

## AI Assignment 2

### Heuristic Logic :

- Consider the current city as X and the final destination city as D. I find the distance from X to Capital City (Delhi) and similarly find the distance between Delhi and D. Let these be  $l_1$  and  $l_2$  respectively.
- I use the triangle inequality principle and figure that the distance between X and D (say  $l_3$ ) would be in range  $|l_1 - l_2| \leq l_3 \leq l_1 + l_2$ .
- Using statistics I approximate  $l_3 = (l_1 + l_2 + |l_1 - l_2|) / 2$  and this is the heuristic function  $h$  for my best first search algorithm.

### Algorithms Implemented :

- Depth First Search
- Best First Search
- Breadth First Search

For building Prolog Knowledge base I used pandas and parsed the excel sheet - Code in `gen.py`

Working of program : (To run, load `sol.pl` and then start.)

- Depth First Search

```

deepam@os-sarmah: ~/Desktop/Courses/CSE643/Assignment 2
File Edit View Search Terminal Help
Please run ?- license. for legal details.

For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- [sol].
true.

?- start.
Enter which search to use:

[1]. Show Depth First Search
[2]. Show Best-first search
[3]. Show Breadth First Search

|: 1.

Enter Source :
|: cochin.

Enter Destination :
|: pune.

Starting Depth First Search...
Printing Depth First Search Path...

cochin agartala ahmedabad agra bangalore allahabad bhubaneshwar amritsar bombay asansol calcutta baroda chandigarh bhopal delhi calicut hyderabad coimbatore i
ndore gwalior jaipur hubli kanpur imphal lucknow jabalpur madras jamshedpur nagpur jullundur nasik kolhapur panjim ludhiana patna madurai pondicherry meerut p
une

true .

```

```
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?- [sol].
true.

?- start.
Enter which search to use:

[1]. Show Depth First Search
[2]. Show Best-first search
[3]. Show Breadth First Search

]: 1.

Enter Source :
]: hubli.

Enter Destination :
]: nasik.

Starting Depth First Search...
Printing Depth First Search Path...
hubli ahmedabad agartala bangalore agra bhubaneshwar allahabad bombay amritsar calcutta asansol chandigarh baroda cochin bhopal delhi calicut hyderabad coimbatore indore gwalior jaipur imphal kanpur jabalpur lucknow jamshedpur madras jullundur nagpur kolhapur nasik
true .
```

## 2. Best First Search

```
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For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- [sol].
true.

?- start.
Enter which search to use:

[1]. Show Depth First Search
[2]. Show Best-first search
[3]. Show Breadth First Search

]: 2.

Enter Source :
]: jaipur.

Enter Destination :
]: imphal.

Starting Best First Search...
Printing Best First Search Path...
jaipur imphal
true .
?- 
```

```
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For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- [sol].
true.

?- start.
Enter which search to use:

[1]. Show Depth First Search
[2]. Show Best-first search
[3]. Show Breadth First Search

|: 2.

Enter Source :
|: ranchi.

Enter Destination :
|: meerut.

Starting Best First Search...
Printing Best First Search Path...
ranchi ahmedabad meerut

true .
?- 
```

### 3. Breadth First Search

```
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File Edit View Search Terminal Help

For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- [sol].
true.

?- start.
Enter which search to use:

[1]. Show Depth First Search
[2]. Show Best-first search
[3]. Show Breadth First Search

|: 3.

Enter Source :
|: trivandrum.

Enter Destination :
|: panjim.

Starting Breadth First Search...
Printing Breadth First Search Path...
trivandrum panjim

true .
?- 
```

```
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File Edit View Search Terminal Help
-----
For online help and background, visit https://www.swi-prolog.org
For built-in help, use ?- help(Topic). or ?- apropos(Word).

?- [sol].
true.

?- start.
Enter which search to use:

[1]. Show Depth First Search
[2]. Show Best-first search
[3]. Show Breadth First Search

|: 3.

Enter Source :

|: asansol.

Enter Destination :

|: jabalpur.

Starting Breadth First Search...
Printing Breadth First Search Path...
asansol ahmedabad jabalpur

true .

?- █
```