

1) Estimate the number of people in India who own a bike.

Setting the Stage: To estimate the number of bike owners in India, we utilized population data and applied a mutually exclusive and collectively exhaustive (MECE) approach. We segmented the population into various categories, refining our approach to derive accurate results. Employing a TOP-DOWN Approach, we divide the population into demographic groups such as Rural-Urban Split, Age Group Split, Income Split, and Gender Split, because men majorly own bikes compared to women. According to the motor vehicle act, individuals below 18 years of age cannot own bikes, so we cut down these age group in the data. Through this process, we estimated the number of bikes in India. Additionally, we considered the fact that in joint families, where multiple males lives in one household, it's unlikely that every male owns a bike. In some cases, households with 6-7 members may have only one bike, even if there are 3 males residing in the household.

Steps That are Involved:

- What is the Population of India?
- Age Group Categorization.
- What is the Split between Rural and Urban Population?
- How is the population categorized based on income?
- Gender split in every income group.
- Number of Males and Female Bike Owner.
- What is the Number of Bikes owners in India?

Population of India: The estimated population of India today is 1.40 billion, which is equivalent to 140 crores.

Age Group Categorization: Considering that individuals below the age of 18 cannot own bikes as per the law, we estimate that this age group constitutes 30% of the population in India. Therefore, 30% of 140 crores is equivalent to 42 crores. Subtracting this from the total population of 140 crores, we estimate that the population eligible to own bikes is 98 crores.

Rural and Urban: The split between rural and urban areas in India is 70:30, with 70% of the population residing in rural areas and 30% in urban areas.

70% of 98 Crores is 68.8 Crores

30% of 98 Crores is 29.4 Crores

Population:

Population	Calculation
Total Population	140 crores
0-18 age group	42 crores
Rural Population	$98 \times 70\%$ $= 68.8$ Crores
Urban Population	$98 \times 30\%$ $= 29.4$ Crores

Income Split: Income distribution varies between rural and urban areas. In rural areas, the income split is 20-30-40-10, while in urban areas, it is 40-40-20.

Rural - 20% Below Poverty Line, 30% Low Income, 40% Middle Class, & 10% High Class

$68.6 \times 20\% = 13.7$ crore, $68.6 \times 30\% = 20.5$ crores, $68.6 \times 40\% = 27.4$ crore, & $68.6 \times 10\% = 6.8$ crore

Urban – 40% Low Class, 40% Middle Class, & 20% High Class

$29.4 \times 40\% = 11.7$ Crore, $29.4 \times 40\% = 11.7$ Crores, & $29.4 \times 20\% = 5.8$ crores

Based on the income split, we determine the number of vehicles owner in each income category.

Types	Rural Population	Urban Population
Total Population	68.6 Crores	29.4 Crores
BPL Population	$68.6 \times 20\% = 13.7$ Crores	----
Low Income	$68.6 \times 30\% = 20.5$ Crores	$29.4 \times 40\% = 11.7$ Crores
Middle Income	$68.6 \times 40\% = 27.4$ Crores	$29.4 \times 40\% = 11.7$ Crores
High Income	$68.6 \times 10\% = 6.8$ Crores	$29.4 \times 20\% = 5.8$ Crores

Gender Split: The ownership of bikes is heavily influenced by gender in India, with a higher prevalence among men compared to women. While some women do enjoy riding bikes, this is more common in urban areas or metropolitan cities. In general, women are more inclined

to own scooters rather than bikes. In rural areas, the male population constitutes 52% of the total population, while the female population is 48%. In contrast, the male-female ratio in urban areas is 50:50. Considering the gender split is crucial for estimating the number of bike owners in India.

Rural:

BPL Population : assume that no in bpl population own bikes.

Low Income: In rural areas, the low-income population is 20.5 crores, with 52% being males, totalling 10.6 crores. Assuming that 30% of these males own bikes, we calculate $10.6 * 20\% = 2.12$ crores male bike owners. It is assumed that no females own bikes in this specific category.

Middle Income: In rural areas, the middle-income population is 27.4 crores, with 52% being males, totalling 14.2 crores. Assuming that 50% of these males own bikes, we calculate $14.2 * 50\% = 7.1$ crore male bike owners. Additionally, there are 48% females, totalling 13.1 crores. Assuming that only 2% of these females own bikes, we calculate $13.1 * 2\% = 0.2$ crore female bike owners.

High Income: In rural areas, the high-income population is 6.8 crores, with 52% being males, totalling 3.5 crores. Assuming that 80% of these males own bikes, we calculate $3.5 * 80\% = 2.8$ crores male bike owners. Additionally, there are 48% females, totalling 3.2 crores. Assuming that 5% of these females own bikes, we calculate $3.2 * 5\% = 0.1$ crore female bike owners.

Urban:

Low Income: In urban areas, the low-income population is 11.7 crores. Out of this, 50% are males, totalling 5.8 crores. Assuming that 40% of these males own bikes, we calculate $5.8 * 40\% = 2.32$ crores male bike owners. Females constitute 50% of this category, which is also 5.8 crores. It is assumed that no females own bikes in this specific category.

Middle Income: In urban areas, the middle-income population is 11.7 crores. Out of this, 50% are males, totalling 5.8 crores. Assuming that 60% of these males own bikes, we calculate $5.8 * 60\% = 3.48$ crores male bike owners. Females also constitute 50% of this category, which is also 5.8 crores. Assuming that 5% of these females own bikes, we calculate $5.8 * 5\% = 0.29$ crores female bike owners.

High Class: In urban areas, the high-income population is 5.8 crores. Out of this, 50% are males, totalling 2.9 crores. Assuming that 90% of these males own bikes, we calculate $2.9 * 90\% = 2.61$ crores male bike owners. Females also constitute 50% of this category, which is also 2.9 crores. Assuming that 20% of these females own bikes, we calculate $2.9 * 20\% = 0.58$ crores female bike owners.

Total Number of People in India Who Own Bikes: In rural areas, a total of 12.3 crores ($2.12 + 0 + 7.1 + 0.2 + 2.8 + 0.1$) people own bikes, while in urban areas, a total of 9.28 crores ($2.32 + 0 + 3.48 + 0.29 + 2.61 + 0.58$) people own bikes. Therefore, the total number of people in India who own bikes are **21.60 crores** ($12.3 + 9.28$).

Population	Area Split	% of Income Split	Income Categories	% of Gender Split	Genders	% of People who own Bike	Number of People who own bike
140 Crore	Rural 70%	20%	BPL	52%	Male	0%	0 Crore
				48%	Female	0%	0 Crore
		30%	Low Class	52%	Male	20%	2.12 Crore
				48%	Female	0%	0
		40%	Middle Class	52%	Male	50%	7.1 Crore
				48%	Female	2%	0.2 Crore
		10%	High Class	52%	Male	80%	2.8 Crore
				48%	Female	5%	0.1 Crore
	Urban 30%	40%	Low Class	50%	Male	40%	2.32 Crore
				50%	Female	0%	0 Crore
		40%	Middle Class	50%	Male	60%	3.48 Crores
				50%	Female	5%	0.29 Crores
		20%	High Class	50%	Male	90%	2.61 Crores
				50%	Female	20%	0.58 Crores
Number of People in India who Own a Bike							21.60 Crore

2) Determine approximately how many gallons of water are used to fill a standard swimming pool

Setting the Stage: Firstly, we need to determine the average pool size, which will be determined by the length, width, and depth of the pool. The ratio of the swimming pool will be 2:1 in length and width. Let's consider that the average length of the pool is 30 feet, the width is 15 feet, and the depth is 6 feet. We chose a depth of 6 feet based on the average height of people worldwide, which is 5.7 feet, ensuring that individuals between the ages of 18 to 60 can comfortably swim. To calculate the volume of water, we multiply the length, width, and depth of the pool, and then multiply the result by 7.5 to convert it into gallons.

Additionally, we assume that the pool uses only 90% of its capacity, as not the entire pool is covered by water.

Approach:

Assuming a Standard Pool Size: Let's consider the average pool length to be 30 feet, the width to be 15 feet, and the depth to be 6 feet.

Calculate the Volume: To calculate the volume of the pool, we can use the formula for the volume of a rectangular prism:

$$\text{VOLUME} = \text{LENGTH} \times \text{WIDTH} \times \text{DEPTH}$$

$$\text{So, } 30 \text{ feet} \times 15 \text{ feet} \times 6 \text{ feet} = 2700 \text{ Cubic Feet.}$$

Convert into Gallons: We know that 1 cubic foot is roughly equal to 7.48 gallons. By multiplying our estimated volume by this conversion factor, we get:

$$2700 \text{ cubic feet} \times 7.48 \text{ gallons/cubic foot} = 20196 \text{ gallons}$$

So, we can estimate that it requires approximately 20,196 gallons of water to fill a standard swimming pool.

Consideration: We understand that not every pool is filled up to 100 percent. Typically Swimming pool are filled up to the 90% of their capacity. So, 90% of 201,96 is 18176.4.

Conclusion: After considering this factor and performing all the calculations and estimates, we can conclude that to fill a standard swimming pool, it requires approximately **18,176 gallons** of water.

Standard pool size	Length = 30 feet	Width = 15 Feet	Depth = 6 Feet
Pool Size (Cubic Ft.)	2700 Cubic Feet (30X15X6)		
Convert into Gallons	20,196 Gallons (2700 X 7.48)		
Capacity of Pool	90%		
Gallons of Water to fill Swimming Pool	18,176 Gallons		

3) Estimate the amount of tea consumed in Kolkata every day.

Setting the Stage: To estimate the amount of tea consumed in Kolkata, we first gather information about the population of Kolkata and employ a Top-Down approach & Demand side approach. The population of Kolkata is approximately 1.50 crore. Considering Kolkata's status as a metropolitan city, it's important to note that, Like North Indians, East Indian people prefer tea over coffee. Tea consumption varies across different age groups, with children often preferring milk over tea, while older individuals tend to Favor tea over coffee. Additionally, consumption habits vary, with some individuals drinking a single cup of tea and others consuming it twice a day. Once we determine the number of cups of tea consumed in a day, we calculate the total amount of tea consumed. Typically, a cup of tea contains approximately 3 grams of tea leaves. By multiplying the number of cups by 3, we obtain the amount of tea consumed in grams. We then convert this value into kilograms by dividing it by 1000. This provides us with the estimated amount of tea consumed in Kolkata every day.

Approach:

Population: The Population of Kolkata is 1.50 Crores as per 2020 report.

Culture of Tea: We know that people in East India prefer tea over coffee, like North Indians.

Let's assume that 80% of people drink tea, while the remaining 20% do not. So, 80% of 150 Crores is 1.20 Crores.

Age Group Segmentation: Different age groups have different preferences. Let's categorize the population of Kolkata into different age groups:

- Ages 0-15: 25% of the population, which is $1.20 \text{ crores} * 25\% = 30 \text{ lakhs}$.
- Ages 16-25: 20% of the population, which is $1.20 \text{ crores} * 20\% = 24 \text{ lakhs}$.
- Ages 25 and above: 55% of the population, which is $1.20 \text{ crores} * 55\% = 66 \text{ lakhs}$.

Average Cups of Tea:

Different age groups have different preferences when it comes to tea consumption. Let's break down the tea consumption estimates for each age group:

- Ages 0-15: There are 30 lakhs children in this age group. Assuming 90% of them don't drink tea, which leaves 3 lakhs children who consume 1 cup of tea per day. So, there are approximately 3 lakhs cups of tea consumed by this age group every day.
- Ages 16-25: This age group consists of 24 lakhs individuals. We assume that 30% of them don't drink tea, leaving 70% who do. Among them, 60% consume 1 cup of tea per day, which amounts to 14.4 lakhs cups of tea. Additionally, 10% of them consume 2 cups of tea per day, which amounts to 4.40 lakhs cups of tea. So, this age group consumes approximately $(14.4 + 4.40) = 18.8 \text{ lakhs cups of tea daily}$.
- Ages 25 and above: There are 66 lakhs individuals in this age group. Assuming 10% of them don't drink tea, 50% consume 1 cup of tea per day, amounting to 33 lakhs cups of tea. Additionally, 40% consume 2 cups of tea per day, amounting to 52.8 lakhs

cups of tea. So, this age group consumes approximately $(33 + 52.8) = 85.8$ lakhs cups of tea daily.

So, $3 + 18.8 + 85.8 = 107.6$ lakhs (1.07 crores cups of tea).

In Kolkata, Every **Day 1.07 crore cups** of tea consumed every day.

Amount of Tea: After estimating that 1.07 crore cups of tea are consumed in Kolkata every day, we need to determine the total amount of tea consumed. Typically, one cup of tea contains 3 grams of tea leaves. Therefore, the total amount of tea consumed daily in Kolkata is calculated as 1.07 crore cups * 3 grams, which equals 3.21 crore grams of tea. Since there are 1000 grams in 1 kilogram, converting 3.21 crore grams to kilograms yields **32100 kg** of tea consumed daily in Kolkata.

Population	Percentage of age group	Age Group	Split of Age Group	No of Cups	Total
1.20 crores	25%	0-15	90%	0	27 lakhs
			10%	1	3 lakhs
	20%	16-25	30%	0	7.2 Lakhs
			60%	1	14.4 Lakhs
			10%	2	4.4 Lakhs
	55%	25+			
			10%	0	6.6 Lakhs
			50%	1	33 lakhs
40%			2	52.8 Lakhs	
The total number of cups of tea consumed in a day in Kolkata.					1.07 Crore
The average amount of tea in a cup					3 Grams
Total Amount of Tea					3.21 Crore Gram
	In Kilograms				32,100 KG

4) Research and estimate the annual number of visitors to Disneyland.

Setting the Stage: Disneyland is a popular spot for families and kids, especially during vacations. To figure out how many people visit Disneyland each year, we need to look at the park's size and what's inside, like shops and rides. We'll estimate how many visitors go to each shop and ride every day and then multiply that by the number of days in a year. We'll also consider busy times, like holidays, when more people might visit. By doing all this, we can get an idea of how many people visit Disneyland annually.

Steps that are involved:

1. Seasonal months and non-seasonal months
2. What is the size of Disneyland?
3. Total number of shops and riders
4. Peak hours and non-peak hours
5. Average per day visitors in a shop and a ride.
6. Multiplying into seasonal days and non-seasonal days
7. Getting out the result

Approach:

Seasonal and Non-seasonal Months: Most kids visit Disneyland during their school holidays, which are in summer and winter. In summer, kids get a break for June and July, and during winter, they have off in December and January for holidays like Halloween and New Year's. So, we have 4 months where more people visit (seasonal), and 8 months where it's less busy (non-seasonal).

Size of Disneyland: Disneyland covers an area of around 100 acres, which is equal to 43,56,000 square feet.

Total Number of Shops and Rides: Let's assume that in Disneyland, a significant portion of the land is dedicated to fountains, parks, sitting areas, and other attractions. Considering this, we estimate that 60% of the land is occupied by non-shop and non-ride areas, while 20% is allotted for shops and 20% for rides. With Disneyland covering an area of 4,356,000 square feet, this translates to 871,200 square feet for both shops and rides. Assuming each shop is about 1600 square feet (40 feet length x 40 feet width), we can estimate that there are approximately 544 shops. For rides, given their larger space requirements, we estimate that each ride occupies around 18,000 square feet (180 feet in length and 100 feet in width). Consequently, there would be approximately 50 rides in Disneyland.

	Shops	Rides
Total area	8,71,200 Square feet	8,71,200 Square feet
Average size of one shop/rides	1600 Square feet	18000 square feet
Total number of shops / rides	$8,71,200 / 1600 = 544$ Shops	$8,71,200 / 18000 = 50$ Rides

Peak Hours and Non-Peak Hours: Disneyland operates for different durations during seasonal and non-seasonal months. In seasonal months, it opens for 15 hours from 9:00 AM to 11:59 PM, while in non-seasonal months, it operates for 13 hours from 9:00 AM to 10:00 PM. During seasonal months, peak hours are from 9:00 AM to 1:00 PM and 6:00 PM to 10:00 PM, totalling 8 peak hours, while non-peak hours are from 1:00 PM to 6:00 PM and 10:00 PM to 12:00 PM, totalling 7 non-peak hours. In non-seasonal months, peak hours

remain the same, totalling 8 hours, while non-peak hours are from 1:00 PM to 6:00 PM, totalling 5 hours.

	Seasonal Months		Non-Seasonal months	
Opening Hours	15 hours		13 hours	
	Peak Hour	Non-peak hour	Peak hours	Non-peak hours
Peak Hours' Time	9:00AM to 1:00PM and 6:00PM to 10:00PM	1:00PM to 6:00PM and 10:00PM to 11:59PM	9:00AM to 1:00PM and 6:00PM to 10:00PM	1:00PM to 6:00PM and
Total hours	8 Hours	7 Hours	8 Hours	5 hours

Average daily visitors in shops and rides: The number of visitors to Disneyland fluctuates depending on the season, with more visitors during seasonal months compared to non-seasonal months. Additionally, the number of visitors differs between shops and rides.

Shops:

- Seasonal months:
 - During peak hours: 40 people visit per hour, so in 8 hours, it's $40 * 8 = 320$ people.
 - During non-peak hours: 25 people visit per hour, so in 7 hours, it's $25 * 7 = 175$ people.
 - Total visitors per day: 320 (peak hours) + 175 (non-peak hours) = 495 .
- Non-seasonal months:

- During peak hours: 30 people visit per hour, so in 8 hours, it's $30 * 8 = 240$ people.
- During non-peak hours: 15 people visit per hour, so in 5 hours, it's $15 * 5 = 75$ people.
- Total visitors per day: 240 (peak hours) + 75 (non-peak hours) = 315 .

Rides:

- Seasonal months:
 - During peak hours: 100 people take a ride per hour, so in 8 hours, it's $100 * 8 = 800$ people.
 - During non-peak hours: 60 people take a ride per hour, so in 7 hours, it's $60 * 7 = 420$ people.
 - Total visitors per day: 800 (peak hours) + 420 (non-peak hours) = 1220 .
- Non-seasonal months:
 - During peak hours: 70 people take a ride per hour, so in 8 hours, it's $70 * 8 = 560$ people.
 - During non-peak hours: 40 people take a ride per hour, so in 5 hours, it's $40 * 5 = 200$ people.
 - Total visitors per day: 560 (peak hours) + 200 (non-peak hours) = 760 .

Seasonal and Non-Seasonal Visitors:

During the season:

- In shops: On average, 495 people visit a shop per day. Considering 544 shops, the total daily visitors to all shops would be 269,280. However, assuming each person visits around 10 shops per day, the unique daily visitors would be 26,928. Over the 4-month season, this totals to 32,31,360 visitors.
- For rides: With 1220 people taking a ride per day from each of the 50 rides, the total daily visitors would be 61,000. Accounting for the possibility that each visitor takes an average of 5 rides, the unique daily visitors are 12,200. Across the 4-month season, this equals 14,64,000 visitors.
- During non-season months:
 - In shops: Each day, 315 people visit a shop. With 544 shops, the total daily visitors to all shops amount to 17136. Assuming each person visits around 10 shops per day, the unique daily visitors are $17136 / 10 = 1713.6$. Over 240 days, this totals to 41,12,640 visitors.
 - For rides: With 760 people taking a ride per day from each of the 50 rides, the total daily visitors would be 38,000. Considering each visitor takes an average of 5 rides, the unique daily visitors are 7600. Across the 240 non-season days, this equals 18,24,000 visitors.

Final Output: After calculating the seasonal and non-seasonal visitors in Disneyland, we find that the seasonal visitors total 46,95,360 (approximately 47 lakhs) and the non-seasonal

visitors total 59,36,460 (approximately 59 lakhs). Combining these, we estimate that a total of 1,06,31,820 (approximately **1.06 crores**) visitors visit Disneyland in a year.

5) Estimate how many people are using public transport in a major city at any given moment.

City – Mumbai | Time span – once in a month

Setting the Stage: To estimate the number of people using public transport in Mumbai, we employ a top-down approach. We assume that within a month, individuals utilize public transport for their daily routines or longer routes. We begin with the population of Mumbai and segment it into various demographic groups, considering factors such as age, income, access to public transport, cultural preferences, and traffic. School and college students below 18 primarily rely on bicycles or public transport for transportation. Generally, individuals from low- and middle-class backgrounds prefer public transportation due to its affordability, while those with higher incomes favor personal vehicles. Mumbai, being a metropolitan city, boasts a metro train system, with many working professionals commuting via local trains. The city comprises individuals from both low and high-income brackets. Taking all these factors into account, we arrive at our estimation.

Steps that are involved:

- 1) What is the population of Mumbai?
- 2) What is the age split in Mumbai?
- 3) Income distribution in Mumbai
- 4) Preferences of Mumbai locals.
- 5) Final output

Approach:

Population: as per the 2023 report, the population of Mumbai is 21 million, equivalent to 2.10 crores.

Age Split: We segment the population into three categories: 0-18 years comprising 25%, 19-60 years making up 55%, and those aged 60 and above accounting for 20%. Therefore, there are 52.5 lakhs in the 0-18 age group, 1.15 crore in the 19-60 age group, and 42 lakhs in the 60+ age group. We then proceed with an income split among these demographics.

Income Disparity: Income significantly influences people's choice between using public transport and private vehicles. Typically, individuals with high incomes prefer personal vehicles over public transport, while a majority of low- and middle-class individuals opt for public transport due to its affordability and convenience.

0-18 age group are students whether in school or colleges. They don't own any kind of vehicle and have no right to ride any vehicle under motor vehicle act. So, we assume whether they travel in public transportation or go to school / colleges travelling by transport or their parents drop and pick them up from school/ colleges. Some of students also have their own bicycle and some of them may go to school by their own. We can assume that 30% of the students travel with family in personal vehicles. 30% go to their own and rest 40% use school buses and rikshaw. Why 40%,

because school buses are bit expensive so only those students can afford school / college buses whose family falls on high class or some middle-class family. 0-18 age group children are 52.2 lakhs and 40% of this are 20.88 lakhs. So, this specific age group 52.2 lakhs individuals travel from public transport once in a month.

19-60 age group population is 1.15 crore in Mumbai. They may fall on low-income class, middle income class or high class. We know Mumbai have two side, one is those who live in slums and one who live in Porshe areas. Both are live in Mumbai together. But we also know that all the billionaires and high rich class family want to live in metro city and in Mumbai there are lot of high rich class people exist. So, in 19-60 age group of peoples, 30% are from low-income class 40% are from middle income class and 30% are from high income class that are $1.15 \text{ Crore} * 30\% = 34$ lakhs people. We only talk about the adult population. Low-income class family barely have any personal vehicles, so they travel through the public transportation, and mainly who falls on 19-60 age group are working people and they daily travel through the rikshaws, auto or by trains. Also, for long route they prefer buses or trains. So out of 34 lakhs low-income class peoples we can assume that 90% of this population travel by the public transport or heavily reliable on public transport. So, $34 \text{ lakhs} * 90\% = 30.6 \text{ lakhs}$ people uses public transport. In this age group (19-60) 40% people belongs to middle class category that is around $1.15 * 40\% = 46 \text{ lakhs}$. Out of this 46-lakh people some of them own their own vehicles to travel in daily routine. But when it comes to travel long route, then they are also reliable on public transport. But out of 46 lakhs middle class people some of them own their 4-wheeler which they use for long routes. So, we can assume that 60% of them use public transport whether for daily routine or for long route. So, 60% of 46 lakhs are 27.6 lakhs people. So, in

19-60 age group, middle class are 40% and out of them 60% use public transport that is 27.6 lakhs. Now 20% of high-class income individuals are left in this specific age group. So, 20% of 1.15 crore are 23 lakhs. Most of the high-class individuals have their own vehicle. They own both two-wheeler and four-wheeler also. So, we can say that they barely use public transport for the traveling. They might be using airplane for the business trip or vocational trip, but in rare case they use plane every month. We can say that out of that specific individual, only 10% may use public transportation in a month. So, 10% of 23 lakhs are 2.3 lakhs. In this specific age group of individuals 60.5 lakhs ($30.6 + 27.6 + 2.3$) who use public transport once in a month.

- **In the 60+** age group, consisting of 42 lakh individuals, travel patterns differ due to health considerations and income levels. Approximately 30% of the low-income individuals, or 12.6 lakhs, out of that 40% people are estimated to use public transport that are 5.04 Lakhs. Similarly, around 30% of the middle-class individuals in this age group or 16.8 lakhs, out of that 30% people, may use public transport that are 5.08 lakhs. However, among the 12.6 lakh high-income individuals, none are expected to utilize public transportation. Therefore, a total of 10.08 lakh individuals in the 60+ age group are estimated to use public transportation.

Final Output: 0-18 age group who use public transportation in a month are 20.88 lakhs, 19-60 age group who use public transportation in a month are 60.5 and 60+ age group who use public transportation in a month are 10.08 lakhs. So, in total **91.46 lakhs** people use public transportation at least once a time in a month.

Age Split	% of People in Age Range	Income Class	% of Income Class	% of People use Public Transport	Number of People use Public Transport
0-18	25%	---	---	40%	20.88 lakh
19-60	55%				
		Low Class	30%	90%	30.60 Lakhs
		Middle Class	40%	60%	27.60 Lakhs
		High Class	30%	10%	2.30 Lakhs
60+	20%				
		Low Class	30%	40%	5.04 Lakhs
		Middle Class	40%	30%	50.04 Lakhs
		High Class	30%	0%	0 Lakh
Total Number of People Using Public Transport once a Month					91.46 Lakhs

6) Estimate the number of blades of grass on a standard football field.

Setting the Stage: To estimate the count of number of blades of grass on football field, we must calculate the size of football field. The average American football field is 120 yard long and 53.3 yard wide. We have to convert it into square meter for further calculations. Then we have to find out that how many grass blades are there in 1 square inch field. Then we have to multiply it by square feet. After that we get an estimate idea that how much grass blades are there in 1 square feet. Then simplify multiply it with the football field. After doing all these calculations we get to know about the estimate idea about the number of blades of grass on a standard football field.

Steps that are Involved:

- What is the Standard Size of Football Field?
- How many Blades of Grasses are there in one square inch of football field?
- Calculate both answers in square feet.

- Multiply number of grasses in square inches into Size of football field which is already in square feet.
- Final Output.

Solution:

Standard Size of Football Field: We have an idea about the standard size of football field in America. Football Field in America is 120 yards long and 53.3 yards wide. Now we must convert these numbers into the Feet. We all know that 1 yard is equal to 3 feet. So, we can say that the length of football field is $120 \text{ Yard} \times 3 \text{ Feet} = 360 \text{ Feet}$ and width is $53.3 \text{ Yard} \times 3 \text{ Feet} = \text{approximately } 160 \text{ feet}$. So now we can say that the size of the football field is 57,600 square feet.

Blades of Grass: Now we must calculate the number of blades of grasses in one square inch. We assume that in one-inch long are there are 10 blades of grasses and in one-inch-wide area there are also 10 blades of grasses. So, we can say that in one square inch there are $10 \times 10 = 100$ blades of grasses. After knowing the number of blades of grasses in one square inch area, we easily calculate that how many numbers of blades are there in one square feet of area. In 1 foot there are 12 inches. So, in 1 square foot there are $12 \times 12 = 144$ square inches. 100 blades of grasses in 1 square inches. So, $100 \times 144 = 14,400$ blades of grasses in 1 square feet.

Calculation: Now we have both the numbers in square feet. The size of the football field is 57,600 square feet and there are 14,400 blades of grass are there in one square feet. If we simplify multiply these numbers, we get to know the idea that how many blades of grass are there in one football field. So, $57,600 \text{ (Football Field)} \times 14,400 \text{ (Blades of Grasses)} = 8,29,44,000$ blades of grasses are there in 1 football field

Final Output: We get the Estimate Number of Blades of grasses in one football field and these number is **8,29,44,000.**

Parameter	Values
Length of the football Field (yards)	120 Yards
Width of the Football Field (yards)	53.3 Yards
Length of the football Field (feet)	360 Feet
Width of the Football Field (feet)	160 Feet
Arrea of the Football Field (Sq. Ft.)	57,600 Square Feet
Desnsity of Grass blades (per Sq. Inch)	100 Blades / Sq. Inch
Desnsity of Grass blades (per Sq. ft)	14,400 Blades / Sq. Ft.
Total Number of Grass Blades	8,29,44,000 Blades