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Course Assignment

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By submitting this work, I verify that it is my own. That is, I have written my own solutions to each problem for which I am submitting an answer. I have listed above all others with whom I have discussed these answers.

Problem 1

(a) The problem states that we should find x that solves the following equation

$$2x^2 + 4x - 6 = 0 \,. \tag{1}$$

    (i) We take the standard algorithm for solving equations of the form $ax^2 + bx + c$ and apply it to Equation **??**. This gives us

$$x = \frac{2}{2 \cdot 2} \pm \sqrt{\left(\frac{2}{2 \cdot 2}\right)^2 + \frac{6}{2}} \tag{2}$$

$$= 1 \pm 2 \tag{3}$$

    So the solutions are $x = 3$ and $x = -1$.

(b) Example of how to add figure (can be used for jpeg, png, pdf, eps etc) In Figure 1, we can see an example of how people in our class must feel.

Figure 1: Example figure

Problem 2

Example of simple, centered table:

BV	z	x_1	x_2	x_3	x_4	x_5
y_1	1	0	0	$-\frac{2}{5}$	$-\frac{1}{5}$	0
y_2	0	0	1	$-\frac{1}{5}$	$\frac{2}{5}$	0

Here is how you make vectors and matrices:

$$\mathbf{x} = \begin{bmatrix} 1 & 2 & 3 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}^\top \tag{4}$$

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}^{-1} \tag{5}$$

Since I use the formula $\mathbf{x}$ often, I have created a macro for it in the header of this document such that I can use $\mathbf{x}$ for shorthand.

Here is a formulation of a linear program:

$$\min_x \quad c^\top x \tag{6}$$

$$\text{s.t.} \quad Ax \leq b \tag{7}$$

$$-1 \leq x_n \leq 1, \quad n = 1, \ldots, N \tag{8}$$

number	sample strings	accepted	weight
1	educational is this not		
2	is this assignment educational		
3	not educational is not educational		
4	this assignment is not educational		
5	is this assignment educational		
6	this assignment course is educational		
7	is this assignment not educational		
8	this assignment not		
9	this course assignment is not educational		
10	this course is not not educational		
11	not educational is this		
12	course assignment is not educational		
13	not this assignment is educational		
14	not not not educational		
14	is this course assignment not educational		
15	course assignment is this		
16	this course is interesting		
17	this course assignment not educational		

Table 1: Some strings from $\mathcal{Y}_{\geq 2, \leq 6}$

iteration: n = 0, weight matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 0, backtracking matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 1, weight matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 1, backtracking matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 2, weight matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 2, backtracking matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 3, weight matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 3, backtracking matrix

	a this	b assign-ment	c course	d is	e not	f edu-cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

Figure 2: Floyd-Warshall algorithm, iteration 0 to 3; left column matrix should contain weights after iteration n; right column matrix should be iteratively filled for backtracking each path

iteration: n = 4, weight matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 4, backtracking matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 5, weight matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 5, backtracking matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 6, weight matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 6, backtracking matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 7, weight matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

iteration: n = 7, backtracking matrix

	a this	b assign- ment	c course	d is	e not	f edu- cational
a this						
b assignment						
c course						
d is						
e not						
f educational						

Figure 3: Floyd-Warshall algorithm, iteration 4 to 7; left column matrix should contain weights after iteration n; right column matrix should be iteratively filled for backtracking each path