Name # Safiullah

ID # 14677

program # BS (SE)

Section # "B"

Subject # oPerations Research

Class Timing # wednesday (8:00 to 11:00)

M□T□W□T□F□S H/W□-C/W□ Dated:...../...../20.....

Q1 sol Max $Z = 3000x_1 + 1500x_2$

$12x_1 + 3x_2 \leq 1000$

$6x_1 + 8x_2 \leq 800$

$8x_1 + 6x_2 \leq 400$

$x_1, x_2 \geq 0$

Now adding the Slack Variables.

$Z - 3000x_1 - 1500x_2 = 0$

$12x_1 + 3x_2 + S_1 = 1000$

$6x_1 + 8x_2 + S_2 = 800$

$8x_1 + 6x_2 + S_3 = 400$

Table 1

Basic	W	x_1	x_2	S_1	S_2	S_3	R.H.S
W	1	-3000	-1500	0	0	0	0
S_1	0	12	3	1	0	0	1000
S_2	0	6	8	0	1	0	800
S_3	0	8	6	0	0	1	400

Table 2

Basic	W	x_1	x_2	S_1	S_2	S_3	R.H.S	
W	1	-3000	-1500	0	0	0	0	
S_1	0	1	1/4	1/12	0	0	83.33	$R_1 \frac{1}{12}$
S_2	0	6	8	0	1	0	800	
S_3	0	8	6	0	0	1	400	

□T□W□T□F□S H/W□-C/W□ Dated:...../...../20.....

Table 3

Basic	W	x_1	x_2	s_1	s_2	s_3	R.H.S	
W	1	0	-7500	250	0	0	249,990	$R_1+3000R$
s_1	0	1	1/8	1/12	0	0	83.33	
s_2	0	6	8	0	1	0	800	
s_3	0	8	6	0	0	1	900	

Table 4

Basic	W	x_1	x_2	s_1	s_2	s_3	R.H.S
W	1	562.5	0	250	750	0	324,990
s_1	0	1	1/4	1/12	0	0	83.33
s_2	0	6/8	1	0	1	0	100
s_3	0	8	6	0	0	1	900

Maximum valu is

324,990

at $x_1=0$ $x_2=400$

∴

M□T□W□T□F□S H/W□-C/W□ Dated:...../...../20.....

Question (2)

Sol

T Types of Product

Types of Product	number Sold in a month	net Profit
A	150	
B	200	

The MD of the Company has set the following goal which are arrange in order of Pirority

P_1 no under utilization of Plant Production Capacity.

P_2 Sell maximum Possible number of Product A and B. The MD has twice as much desire to Sell Product A as far Product B, because the net Profit from the Sale of Product A is a twice the amount from that of Product B

P_3 minimise overtime operator

M□T□W□T□F□S H/W□-C/W□ Dated:...../...../20.....

of the Plant formulate the above as a goal Programing Problem and Solve it So Let x_1 and x_2 be the number of Product A and B Since over time operation are not allowed

$$x_1 + x_2 + d_1^- - d_2^+ = 500 \text{ (Plant capacity)}$$

where d_1^- = under utilisation of Product capacity variable. ~~capacity~~

d_1^+ - overtime Production operation capacity variable.

Since goal is the maximum of Sales Since Positive deviation will not appear in contraint related with Sales

Then $x_1 + d_2^- = 150$

and $x_2 + d_3^- = 200$

d_2^- = under achevirment of Sale goal for (A)

d_3^- = under acheivement of Sale of goal for (B)

M□T□W□T□F□S H/W□-C/W□ Dated:...../...../20.....

Now the Goal Programing mathimatically model an be written as minimize

$$Z = P_1 d_1^- + 2P_2 d_1^- + P_3 d_1^+ + P_2 d_3^+ = 500$$

$$x_1 + x_2 + d_1^- + d_1^+ = 500$$

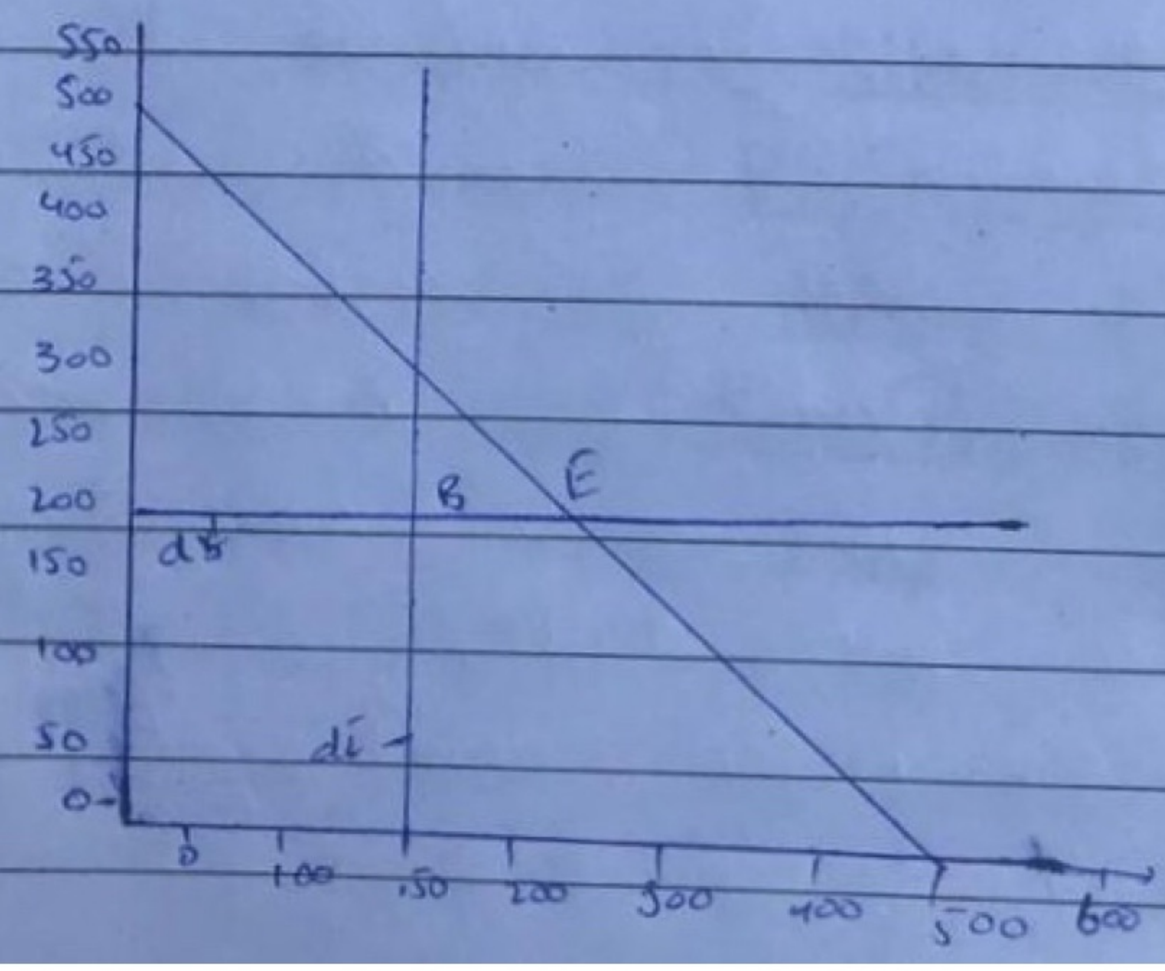
$$x_1 + d_2 = 150$$

$$x_2 + d_3 = 200$$

and

$$x_1, x_2, d_1, d_2^-, d_1^+ \geq 0$$

All the goal Contrains can be Plotted on the graph



Date:

②:(3)

Improving Time-cost Balance in Critical Path Method (CPM) Using Dragonfy Algorithm (DA).

Abstract:-

The CPM (critical path method) method is used for Seasching the huge path to do required activities for Compressing and clamping back the time it takes for a project which finially ends up inside the creation of an identical and intensive network of activities inside the lasgeted working. The CPM network analysis can provide project management with a convenient tools.

1) Introduction:

Critical Path methodology (CPM) is a programming methodology which replace all the various interaction, communication and defect a path within a kind of a project network diagram. The CPM methodology is to Seasching out the largest path to doing activities hence Compressing and deduction of time which takes for a project that ends inside the creation of an evem deep network of presidency activities inside the tasgeted Sussoundings. It is required to calculate the time it taken to complete for whole project, consitituting a quantity of times which spent performing all the specified interactions on the route with respect to a number of essential conditions.

Research Hypothesis:

This type of methodology use only a rule among many specified algorithmic rules to simulate the calculation of the lasgest path, so minimum time is required to do a work from dragonflies algorithm and the result can be checked.

Date:

The result of the papess show that each of the planned dragonfly algorithms benefits from high exploration due to programmed static swarming behaviours of dragonflies.

2) Literature Review:-

Critical Path Method (CPM) in the past, many authors have succeeded in the exploiating CPM to calculate times, resources and value requiring for projects & events. It is very important that creatures notices the simplest things and perform tasks in group. It is obvious that they have to be evolved over centuries to figure out such best and economical behaviours. A formula is projected the noted properties The no gift (NFL) theorem performs the motivated of the job to propose this optimizer So this formula may go completely specified algorithms on some problems that have not been soloed to this point. It is formula that have capability to use and implemant throughout this papes to spice up important path methodology work notice activities which minute quantity expensive and time consuming then select the foremost time and economical route for the project.

3) CPM Simulation:-

In the classic CPM analysis, the very begining time atomic numb numbes 99, the advance stating time LS, the easlest end time EF, the latest end time radic frequancy and total float time TF should be documented for each activity. The critically of AN activity will be find supported TF. A true project might compass many distinct activities. To reveal the implicit schedule risk of every activity and of the total projects the simulation may have to be run many times.

Date:

4) Research Methodology:-

This Study Utilizes the dynamic and static group behaviours of dragonflies in nature to obtain a dragonfy algorithm. The properties of this approch are to use the dragonflies' behavior to compass goals such as environmental identification and apply it to conduct behavioral models with the consideration of social intesaction of dragonflies in routing, Seaching and avoiding behavior danger, which have used behavior to design, which we have used an algorithm for routing. The patterns of dragonflies are as follows.

- Splitting.
- Setting.
- Coherence.
- Search for food.
- Deviation from the enemy.

$$Ei = \bar{X} + X$$

where "X" is the position of current individual & "$\bar{X}$" shows the position of the enemy.

Situational vectors are calculated by.

$$x_{t+1} = x_t + \Delta x_{t+1}$$

where "t" is repetition.

- Cohesence and Solidasity.

$$Ci = \frac{\sum_{j=1}^{n} xj}{N} - X$$

X = current Position

Xj = Position of near insect j-th

- Setting

$$Ai = \frac{\sum_{j=1}^{n} Vj}{N}$$

$$x_{t+1} = \begin{cases} -x_t & \gamma < T(\Delta x_{t+1}) \\ x_t & \gamma \geq T(\Delta x_{t+1}) \end{cases}$$

Date:

5) Result:

Separation from each other Si: To avoid the dragonflies from static collision with other human fellows.
Coordination and alignment: Ai is the dragonfly's behaviors to match speed with other fellow human.

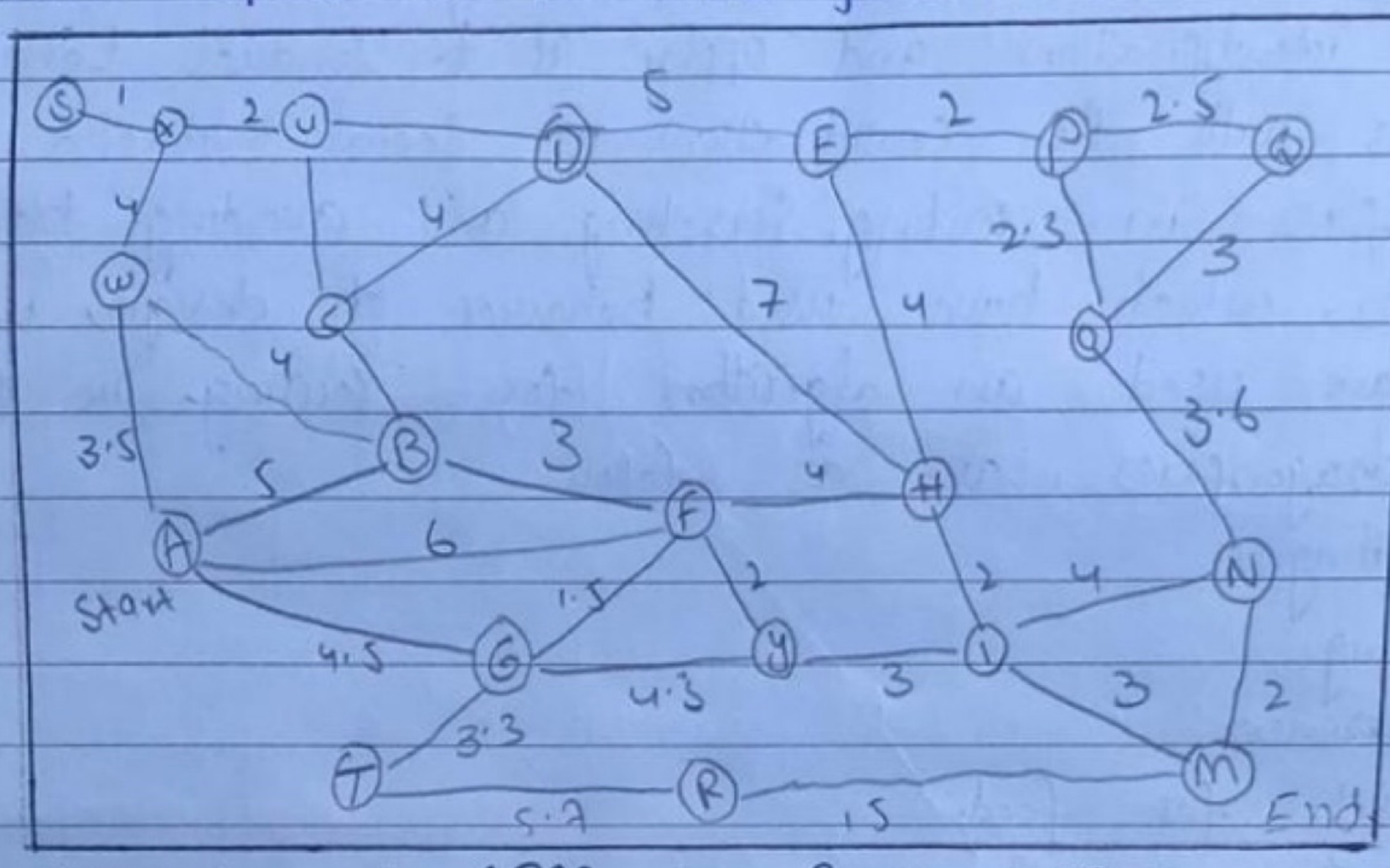


fig 1. Simulation of CPM to find longest route in time. shortest

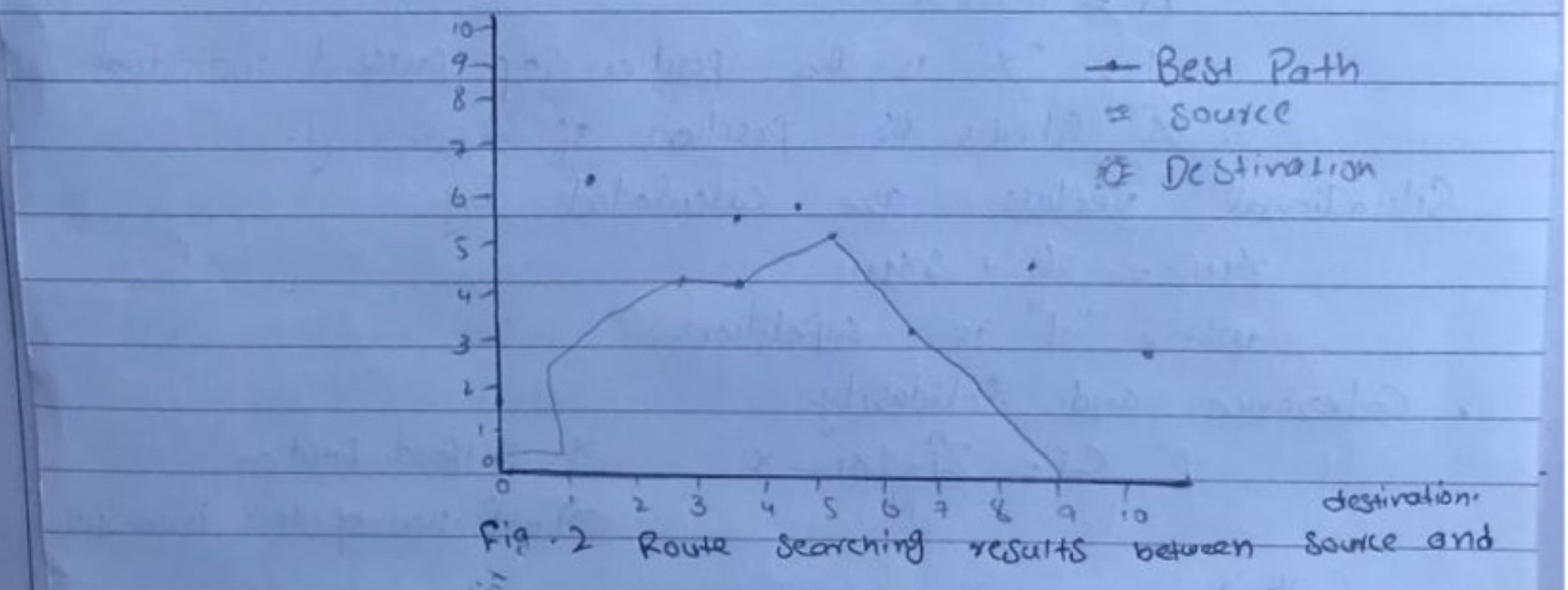


Fig. 2 Route searching results between source and

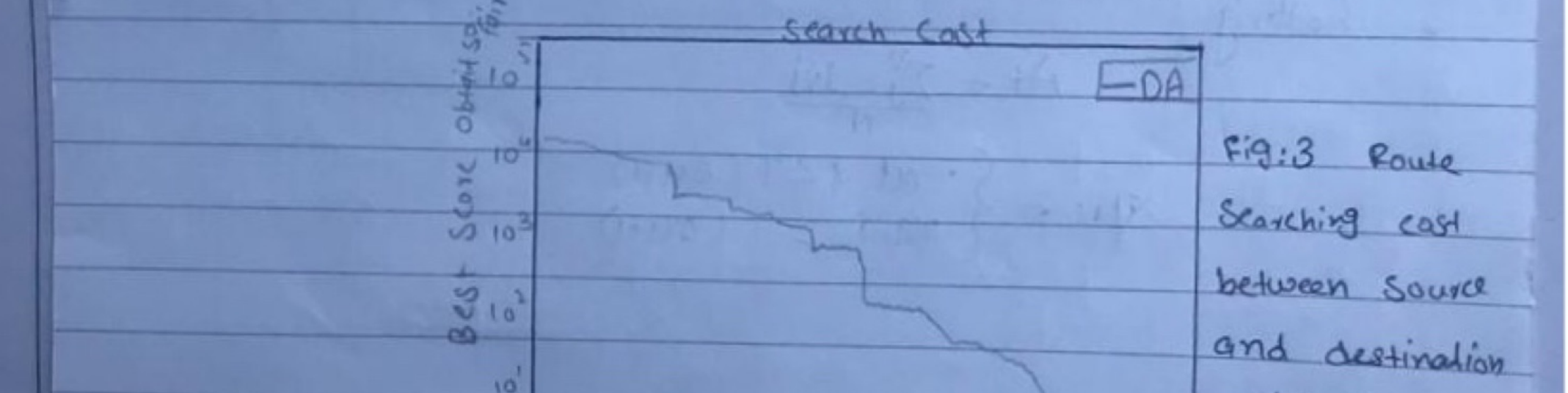


Fig:3 Route Searching cost between source and destination using DA algorithm