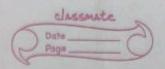
ASSIGNMENT-1



PARTAR + Conceptual ountions

Sofrey Admissible Heuristic) A hurristic function h(m)

So admissible if for every mode

n, 0 \le h(m) \le h*(m) where h*(n) is the town

copt of the least-coat path from n to a goal.

I am admissible huristic over overestimates the true

remaining copt.

Ex:- for a gold world (4 neighbour mover, unit cost):

Manhatton distance: homon ($^{v}_{i}c$) = $|^{v}$ - $^{v}_{goal}|+|^{c}$ - $^{c}_{goal}|$ This equals the exact minimum number of asthegonal mover required on an unobstructed gold, so it never our estimates when move cost = 1.

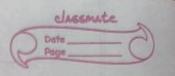
Ex (Non-admissible) for a grid-world:

hnon (8,C) = 1.5 x Momhattom (8,C). Multiplying by
1.5 con cause the huristic to exceed the
actual remaining cost or some nooles, i.e it con
everestimates — not admissible.

Solutions a Definition (consistent) monotone):

A hursintic h jp compietent if for every

edge from node m to succepted n' with cont(n, or'): $h(n) \leq c(n, n') + h(n')$ and dypically h(goal) = 0.



Relation to triongle frequality:

This conclition is equivalent to a triongle—

inequality—like property:—The entimated cost

from m to the goal is me greater than the

cost of stepping to a neighbor m' plus the

extimated cost from that neighbor to the

goal. It enforces that pollowing on edge cannot

make the estimated remaining cost puddenly drop

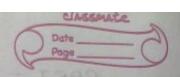
by more than the edge cost—just like how

a trionger inequality bounds distances.

Solutions, YES. Consistency implies admissibility (a consistent huristic must be < true cost to goal), but the converse is not always true. One can design a huristic that never overestimates the true semaining cost (admissible) but violates h(n) < c(n,d) + h(m) for some edge (i.e., there exists a local dip/jump that breaks monotonicity). That local violation muons At may need to se-open noods (in graph-pearch) even though the humistic semains optimistic overall.

Admispibility ensures that f(m) = g(m) + h(m) is a lower bound on the true cost of any pollution path that goes through m. If h can overestimate At might prune or profes a path whose of looks better but actually cannot reach the real optimum -so At can seem a puboptimal goal.

	classmate
	Date
	PART - B (worked Examplys (Pater/Pencil) Page
	Criven grouph:
The little	Criven graph: $A = -2 - > B = -2 - > c(goal)$
	H6>C
PART	costs shown on edges. h(e) = 0 always.
- 610	
Solnia	To phow with $h(A) = 3$, $h(B) = 1$, $h(C) = 0$, $A*$ finds the optimal path.
	the optimal path.
	for 21 < = (3) for equipment (3) (3)
	Start: only A in OPEN with g(A) = 0
	start: only A in OPEN with $g(A) = 0$ * $f(A) = g(A) + h(A) = 0 + 3 = 3$. Pop A (exported)
te	Demonstrate (a) (F=1)) (2=13 a) a (4en Mara)
7 2	Expanding A:
P. ASS	* Successor B: $g(B) = g(A) + cost(AB) = 0 + 2 = 2$.
100	f(B) = g(B) + h(B) = 2+1 = 3.
350	stor deroite yearing with betterlag to making to
5010	
	* Succeppor c (direct): $g(c) = g(A) + cool (A, c)$ = 0+5 = 5. $f(c) = 5+0=5$.
	OPEN now: B(+=3), c(+=5). pop the proallest
	f: 8 (f=3).
- plane	and the Condition of th
	Expand 8:
	* Successor C: tentative g = g(B) + cost (B,C)
	* Successor C: tentative $g = g(B) + cont(B,C)$ = $2+2=4$. $f(C) = 4+0=4$. This improves
	C (from g=5 to g=4).
	C (from g=5 to g=4). OPEN now: C(f=4). Pop (which is goal. Path recovered: A + B + C with total coat 4 - optimal (since 4<5).
	A + B + C with total cost 4 - optimal (since 465)
	AR puccepped.
THE PERSON	



Solutione, with h(A) = 5, h(B) = 5, h(C) = 0,

to phow ptep-by-step that At fails to find
the optional path.

Start:

* + (A) = 0+5=5. Pop A

Exported A:

· To B: 9(B)=2 + + (B)=2+5=7

· To C: g(c)=5-) +(c)=5+0=5.A

OPEN now: C(f=5), R(f=7), Pop the promallest f:C(the goal!) and veteron $A \to C$ with cost s.

But the true optional path is $A \to B \to C$ with C opt G.

But the Browne hoverestimated and braved G and braved G path to the pelected the publishmal alived path to the goal and terminated G po G failed the clue to non-admissible hunistic.

Solution 37 Consistency tests (Domn graph):

We check $h(n) \leq c(n, n') + h(n')$ for each edge

Capel \neq h(A) = 3 h(B) = 1 h(C) = 0 $+ A \rightarrow B$: $3 \le 2 + 1 = 3$

* A+C: 3 = 5 +0 = 5 V

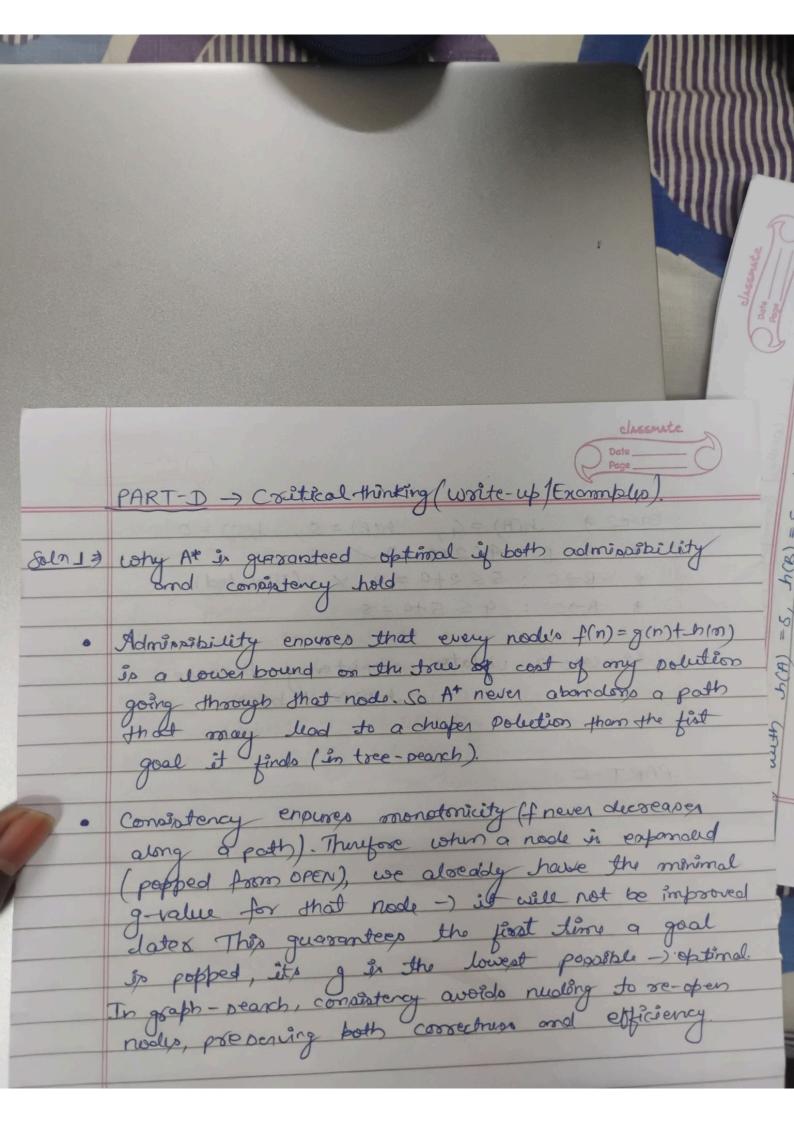
All Batisfied - Consistent

case2) h(A) = 4, h(B) = 5, h(C) = 0 + A) 8: 4 < 2+5 = 7 / + B) 0: 5 < 2+0 = 2 × (Wolated)

* AJC: 955+0=5

so case 2 violates consistency because h(B)>2+h(C).

PART-C



PRAGATI-

_											
E	1						,		4	-	
51	9	8	7	6	5	4	3	2	1	9	-
1	10	#	#	#	#	#	#	世	2	#	-
	11	#	#	20	#	#	#	#	3	#	-
	12	#	#	9	8	7-	PR#	#	4	#	-
	13	+	4	10	#	8	#	#	5	#	-
	114	#	#	11	+	9	#	#	6	#	-
	15	#	+	12	#	10	9	8	7,	#	1-
	198	1	1	13	#	Xe	#	#	A.	#	1-
	13	16	15	14	P	14	#	1#	1#	#	1-
	-										

we have two paths S, M, G and S, P, Q, R, X,

Y, Z we make givet on adminishle

ib In path SMG Heymptic all time is 16

now we made non-adminishle = 3×16 748

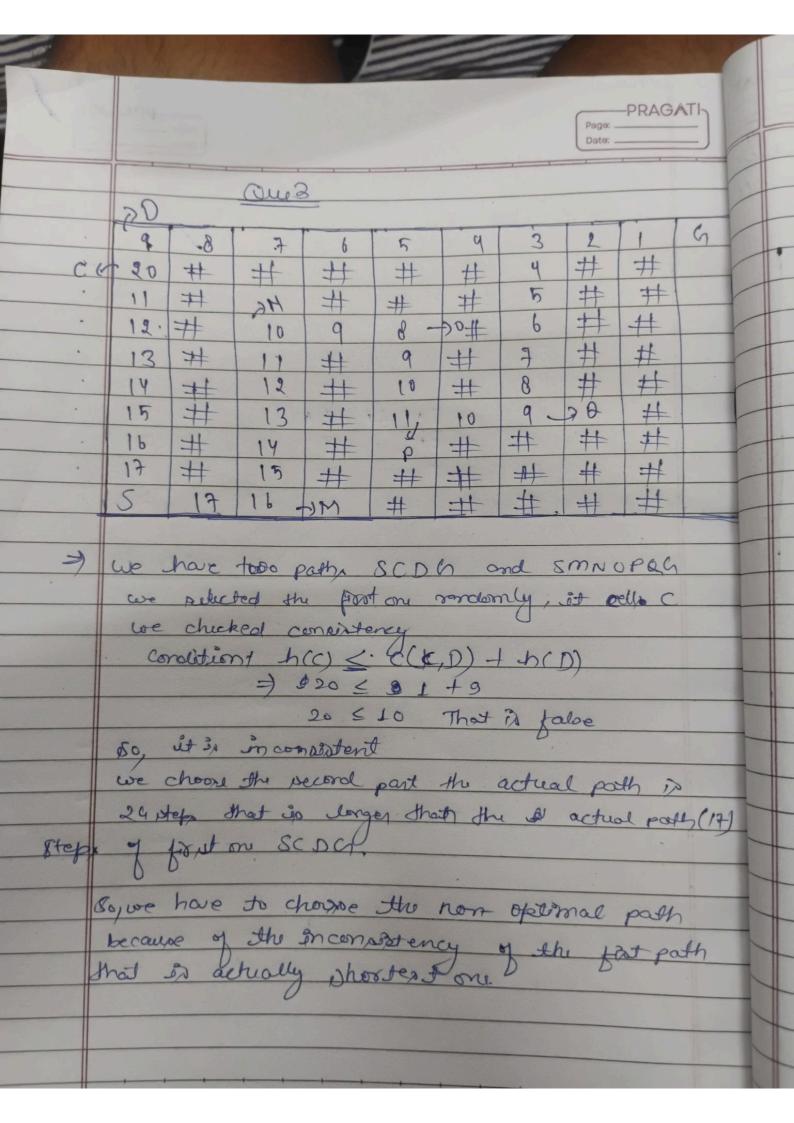
Bo, Here we relied the second path SPQRXY2

whose actual step is 22 that is larger the actual

olistence of the first one SMG (16) steps.

Here we have to relied Non-obstimal path because

of non-adminishle of the S,M,G



Que 4

	-++	7	+	- V							
	1	1#	1 #	1 #	1#	#	3	2	1	Cn	_
	111	1#	1#	##	1#	1	14	+	#	#	1
	1	1#	#	#	#	#	5	#	#	#	
-	#	#	#	#	#	#	6 -	DR.	#	#	
	1#	1#	#	#	#	#	4.	20	#	#	
	1#	1#	AA	1 94	#0	#	8 -	50	#	#	
	#	#	13	12	19	10	9	#	#	#	
`	1#	#	14	#	#1	#	#	#	#	1	
*	+	#	15	#	#	#	#	+121	++	+	T
	S	17	16	#	#	# 1	#	410	1	+	H
	r.date-tal					1 3 4	1	+1			-

Here h(Q) = 4 and actual path is 7 h(Q) = 7 $h(Q) \leq h(Q^*)$ that is admissible now few compostercy $h(Q) \leq C(Q,K) + h(R)$

(17

4 \le 7 that is galor or worm it is Inconsistent.

So, the Here we got the one path that is admirable but Incompitent.

