Intro to Computer Science
Sheet#01

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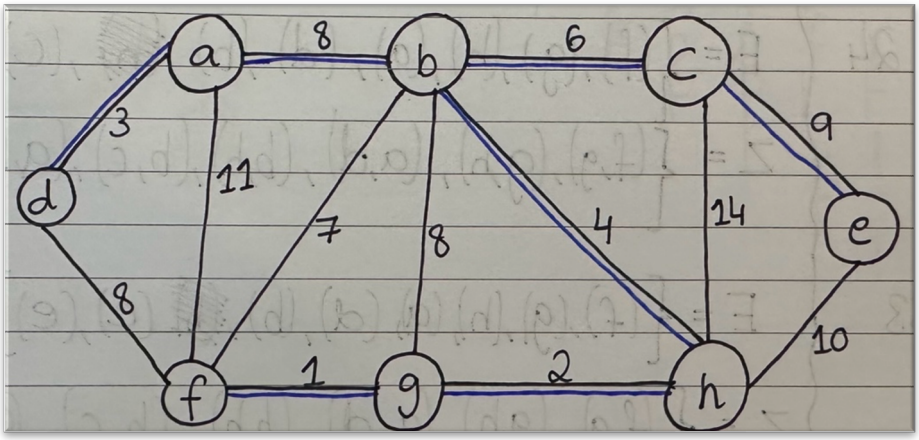
Problem 1.1:



a) V = {a, b, c, d, e, f, g, h}
A = {(a, b), (a, d), (a, f), (b, f), (b, g), (b, h), (b, c), (c, h), (c, e), (e, h), (h, g), (g, f), (f, d)}

G= {V, A}

b) Step 0:
C = 0
Z = {(a), (b), (c), (d), (e), (f), (g), (h)}
E = {}

Step 1:
C = 1
Z = {(a), (b), (c), (d), (e), (f, g), (h)}
E = {(f, g)}

Step 2:
C = 3
Z = {(a), (b), (c), (d), (e), (f, g, h)}
E = {(f, g), (g, h)}

Step 3:
C = 6
Z = {(b), (c), (a, d), (e), (f, g, h)}
E = {(f, g), (g, h), (a, d)}

Step 4:

C = 10
Z = {(c), (a, d), (e), (b, f, g, h)}
E = {(f, g), (g, h), (a, d), (b, h)}

Step 5:

C = 16
Z = {(a, d), (e), (b, c, f, g, h)}
E = {(f, g), (g, h), (a, d), (b, h), (b, c)}

Step 6:

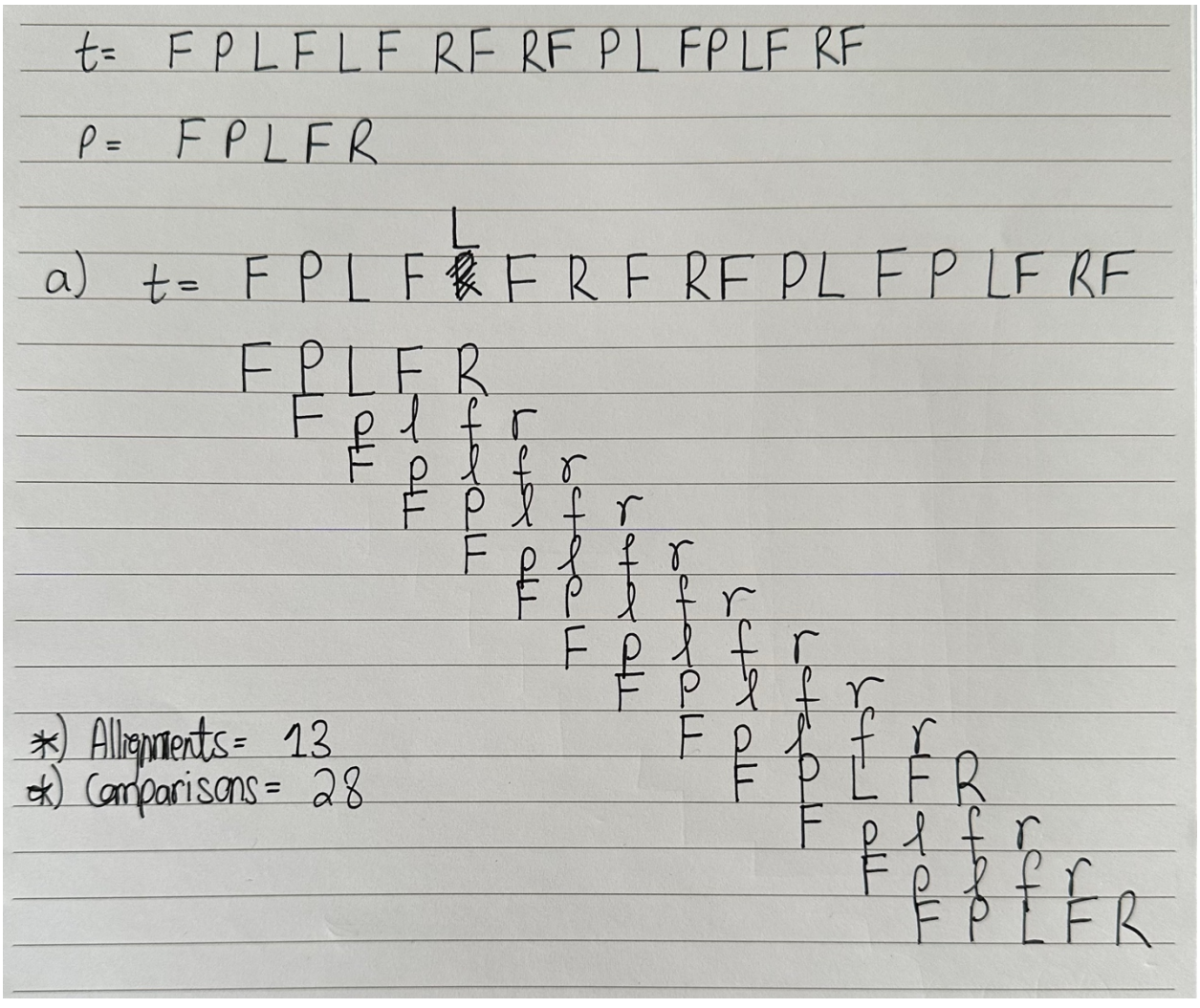
C = 24
Z = {(e), (a, b, c, d, f, g, h)}
E = {(f, g), (g, h), (a, d), (b, h), (b, c), (a, b)}

Step 7:

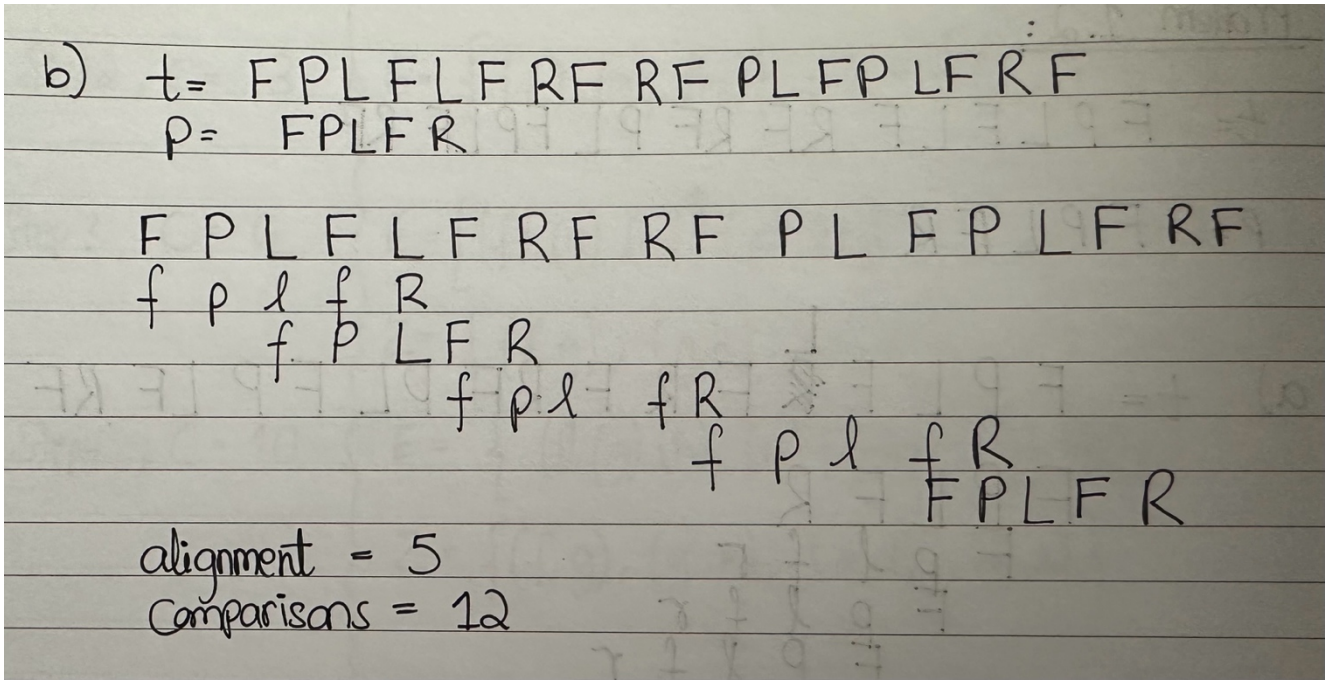
C = 33
Z = {(a, b, c, d, e, f, g, h)}
E = {(f, g), (g, h), (a, d), (b, h), (b, c), (a, b), (c, e)}

Problem 1.2:

a)



b)



c)

c)

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

Problem 1.3:

a) Non-associative operators in Haskell without additional parenthesis to give an order of precedence will result in an incorrect calculation being computed. This can be visualised with the use of the ‘^’ exponent operator. If a calculation were to be coded without parenthesis like the following:

3 ^ 2 ^ 3

Will produce the following answer: 6561.

However, the correct answer would be: 729 which is computed with the following format: (3^2)^3

Hence, the use of parenthesis is important for establishing precedence in Haskell for non-associative operators.

b) The $ operator in Haskell tells the compiler to compute the arithmetic operations on the right side of the $ sign giving it precedence. Hence, meaning that this operator is right-associative. This (^) 2 $ (*) 4 $ (+) 13 operation can be writing in infix notation as the following:

(2 ^ (4 * (1 + 3)))