

# Design and Analysis of Algorithms

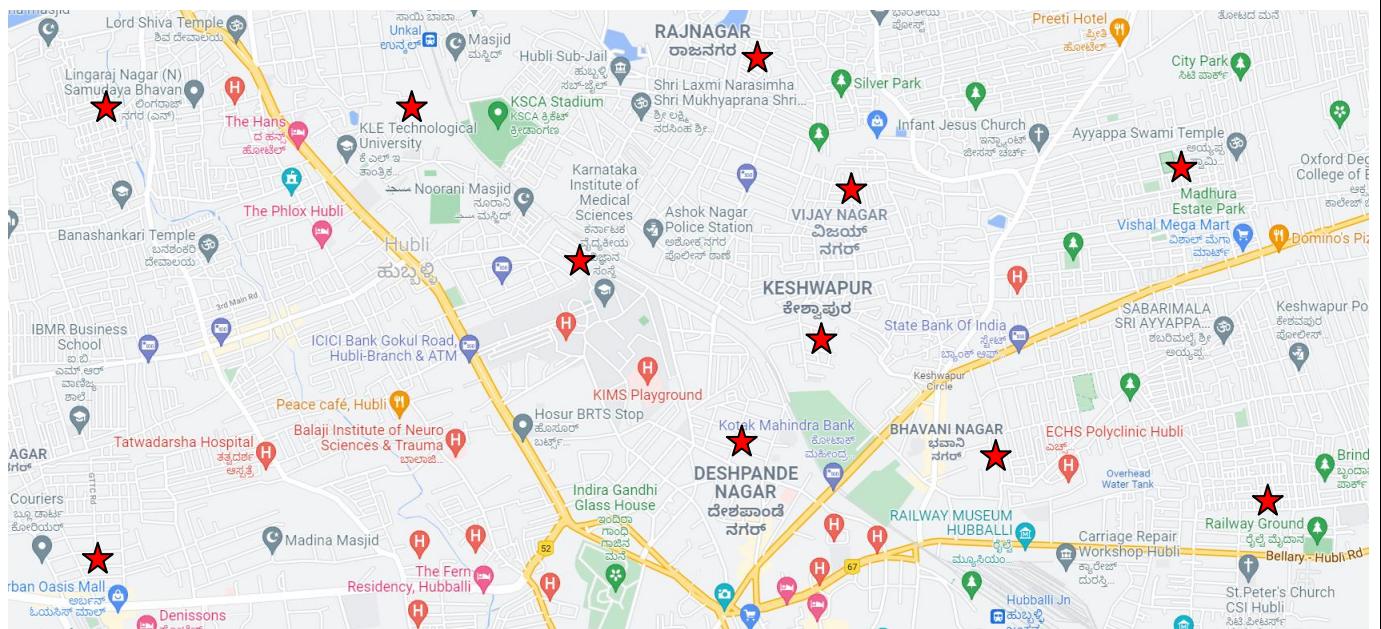
## Case Study – Invitation Problem

### Question: New Year Celebrations Invitation

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Aryan is thrilled about the upcoming New Year celebrations, especially since his start-up will also be marking its first anniversary. With just about a month and a more left, he knows this calls for a well-thought-out plan to celebrate both milestones.

The first phase of his plan is to make a list of all his friends and create a travel itinerary to visit each of them personally for the invitation. No calls, no messages, just a warm, face-to-face invitation. He has already marked the places to visit on Google Maps (indicated with red stars) and is excited to start his journey.



The places to be visited are: KLE TU (start point), Lingaraj Nagar Samudaya Bhavan, Urban Oasis Mall, KIMS, Deshpande Nagar, Keshwapur, Vijay Nagar, Raj Nagar, Bhavani Nagar, Railway Ground and Madhura Estate. Aryan's friends are nearby to these locations.

Well, that's too many places to visit.

The path way between two places, as we know is bi-directional. Help Aryan in deciding a proper order of visit. Aryan wants to start the journey from KLE Tech.

## DAA Case Study

Provide Aryan with an optimized travel itinerary, including the total cost involved. The primary objective should be to minimize his expenses. Consider whether additional factors, such as time constraints, travel duration, or other logistical elements, might impact the plan. How long will the invitation and planning process take? Note that Aryan can revisit any location if necessary, can use any mode of commute and take his decisions as per convenience.

Deliver a detailed, executable plan with realistic expectations, using Google Maps to ensure accuracy. Aim for a practical and efficient design that takes all relevant parameters into account. You are free to make necessary assumptions for the missing data.

Once you do, ask LLM to generalize it and write an algorithm for this.

At the end you must present:

- A solution to above problem with plan, time and cost.
- A generalized algorithm to solve such similar problems.

*P.S. Sometimes it's the simple problems that come with the not-so easy solution!*

**\*\* Break a Leg \*\***