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# MA5895 : Numerical Optimization

## Combined Assignment Report

### Cell Tower Problem

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**Summary :** Hi

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## **Contents**

<b>1</b>	<b>Problem Statement</b>	<b>1</b>
<b>2</b>	<b>Approach to tackle the problem</b>	<b>2</b>
<b>3</b>	<b>Assumptions</b>	<b>2</b>
<b>4</b>	<b>Formulation</b>	<b>2</b>
<b>5</b>	<b>Algorithm</b>	<b>2</b>
<b>6</b>	<b>Results and Discussion</b>	<b>2</b>
6.1	Voronoi Diagram of few values of input . . . . .	2
6.2	Computational time as a function of input parameters . . . . .	2
6.3	Largest problem solution . . . . .	2
<b>7</b>	<b>References</b>	<b>3</b>

## **Problem Statement**

In city planning, the issue is to place towers for given the population. Divide the population into region based on maximum capacity to plant tower sites. Out of all possible cell tower cites, find out the optimal tower location such that maximum population is served within limit of budget constrain.

## **Approach to tackle the problem**

## **Assumptions**

Assumed that,

- The city is a rectangular region
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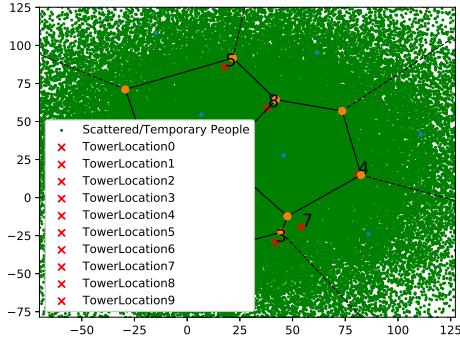
## Formulation

$$V(s) = \underset{Q(s,a)}{\operatorname{argmax}} \quad (1)$$

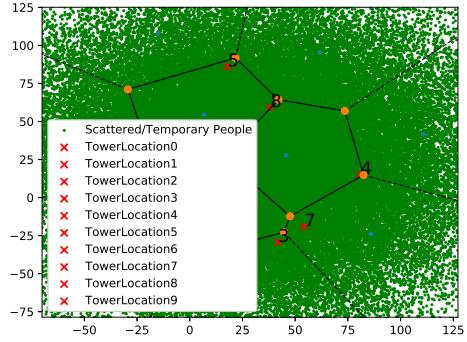
## Algorithm

## Results and Discussion

### Voronoi Diagram of few values of input



(a) Grid world with goal G1



(b) Grid world with goal G2

Figure 1: Grid world of four rooms. Blue:Agent, Green:Terminal The grid world-1(a) has terminal state G1 and grid world-1(b) has terminal state G2. Arrow indicates the optimal policy. The policy in fig-1(a) is obtained using option-1 where as same in fig.-1(b) by option-2

### Computational time as a function of input parameters

### Largest problem solution

## ***References***