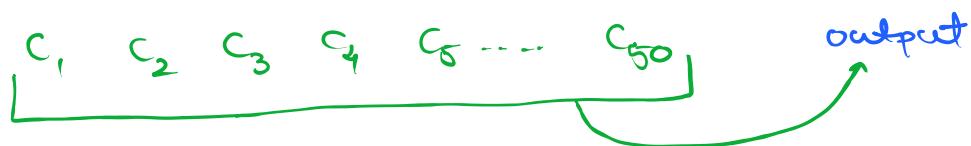
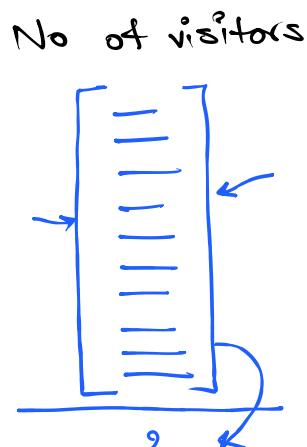


Time Related Weeks	No of visitors	Numerical
1	2882	
2	3105	
3	2791	
4	4725	
5	6720	
6	4850	
7	3990	
:	:	
40	5135	
		Auto regression
		3850 (Avg)
41	?	3850
42	?	3850
43	?	3850
44	?	3850

RegressionAutoregression

5  
2  
0  
2  
.

## Ways of Time Series Forecasting →

### Quantitative

- Data available
- Historical patterns repeat mostly.
- We can easily capture complex patterns through available data.

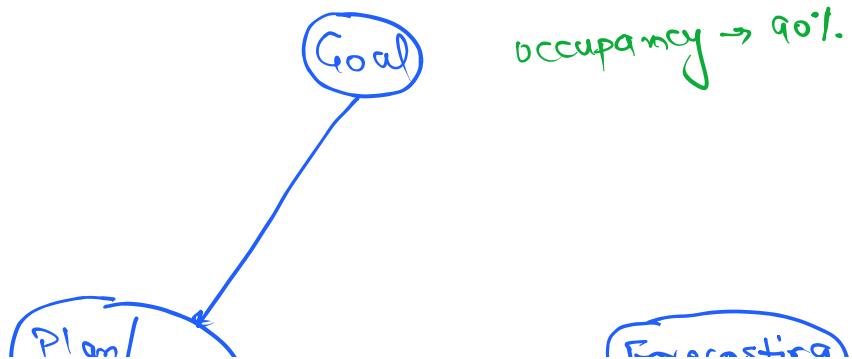
### Qualitative

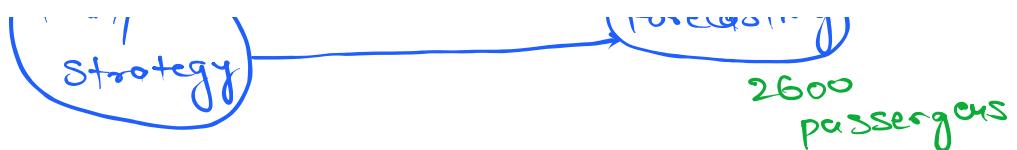
- No data available
- we have no idea about the historical pattern.
- We can't capture/identify the complex patterns because of unavailability of data.

## 3 Components of Time Series Forecasting →

- ① Time Series Data.
- ② Time Series Analysis.
- ③ Time Series Forecasting.

## Basic Terminologies





A1:  $\sim 1000$

A2:  $\sim 2000$

A3:  $\sim 3000$

### Steps in Forecasting

- Define the problem statement.
- Collect the data
- Analyze the data.
- Build and evaluate the forecasting models.

Some caveats associated with Time-Series forecasting →

- ① The granularity rule: The more aggregate your forecasts are, the more accurate they will be.
- ② The frequency rule: Keep updating your forecasts regularly to capture any new trend/information that comes.
- ③ The Horizon Rule: When you have forecasted for many future weeks/months, your forecasts are more likely to be very

more accurate in the earlier weeks/months  
as compared to the later ones.

Three important characteristics of a time-series data:

- ① Relevant: Data should be relevant to our goal/objective.
- ② Accurate: Data should be accurate in terms of capturing the timestamps and the related observations.
- ③ Long Enough: Data should be long enough to forecast accurately. This is important to identify all the patterns in the past.

Basic Approaches for Time Series Forecasting →

① Naive Approach

$$\text{Forecasted} = \frac{\text{Last observed}}{\text{value}}$$

② Simple Average Approach

③ Moving Average Approach

④ Weighted moving average approach.

U U O

$$x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5$$
$$2000 \quad 2100 \quad 1980 \quad 3150 \quad 2950$$

$$\text{Avg} = \frac{x_1 + x_2 + x_3 + x_4 + x_5}{5}$$

$$\text{Weighted Avg} = \frac{w_1 x_1 + w_2 x_2 + w_3 x_3 + w_4 x_4 + w_5 x_5}{5}$$

Homework (30%) - Score: 85

- Quizzes (20%) - Score: 90

- Final Exam (50%) - Score: 80

- Multiply each score by its respective weight:

- Homework: ( 85 \times 0.3 = 25.5 )

- Quizzes: ( 90 \times 0.2 = 18 )

- Final Exam: ( 80 \times 0.5 = 40 )

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- Homework: ( 85 \times 0.3 = 25.5 )

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