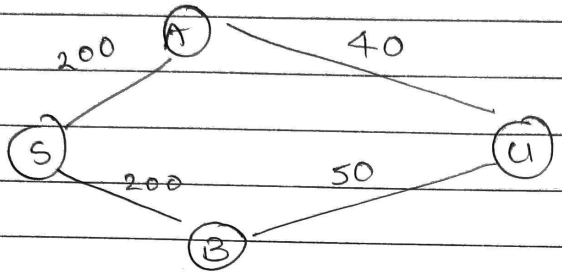
118A1077
BE·CE·D
AISC

(Q2) b)

Given path:



i) Solving using the first heuristic:

Node	Heuristic
S	0
A	50
B	20
G	0

$X^{A,B}$ = A w/o heuristic.

closed	Open (Priority Queue)
	$S_{0,0}$
$S_{0,0}$	$A_{200,250}$ $B_{200,200}$
$B_{200,220}$	$A_{200,250}$ $G_{250,250}$
$G_{250,250}$	—

(Q2, b)

Path that we got: S – B – G cost = 250.

Shortest path: S–A–G, cost = 240. (This we did not get using first heuristic).

ii) Solving using second heuristic.

Node	Heuristic
S	0
A	30
B	20
G	0

Closed	Open (Priority Queue)		
	$S_{0,0}$		
$S_{0,0}$	$A_{200,230}$	$B_{200,250}$	
$B_{200,220}$	$A_{200,230}$	$G_{250,250}$	
$A_{200,230}$	$G_{250,250}$ (B)	$G_{240,240}$ (A)	
$G_{240,240}$			

(Q2, b)

Path that we got : S - A - G, cost = 240.

Shortest Path : S - A - G, cost = 240.

iii) Why :

a) Second heuristic gives us the correct answer (global minimal) because the second heuristic approximates lower than the actual answer.

b) i.e It underestimates the answer.

c) This is due to the property that, it is guranteed that A* will find the optimal path to the goal (if one exists) if and only if it ~~un~~de the heuristic function is chosen such that it underestimates the actual cost.