

TP547 – Lista filas – Alessandra Domiciano – 939

1. $\lambda = 0,6$ Carros/min

$$t_s = 1 \text{ min}$$

$$\mu = 1 \text{ Min}$$

$$\rho = 0,6$$

a. $E[t_q] = \frac{1}{1 - 0,6} = \mathbf{2,5 \text{ min}}$

b. $E[t_w] = 2,5 - 1 = 1,5 \text{ min}$
 $E[w] = 0,6 * 1,5 = \mathbf{0,9 \text{ carro}}$

2. $\lambda = 40$ Pct/s

$$L = 5000 \text{ bits}$$

$$C = 500000 \text{ bits}$$

$$\mu = \frac{500000}{5000} = 100 \text{ Pct/s}$$

$$\rho = \frac{40}{100} = 0,4$$

a. $E[t_q] = \frac{1}{100 - 40} = \mathbf{0,0167s}$

b. $E[t_s] = \frac{1}{100} = 0,01$
 $E[t_w] = 0,0167 - 0,01 = \mathbf{0,0067s}$

3. $\lambda = 200$ Pct/s

$$L = 128 * 8 = 1024 \text{ bits}$$

$$C = 256000 \text{ bits}$$

$$\mu = \frac{256000}{1024} = 250 \text{ Pct/s}$$

$$\rho = \frac{200}{250} = 0,8$$

a. Buffer = 1

$$N = 1 + 1 = 2$$

$$P_b = 0,8^2 \cdot \frac{1 - 0,8}{1 - 0,8^{2+1}} = \mathbf{0,2623}$$

$$E[q] = \frac{0,8}{1 - 0,8} - \frac{(2+1) \cdot 0,8^{2+1}}{1 - 0,8^{2+1}} = \mathbf{0,8524 \text{ Pct}}$$

$$E[t_q] = \frac{0,8254}{(1 - 0,023) \cdot 200} = \mathbf{0,0057s}$$

b. Buffer = 5

$$N = 5 + 1 = 6$$

$$Pb = 0,8^6 \cdot \frac{1 - 0,8}{1 - 0,8^{6+1}} = \mathbf{0,0663}$$

$$E[q] = \frac{0,8}{1 - 0,8} - \frac{(6+1) \cdot 0,8^{6+1}}{1 - 0,8^{6+1}} = \mathbf{2,142 \text{ Pct}}$$

$$E[t_q] = \frac{2,142}{(1-0,067) \cdot 200} = \mathbf{0,0115s}$$

c. Buffer = 10

$$N = 10 + 1 = 11$$

$$Pb = 0,8^{11} \cdot \frac{1 - 0,8}{1 - 0,8^{11+1}} = \mathbf{0,0184}$$

$$E[q] = \frac{0,8}{1 - 0,8} - \frac{(11+1) \cdot 0,8^{11+1}}{1 - 0,8^{11+1}} = \mathbf{3,115 \text{ Pct}}$$

$$E[t_q] = \frac{3,115}{(1-0,0184) \cdot 200} = \mathbf{0,016s}$$

d. Buffer = 15

$$N = 15 + 1 = 16$$

$$Pb = 0,8^{16} \cdot \frac{1 - 0,8}{1 - 0,8^{16+1}} = \mathbf{0,0057}$$

$$E[q] = \frac{0,8}{1 - 0,8} - \frac{(16+1) \cdot 0,8^{16+1}}{1 - 0,8^{16+1}} = \mathbf{3,6 \text{ Pct}}$$

$$E[t_q] = \frac{3,6}{(1-0,057) \cdot 200} = \mathbf{0,018s}$$