data __/__/__

5-3471-9454

10 — 60s
x — 1s

1 — 1
x — 60s

3.5:1

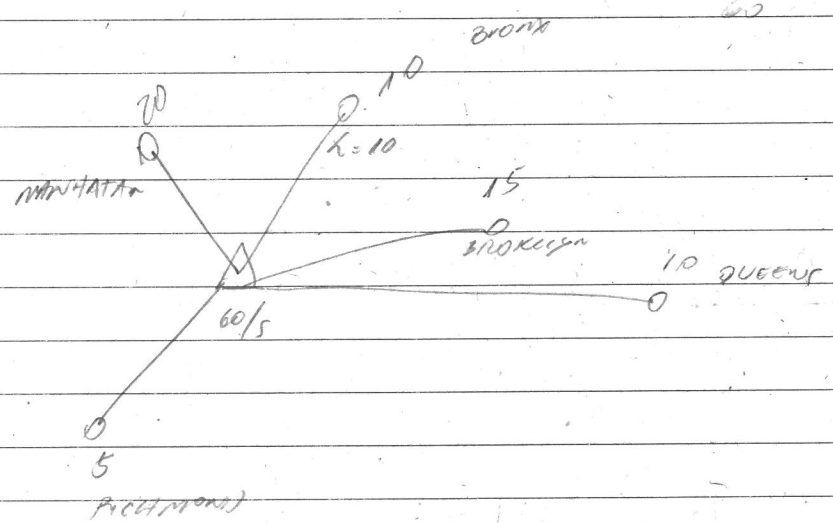
5)

$$T_{min} = \frac{\left(\sum_i \sqrt{\frac{\lambda_i}{\mu_i}}\right)^2}{\gamma C(1-\rho)}$$

terminal tipo w =
1 mins/min = ?
60 ms/seg

C = 2000 bps
λ_i = messag/sec
$\frac{1}{\mu}$ = bits/mensa
$\frac{1}{\mu}$ = 1000 bits ⇒ μ =
μ =

Bairro	N°	t_{min}	λ
Bronx	10	10 min	0,166 /s
Brooklyn	15	15	0,25 /s
Manhatan	20	20/s	0,333 /s
Queens	10	10/s	0,166 /s
Richmond	5	5/s	0,0833 /s
	60		0,9995
			1



$\gamma = \lambda_1 + \lambda_2 \ldots \lambda_5 = 1$ m/s

$0{,}9 \times 10^{-7}$

$$\rho C = \sum \frac{\lambda_i}{\mu_i} \Rightarrow \rho C = \underset{166}{\frac{0{,}166}{\frac{1}{1000}}} + \underset{250}{\frac{0{,}25}{\frac{1}{1000}}} + \underset{333}{\frac{0{,}333}{\frac{1}{1000}}} + \underset{166}{\frac{0{,}166}{\frac{1}{1000}}} + \underset{833}{\frac{0{,}0833}{\frac{1}{1000}}} =$$

$$\rho C = 60000 \Rightarrow \rho = \frac{998{,}3}{2000} = 0{,}5$$

31,59 998.29

68/954

$$T_{min} = \frac{\left(\sqrt{166} + \sqrt{250} + \sqrt{333} + \sqrt{166} + \sqrt{83,3}\right)^2}{1 \cdot 2000 \cdot (1 - 0,5)}$$

$T_{min} = 4,76333$

b) $C = 5000$

$\gamma = \lambda_1 + \lambda_2 + \dots \lambda_5 = 1s$

$\rho C = \sum \frac{\lambda_i}{\mu_i}$, $\rho C = 1000 \Rightarrow \rho = \frac{1000}{5000} = 0,2$

9763,31

$$T_{min} = \frac{\left(\sqrt{166} + \sqrt{250} + \sqrt{333} + \sqrt{166} + \sqrt{83,3}\right)^2}{1 \cdot 5000 (1 - 0,2)}$$

$T_{min} = 1,1908$ segundos

c) $$C_i \Big|_{opt} = \frac{\lambda_i}{\mu_i} + \frac{C(1-\rho)\sqrt{\frac{\lambda_i}{\mu_i}}}{\sum_j \sqrt{\frac{\lambda_j}{\mu_j}}}$$

$C = 2000$

$$C_1 = 166.66 + \frac{2000 \cdot (1 - 0,5) \cdot \sqrt{166,66}}{\left(\sqrt{166} + \sqrt{250} + \sqrt{333} + \sqrt{166} + \sqrt{83,33}\right)}$$

569

3.5.2

data __/__/__

$C_{1opt} = 353,78$ $/pt$

$C_{2opt} = \frac{250 + 2000(1-0,5)\cdot\sqrt{250}}{69}$

$C_{2opt} = 479,15$ $/pt$

$C_{3opt} = \frac{333,3 + 1000(1-0,5)\cdot\sqrt{333,33}}{69}$

$C_{3opt} = 597,91$ $/pt$

$C_{4opt} = C_{1opt} = 353,78$

$C_{5opt} = \frac{83,3 + 2000(1-0,5)\cdot\sqrt{83,33}}{69}$

$C_{5opt} = 215,62$ $/pt$

$C = 215,62 + 353,78 \cdot 2 + 597,91 + 479,15$

$C = 2000,247$ $/pt$

$C = 5000$

$C_1 = \frac{166,66 + 4000(1-0,2)\cdot\sqrt{166,66}}{69}$

$C_{1opt} = 915,04$ $/pt$

$C_{2opt} = 230 + \frac{4000\cdot\sqrt{250}}{69} = 1166,60$ $/pt$

$C_{3opt} = 333,33 + \frac{4000\sqrt{333,33}}{69} = 1391,72$ $/pt$

data __/__/__

$C_{4opt} = C_{1opt} = 915,04$ bps.

$C_{5opt} = 83,3 + \frac{4000\sqrt{83,33}}{69} = 612,39$ bps

d) $C_1 = 353,78 \rightarrow 300$

$C_2 = 479,15 \rightarrow 600$

$C_3 = 597,91 \rightarrow 600$

$C_4 = 353,78 \rightarrow 300$

$C_5 = 215,62 \rightarrow 300$

$T_1 = \frac{1}{\frac{1}{1000} \cdot 300 - 0,166} = 7,46$ s

$T_2 = \frac{1}{\frac{1}{1000} \cdot 600 - 0,250} = 2,85$ s

$T_3 = \frac{1}{\frac{1}{1000} \cdot 600 - 0,33} = 3,745$ s

$T_4 = \frac{1}{\frac{1}{1000} \cdot 300 - 0,1666} = 7,49$ s

$T_5 = \frac{1}{\frac{1}{1000} \cdot 300 - 0,0833} = 4,61$ s

data __/__/__

C = 5000

C1 = 915,04 - 900

C2 = 1166,60 - 1200

C3 = 1391,72 - 1200

C4 = 915,04 - 900

C5 = 612,39 - 600

$T_1 = \frac{1}{\frac{1}{1000} \cdot 900 - 0,166} = 1,365$

$T_2 = \frac{1}{\frac{1}{1000} \cdot 1200 - 975} = 1,051\ s$

$T_3 = \frac{1}{\frac{1}{1000} \cdot 1200 - 0,333} = 1,153\ 45$

$T_4 = \frac{1}{\frac{1}{1000} \cdot 900 - 0,1666} = 1,3635$

$T_5 = \frac{1}{\frac{1}{1000} \cdot 600 - 0,0833} = 1,935\ 4$