COMP 3007 – Assignment 4 (Q2)

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BASE CASE:

(mylength [ ]) - (mylength (filterPQ [ ])) = (countIf[])	
(mylength [ ]) - (mylength (filterPQ [ ])) = 0	[C1]
0 - (mylength (filterPQ [ ])) = 0	[L1]
0 - (mylength []) = 0	[F1]
0 - 0 = 0	[L1]
0 = 0	[Math]

INDUCTIVE ASSUMPTION:

(mylength t) - (mylength (filterPQ t)) = countIf t	[IA]

INDUCTIVE CASE:

(mylength (h:t) - (mylength (filterPQ (h:t)) = (countIf (h:t))

CASE 1: h < 80 (ord h < 80)

(mylength (h:t)) - (mylength (filterPQ (h:t))) = (countIf (h:t))	
(mylength (h:t)) - (mylength (h : (filterPQ t))) = (countIf (h:t))	[B1/F2A]
(mylength (h:t)) - (1 + (mylength (filterPQ t))) = (countIf (h:t))	[L2]
1 + (mylength t) - (1 + (mylength (filterPQ t))) = (countIf (h:t))	[L2]
0 + (mylength t) - (mylength (filterPQ t)) = (countIf (h:t))	[Math]
(mylength t) - (mylength (filterPQ t)) = countIf t	[C2C]

CASE 2: h > 81 (ord h > 81)

(mylength (h:t)) - (mylength (filterPQ (h:t))) = (countIf (h:t))	
(mylength (h:t)) - (mylength (h : (filterPQ t))) = (countIf (h:t))	[A1/F2B]
(mylength (h:t)) - (1 + (mylength (filterPQ t))) = (countIf (h:t))	[L2]
1 + (mylength t) - (1 + (mylength (filterPQ t))) = (countIf (h:t))	[L2]
0 + (mylength t) - (mylength (filterPQ t)) = (countIf (h:t))	[Math]
(mylength t) - (mylength (filterPQ t)) = countIf t	[C2C]

CASE 3: h == "P" (ord h == 80)

(mylength (h:t)) - (mylength (filterPQ (h:t))) = (countIf (h:t))	
(mylength (h:t)) - (mylength (filterPQ t)) = (countIf (h:t))	[F2C]
1 + (mylength t) - (mylength (filterPQ t)) = (countIf (h:t))	[L2]
1 + (mylength t) - (mylength (filterPQ t)) = 1 + (countIf t)	[C2A]
(mylength t) - (mylength (filterPQ t)) = countIf t	[Math]

CASE 4: h == "Q" (ord h == 81)

(mylength (h:t)) - (mylength (filterPQ (h:t))) = (countIf (h:t))	
(mylength (h:t)) - (mylength (filterPQ t)) = (countIf (h:t))	[F2C]
1 + (mylength t) - (mylength (filterPQ t)) = (countIf (h:t))	[L2]
1 + (mylength t) - (mylength (filterPQ t)) = 1 + (countIf t)	[C2B]
(mylength t) - (mylength (filterPQ t)) = countIf t	[Math]