups: Rich, Middle and Poor. Out of these, the poor are assumed to not use Whatsapp. Further exclusions include the extreme age groups and 'people who don't use Whatsapp for other reasons (use other messaging apps, don't use messaging services etc).

The percentage penetration of Whatsapp in each income group is assumed to be 70% for the Rich due to commonly seen widespread usage of the application. In the middle income group, though the absolute numbers will be greater, a lesser percentage of people beyond the age of 35 would be involved.

|                       | %Share in Total Population | People     | With Whatsapp | Comments     |
|-----------------------|----------------------------|------------|---------------|--------------|
| Rich                  | 20                         | 6,000,000  | 4,200,000     | 70% of Total |
| Middle                | 50                         | 15,000,000 | 9,750,000     | 65% of Total |
| Poor                  | 30                         | 9,000,000  | 0             | 0% of Total  |
| Total (Middle + Rich) | 70                         | 21,000,000 | 13,950,000    |              |

Table 4.1 — Distribution of people across Income Groups

**Table 4.1** — Distribution of people across Income Groups

5. The number of messages for heavy, medium and light users have been arrived at using educated guesses for each of the age groups keeping in mind their respective habits and purpose of use as specified in Table 3.1.

| Age Group    | Number of Messages |        |     |
|--------------|--------------------|--------|-----|
|              | High               | Medium | Low |
| 0-15         | -                  | -      | -   |
| 15-24        | 700                | 400    | 200 |
| 25-35        | 500                | 200    | 100 |
| 35-50        | 200                | 100    | 50  |
| 50-60        | 100                | 50     | 25  |
| 60 and above | -                  | -      | -   |

Table 5.1 — Number of messages as defined by messaging habits across age groups

6. We arrive at the respective total number of messages sent by multiplying the number of people in a particular age group to the number of messages as determined by their messaging habits. The results are collated in Table 6.1.

| Age              | 15-24         | 25-35         | 35-50       | 50 and above |
|------------------|---------------|---------------|-------------|--------------|
| Number of people | 6,975,000     | 3,487,500     | 2,092,500   | 1,395,000    |
| Heavy            | 3,417,750,000 | 871,875,000   | 125,550,000 | 13,950,000   |
| Medium           | 558,000,000   | 209,250,000   | 104,625,000 | 20,925,000   |
| Light            | 139,500,000   | 174,375,000   | 20,925,000  | 20,925,000   |
| Total            | 4,115,250,000 | 1,255,500,000 | 251,100,000 | 55,800,000   |
| Grand Total      | 5,677,650,000 |               |             |              |

Table 6.1 — Calculation of number of messages sent according to age group and messaging habits. The total whatsapp user population (Table 4.1) has been distributed into different age groups as per table 3.2

Therefore, the total number of messages sent via Whatsapp each day in Delhi-NCR is 5,677,50,000!

## Guesstimate — Total Revenue earned by the Australian Tourism Industry

**Q. Guesstimate the total revenue earned by the Australian Tourism industry in February and March 2015.**

**Jumping straight to the solution:**

**Assumptions:** //These are to make our calculations easier and referential. Moreover, they also clarify your thought process to yourself and anyone else.

- The guesstimate is for the year 2015
- Average number of days spent by a tourist is taken as 7 days
- The expenditure has been calculated with reference to the cost of living in Australia//List sources used for reference for a competition that requires submission. Use round figures from the same.
- **Weather : Autumn** — Because Australia sits in the Southern Hemisphere, Sydney's warmest weather and peak tourist season occurs from late December to early February

We will assume the number of people who visit Australia for reasons other than the ones mentioned below to be about 200,000 per month, which adds up to 400,000 for the months of February and March. This figure is based on the this document and that almost the same number of people come for exploring a new city as the number of people who come with an objective.

**Possible reasons for tourists to visit Australia:**

**ICC Cricket World Cup:** To be hosted by Australia and New Zealand from 14th Feb to 29th Mar. Australia will hold 26 of the 49 matches.

According to past trends, people who attended

| Year                       | TOTAL Footfall * |
|----------------------------|------------------|
| 2003                       | 630,000          |
| 2007                       | 670,000          |
| Therefore, 2015 (expected) | 750,000          |

\*Source: Cricket World Cup report  
(Growth rate in footfall has been taken as 6.3% annually)

% of attendees from outside Australia: 20% (approx)

Hence, tourists for the ICC World Cup 2015: 150,000

• Festivals/Events

| These are some of the most popular events taking place in Australia in the months in question. We will assume that each event influences about 60,000 tourists to flock to Australia (No duplication). The small events and the duplication will be taken into account by the average that we have chosen. The average footfall of these events in the past has been between 100,000 - 200,000, we are excluding the domestic visitors. | February   | March                                    |
|---|--|--|
|   | Enlighten Canberra                                   | Adelaide Festival of Arts (March)        |
|   | National Multicultural Festival, Canberra (February) | Ten Days on the Island, Tasmania (March) |
|   | Perth International Arts Festival (February–March)   |  |
| <b>Total (60,000 X 5)</b>   | <b>300,000</b>                                       |  |

**Educational:** Since the educational session starts in early February in Australia, there would be a considerable inflow of people into Australia (parents/prospective students). In 2010, there were 450,000 international students studying in Australia. Assuming  $\frac{1}{3}$  of them to be joining the education system every year and including a realistic growth rate, we take students/families flying in as 180,000. A bulk of these would be in the months of Feb, when the year starts (approx 90%). Hence, Estimated students/families flying in during Feb/March: 162,000  
Total inflow of tourists: ICC World Cup + Events + Educational + Seasonal tourists = 150,000 + 300,000 + 162,000 + 400,000 = 1,012,000

**Calculation of Revenue:**

- Airline fares/Transport costs
- Accommodation/Food and Beverages/Entertainment, museums, movies, zoos etc
- Shopping, gifts, souvenir
- Others (phone, postage, medical expenses, repairs, dry cleaning etc).

**Revenue flowing into Australia**

| Expense   | Amount* (A\$) per day                       |
|---|---|
| Accommodation   | 200   |
| Transportation  | 30  |
| Food and Beverages                                      | 20  |
| Shopping  | 30  |
| Entertainment   | 40  |
| Other   | 20  |
| Total per person  | 340   |
| Total expense per person for 7 days                     | 2380  |
| Total tourists (calculated above) in Feb March          | 1,012,000                                   |
| Total expenditure by tourists in Australia in Feb March | $1,012,000 \times 2,380$<br>= 2,408,560,000 |

\*An average estimate has been made

\*An average estimate has been made

Therefore, Total Revenue earned by the Australian Tourism industry is A\$ 2,408,560,000.

## Guesstimates Questions & Answers

**Q. What is the size of the market for disposable diapers in China?**

**Ans:** Here's a good example of a market sizing. How many people live in China? A billion. (For a guesstimate, that's close enough to the actual figure of 1.3 billion.) Because the population of China is young, a full 600 million of those inhabitants might be of childbearing age. Half are women, so there are about 300 million Chinese women of childbearing age. Now, the average family size in China is restricted, so it might be 1.5 children, on average, per family. Let's say two-thirds of Chinese women have children. That means that there are about 300 million children in



China. How many of those kids are under the age of two? About a tenth, or 30 million. So there are at least 30 million possible consumers of disposable diapers.

**Q. How many Delta Airlines planes will take off in the next hour in United States?**

**Ans:** There are several ways to attack this question. One way is to start by figuring out the number of airports in the United States. Most states have one or two large airports from which a major carrier departs. So on average, you can assume that there are 1.2 large airports per state. Finally, if you say that one Delta plane departs every 10 minutes, you can see that six take off per hour from each airport, so you can estimate that there are  $1.2 \times 50 \times 6$ , or 360 Delta planes taking off this hour.

**Q. If I were to fill this room with pennies, how many pennies would fit in?**

**Ans:** A literally in-your-face guesstimate question. This one you might begin by estimating the size of the room. Say, it's 10 feet by 10 feet. So, it's 100 square feet. Next you will try to estimate how many pennies might fit in one square foot. Then, once you have your estimate of that, you simply multiply by 100.

**Q. How many gas stations are in North America?**

**Ans:** Start small or start large. Most people like to estimate how many would be in a hometown of 10,000 people and extrapolate that to the 300 million people in the U.S., while adjusting for the fewer gas stations in New York and other large cities. However you think about this one, just be rational and sure to think out loud!

**Q. Estimate the annual revenue of Tropicana's orange juice division in the U.S.**

**Ans:** Like the others, this is fairly straightforward. You might want to estimate how many glasses of orange juice you drink a week (and/or whether or not you are representative of the general U.S. population), how many people are in the U.S. (300 million), and the general cost of a glass of OJ (or how many glasses might be in a carton of OJ and how much that average carton costs). From here, don't forget that you'll also need to consider how much market-share Tropicana has of the overall orange juice market!

**Questions for more practice:**

- Amount of revenue from mobile industry in India
- YoBikes market share in India
- Estimate revenue through sale of Coke from a typical store in IIM Bangalore. Extrapolate to entire Bangalore
- Number of Maggi consumed on campus in a month
- Number of smokers in Hyderabad
- Number of Vada Paos served in the Annapurna Mess
- Number of Maggi packets sold on the first day of relaunch
- Number of flights taking off in a day from the Delhi Airport
- Number of taxis in Bangalore
- Number of people who have ever lived on the Earth
- Number of vehicles in a toll gate of your choice
- Number of calls to our customer care in a week
- Number of people using FB on campus
- Market for cricket bats in the country
- Market for leather shoes
- How many footballs can be fit in a room
- Estimate cost of laying road from Gurgaon to Bangalore
- Number of excel users in the world. Microsoft wants to de-license some products, so want to estimate revenue loss
- Estimate revenue of Night Mess, IIM Bangalore
- Estimate number of movie tickets sold in Bangalore
- Estimate number of tennis balls that can be fit in a room
- Number of water bottles sold in India
- Number of airplanes in the sky right now
- Market size for electric insect repellent
- Estimate market size of electric bulbs in India
- Guesstimate number of daily flights in India
- Estimate number of movie tickets sold by Book My Show in Bangalore
- Estimate number of staplers in Bangalore
- Probability of exact sub being ordered by a customer
- Estimate per day revenue of a restaurant
- Number of cricket match tickets sold in India
- Estimate cricket bat market size
- Estimate the market size of shuttlecocks in India
- Estimate number of spectacles sold in an year
- Estimate number of pigeons on campus
- Number of people at Delhi airport in a day
- Number of cabs required at Delhi airport
- Estimate market size of online retail in India
- Estimate the amount of money withdrawn SBI branch in IIM every month
- Number of Colgate packets sold in India every year
- 4G penetration in India

- Estimate number of baby diapers sold in India
- Estimate the number of golf balls that are manufactured in India in a day
- Number of schools in your hometown
- Estimate number of people setting foot in Bangalore railway station everyday
- Volume of shampoo used in India
- Number of tyres sold in India in a year
- Number of replacement tyres required in India in a year
- Number of rooms used by tourists in India (in hotels) in a year
- Estimate the number of office chairs in Delhi
- Calculate the total amount of revenue from mobile industry in India
- Number of ticket counters required for Bangalore metro station
- Titan is launching a watch priced at Rs. 12,000. Estimate market size
- Royal Enfield is launching a new bike priced at 2 lakh in India. Estimate market size.
- Estimate Revenue of Make my Trip in an year
- Estimate number of autos in India
- Estimate number of Gmail app users in India