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Best worst and Average case Complexities

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Algorithm Analysis

- Only analyze **correct** algorithms.
  - Halts with correct output.

- **Predicting the resources required for the algorithm**.

- Resources include
  - **Memory**
  - Communication bandwidth
  - Programming cost
  - Computational **time**

Algorithm Analysis

- Running Time
  - Processing power of the computer
  - Capability of the Compiler
  - Speed of memory access
  - Input to the algorithm
    - Typically, **input size** (number of items in the input) is the main driving factor.

- Instructions are executed in a sequential fashion with no concurrent operations.

Algorithm Analysis

```
int sum (int arr[], int n)
{
    int sum = 0;
    for(i = 0; i <= n; i++)
        sum = sum + arr[i];
     return sum;
 }
```

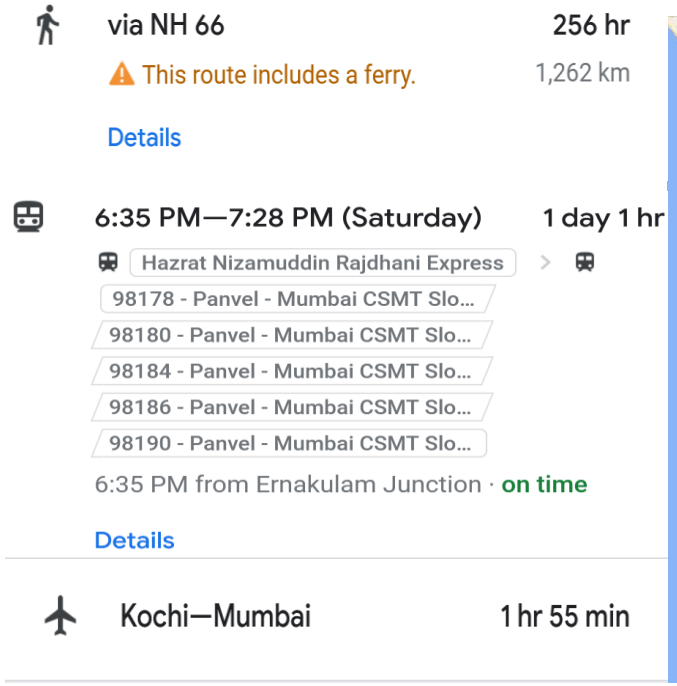
```
int getsum (int arr[], int n)
{
    int sum = 0;
    if (n % 2 ==0)
        return 0;
    for(i = 0; i <= n; i++)
        sum = sum + arr[i];
     return sum;
 }
```

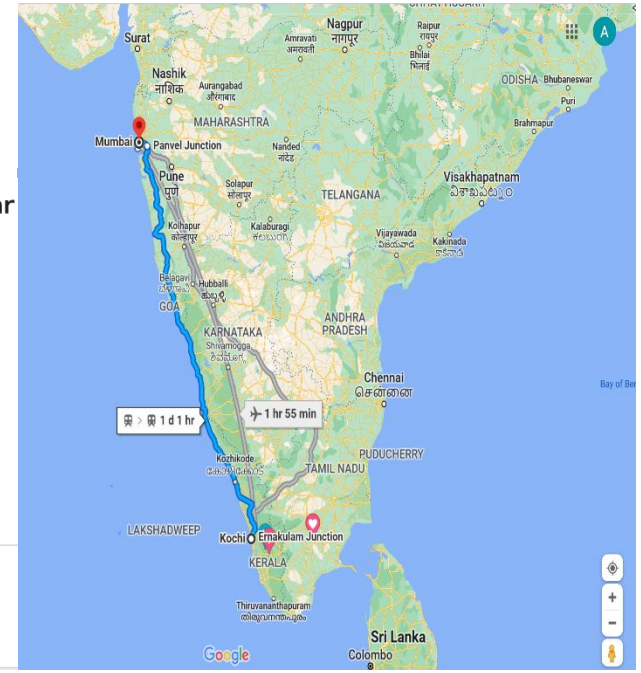
Mathematical Notations

- **Big Oh notation (O)**
- Represent the exact bound or exact upper bound
- **Theta notation (Θ)**
- Represent the exact bound
- **Omega notation (Ω)**
- Represent the exact bound or lower bound.

Mathematical Notations

- **Cochin to Mumbai**





Big Oh (O)

- **f(n) = O(g(n)) iff there exists a constant ‘c’ and ‘n_0’ such that, f(n) <= c g(n) for all n >= n_0**