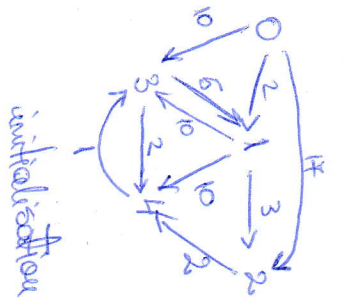


Lab 3 - Lowest cost walk between two vertices using a matrix (exercise 3).



$$S=0, t=3$$

$$E=10$$

$$V=5$$

(nr. of edges)

(nr. of vertices)

(for each iteration, we will specify the line corresponding to vertex edge)

					vertex edges																							
changed	edge	prev	last	d	0	1	2	3	4	5	6	7	8	9														
		<table><tr><td>-1</td><td>-1</td><td>-1</td><td>-1</td><td>-1</td></tr></table>	-1	-1	-1	-1	-1	<table><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>	0	0	0	0	0	0	0	0	0	0	0	1	2	3	4	5	6	7	8	9
-1	-1	-1	-1	-1																								
0	0	0	0	0	0	0	0	0	0																			
					0	0	0	0	0	0	0	0	0	0														
					1	∞	∞	∞	∞	∞	∞	∞	∞	∞														
					2	∞	∞	∞	∞	∞	∞	∞	∞	∞														
					3	∞	∞	∞	∞	∞	∞	∞	∞	∞														
					4	∞	∞	∞	∞	∞	∞	∞	∞	∞														
iteration 1	True																											
	(0,1)	<table><tr><td>-1</td><td>0</td><td>-1</td><td>-1</td><td>-1</td></tr></table>	-1	0	-1	-1	-1	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>	0	1	0	0	0	0	0	0	0	0	d[1]	∞	2	2	2	2	2	2	2	2
-1	0	-1	-1	-1																								
0	1	0	0	0	0	0	0	0	0																			
	(0,2)	<table><tr><td>-1</td><td>0</td><td>0</td><td>-1</td><td>-1</td></tr></table>	-1	0	0	-1	-1	<table><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>	0	1	1	0	0	0	0	0	0	0	d[2]	∞	17	17	17	17	17	17	17	17
-1	0	0	-1	-1																								
0	1	1	0	0	0	0	0	0	0																			
	(0,3)	<table><tr><td>-1</td><td>0</td><td>0</td><td>0</td><td>-1</td></tr></table>	-1	0	0	0	-1	<table><tr><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>	0	1	1	1	0	0	0	0	0	0	d[3]	∞	10	10	10	10	10	10	10	10
-1	0	0	0	-1																								
0	1	1	1	0	0	0	0	0	0																			
	(1,2)	<table><tr><td>-1</td><td>0</td><td>1</td><td>0</td><td>-1</td></tr></table>	-1	0	1	0	-1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>	0	1	2	1	0	0	0	0	0	0	d[2]	∞	17	5	5	5	5	5	5	5
-1	0	1	0	-1																								
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	(1,4)	<table><tr><td>-1</td><td>0</td><td>1</td><td>0</td><td>1</td></tr></table>	-1	0	1	0	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td><td>2</td></tr></table>	0	1	2	1	1	2	1	2	1	2	d[4]	∞	∞	12	12	12	12	12	12	12
-1	0	1	0	1																								
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	(2,4)	<table><tr><td>-1</td><td>0</td><td>1</td><td>0</td><td>2</td></tr></table>	-1	0	1	0	2	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[4]	∞	∞	12	7	7	7	7	7	7
-1	0	1	0	2																								
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	(3,1)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table>	-1	0	1	1	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
-1	0	1	1	1																								
0	1	2	1	1	3	1	3	1	3																			
	(3,4)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>2</td></tr></table>	-1	0	1	1	2	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
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	(4,3)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>2</td></tr></table>	-1	0	1	1	2	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
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iteration 2	False																											
	(0,1)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table>	-1	0	1	1	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
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	(0,2)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table>	-1	0	1	1	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
-1	0	1	1	1																								
0	1	2	1	1	3	1	3	1	3																			
	(0,3)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table>	-1	0	1	1	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
-1	0	1	1	1																								
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	(0,4)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table>	-1	0	1	1	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
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	(1,3)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table>	-1	0	1	1	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
-1	0	1	1	1																								
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	(1,4)	<table><tr><td>-1</td><td>0</td><td>1</td><td>1</td><td>1</td></tr></table>	-1	0	1	1	1	<table><tr><td>0</td><td>1</td><td>2</td><td>1</td><td>1</td><td>3</td><td>1</td><td>3</td><td>1</td><td>3</td></tr></table>	0	1	2	1	1	3	1	3	1	3	d[3]	∞	10	10	8	8	8	8	8	8
-1	0	1	1	1																								
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-1	0	1	1	1																								
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-1	0	1	1	1																								
0	1	2	1	1	3	1	3	1	3																			

Final matrix:

	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	∞	2	2	2	2	2	2	2	2	2	2
2	∞	14	5	5	5	5	5	5	5	5	5
3	∞	10	10	10	8	8	8	8	8	8	8
4	∞	∞	12	7	7	7	7	7	7	7	7

Lowest cost from $s=0$ to $t=3$: $d[3][10]=8$

Lowest cost walk from $s=0$ to $t=3$: $0 \xrightarrow{2} 1 \xrightarrow{3} 2 \xrightarrow{2} 4 \xrightarrow{1} 3$
 $\parallel \quad \parallel \quad \parallel \quad \parallel$
 $prev[1] \quad prev[2] \quad prev[4] \quad prev[3]$