Homework #2

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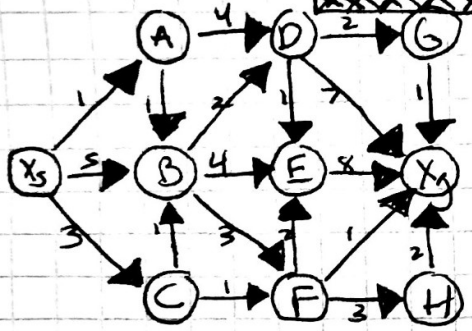
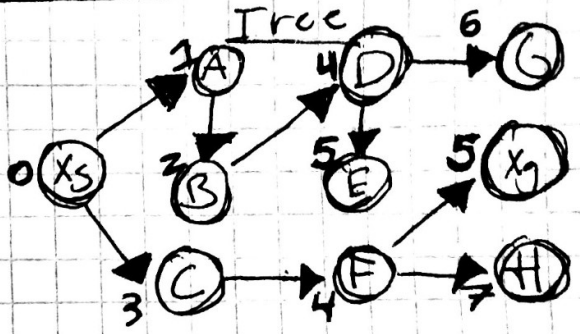
CSE 180

1)

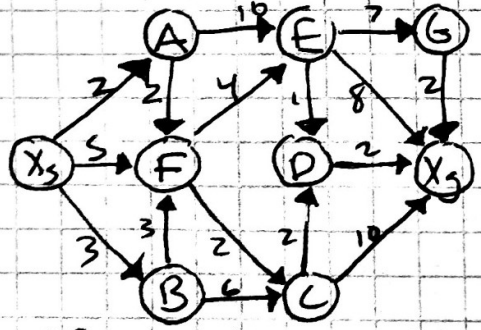


Tree



	Step	Open	Xs	A	B	C	D	E	F	G	H	Xg
expand Xs	0	Xs/0	N/0	N/∞	N/∞	N/∞	N/∞	N/∞	N/∞	N/∞	N/∞	N/∞
expand A	1	A/1, C/3, B/5	N/0	Xs/1	Xs/5	Xs/3	N/∞	N/∞	N/∞	N/∞	N/∞	N/∞
expand B	2	B/2, C/3, D/5	N/0	Xs/1	A/2	Xs/3	A/5	N/∞	N/∞	N/∞	N/∞	N/∞
expand C	3	C/3, D/4, F/5, E/6	N/0	Xs/1	A/2	Xs/3	B/4	B/6	B/5	N/∞	N/∞	N/∞
expand D (alPhabet)	4	D/4, F/4, E/6	N/0	Xs/1	A/2	Xs/3	B/4	B/6	C/4	N/∞	N/∞	N/∞
expand F	5	F/4, E/5, G/6 Xg/12	N/0	Xs/1	A/2	Xs/3	B/4	D/5	C/4	D/6	N/∞	D/12
expand E	6	E/5, Xg/5 G/6, H/7	N/0	Xs/1	A/2	Xs/3	B/4	D/5	C/4	D/6	F/7	F/5
expand Xg, done	7	Xg/5, G/6, H/7	N/0	Xs/1	A/2	Xs/3	B/4	D/5	C/4	D/6	F/7	F/5

2)



Heuristics:

Vertex	Xs	A	B	C	D	E	F	G	Xg
h	7	7	7	3	1	2	4	1	0

	Step	Open	Xs	A	B	C	D	E	F	G	Xg
expand Xs	0	Xs	N/0/7	N/∞/∞	N/∞/∞	N/∞/∞	N/∞/∞	N/∞/∞	N/∞/∞	N/∞/∞	N/∞/∞
expand A	1	A/9, F/5, B/10	N/0/7	Xs/2/9	Xs/3/10	N/∞/∞	N/∞/∞	N/0/∞	Xs/5/9	N/∞/∞	N/∞/∞
expand F	2	F/6, B/10, E/14	N/0/7	Xs/2/9	Xs/3/10	N/∞/∞	N/∞/∞	F/12/14	A/4/8	N/∞/∞	N/∞/∞

2) cont

	Step	Open	X_s	A	B	C	D	E	F	G	X_g
expand C	3	C/9, B/10, E/10	N/0/7	X_s/2/9	X_s/3/10	F/6/9	N/∞/8	F/8/10	A/4/8	N/∞/∞	N/∞/∞
expand D	4	D/9, B/10, E/10 X_g/16	N/0/7	X_s/2/9	X_s/3/10	F/6/9	C/8/9	F/8/10	A/4/8	N/∞/∞	C/16/16
expand X_g	5	X_g/10, B/10/E/10	N/0/7	X_s/2/9	X_s/3/10	F/6/9	C/8/9	F/8/10	A/4/8	N/∞/∞	D/10/10

3)

8	7	6	5	4	3	2	1	2	3
7	6	5	4	3	2	1	X_g=0	1	2
8	7	6	5	4	3	2	1	2	3
		7	6	5			2	3	4
10	9	8	7	6	5	4	3	4	5
11	10	9	8			5	4	5	6
12						6	5	6	7
13						7	6	7	8
14	13	12	11	10	9	8			9
15	14	13	12	11	10	9	10	11	10

4) 1) • the given values do not define a valid navigation function because, on the left side, there is a local minimum that does not equal the global minimum.

• for a navigation function to be valid, there can only be one local minimum, so that all ~~values~~ starting points converge to that minimum.

• This is not the case for the given function, see how to fix it on the next page.

4) cont.

2)

	1	2						
1	6	5	4	3	2	1	2	3
2	7	6		2	1	0		
3	8	7		3	2	1	2	3
4	9	8			3	2	3	4
5	10	7⇒9		5	4	3	4	5
6	9⇒11	8⇒10		6	5	4	5	6
	10	9	8	7	6	5		7
	15	10	9	8	7	6	9	8

3 modifications required:

Matrix[1,6] ⇒ 11

Matrix[2,5] ⇒ 9

Matrix[2,6] ⇒ 10