

ICS 2020 Problem Sheet #1:

Problem 1.1:

-I first sorted all the edges in increasing order of their cost:

$$c((a,f))=1$$

$$c((b,c))= 2$$

$$c((d,e))=3$$

$$c((d,f))=4$$

$$c((e,f))=5$$

$$c((c,f))=5$$

$$c((a,e))=5$$

$$c((b,f))=6$$

$$c((c,d))=6$$

$$c((a,b))=7$$

-Then I will be adding each edge if both of the nodes it connects are from different equivalence classes (in increasing order of their cost):

$$E' = \{ \} \quad \text{start, } C=0$$

$$A = \{\{a\}, \{b\}, \{c\}, \{d\}, \{e\}, \{f\}\}$$

$$E' = \{(a,f)\} \quad \text{Step 1, } C=1$$

$$A = \{\{a,f\}, \{b\}, \{c\}, \{d\}, \{e\}\}$$

$$E' = \{(a,f), (b,c)\} \quad \text{Step 2, } C=3$$

$$A = \{\{a,f\}, \{b,c\}, \{d\}, \{e\}\}$$

$$E' = \{(a,f), (b,c), (d,e)\} \quad \text{Step 3, } C=6$$

$$A = \{\{a,f\}, \{b,c\}, \{d,e\}\}$$

$$E' = \{(a,f), (b,c), (d,e), (d,f)\} \quad \text{Step 4, } C=10$$

$$A = \{\{a,f,d,e\}, \{b,c\}\}$$

$$E' = \{(a,f), (b,c), (d,e), (d,f), (c,f)\} \quad \text{Step 5, } C=15$$

$$A = \{\{a,b,c,d,e,f\}\}$$

-Conclusion:

$$G' = (V, E')$$

$$V = \{a, b, c, d, e, f\}$$

$$E' = \{(a, f), (b, c), (d, e), (d, f), (c, f)\}$$

Problem 1.2:

a) The naive string algorithm:

F	F	L	F	L	F	R	F	R	F	F	L	F	R	F
F	F	L	F	R										
	F	F	l	f	r									
		F	f	l	f	r								
			F	F	l	f								
				F	f	l	f	r						
					F	F	l	f	r					
						F	f	l	f	r				
							F	F	l	f	r			
								F	f	l	f	r		
									F	F	L	F	R	

Comparaison: 22

Alignments: 10

b) Boyer-Moore string search algorithm:

[illegible]

Comparaison:14			
----------------	--	--	--

Alignments: 4

c)

	F	F	L	F	R
	0	1	2	3	4
L	0	1	2	-	0
R	0	1	2	3	-
F	-	-	0	-	0
P	0	1	2	3	4

Problem 1.3:

a) If we have more than one non associative operator in a line the program won't know from where to start. (left or right)

for example:

$$2 = 2 * 1 = 4 / 2$$

b) The \$ operator has a precedence of 0 and right Associativity

prefix: (^) 2 \$ (*) 5 \$ (+) 2 3

infix: $2^{(5*(2+3))}$