

City University of Hong Kong
Department of Electrical Engineering

EE3009 Data Communications and Networking

Solution to Assignment 1

1.

Network Prefix	Link Interface
11100000 00000000/16	0
11100000 00000001/16	1
11100000 0000001/15	2
otherwise	3

2. Normalized throughput per output line = $\frac{\gamma_0}{1/T} = 1 - (1 - p/N)^N$

It is maximum when $p = 1$

Hence, when $N = 8$, the maximum normalized throughput per output line
= $1 - (1 - 1/8)^8 = 0.656$

3.

a. We normalize the weights so that they are all integers, giving us weights 2, 3, and 4. Then, in each round of service, the server serves two packets from A, three from B, and four from C.

b. We divide the weights by the mean packet size to obtain the normalized weights as

$$\frac{0.5}{50}, \frac{0.75}{500}, \frac{1.0}{1500}$$

Multiplying each term by 1500, we have

$$15, 3 \times 0.75, 1$$

Multiplying each term by 4, we have

$$60, 9, 4$$

Thus, the server serves 60 packets from A, 9 from B, and 4 from C in each round of service. This results in 3000 bytes from A, 4500 bytes from B, and 6000 from C served in each round, which is exactly according to their weights of 0.5, 0.75, and 1.0.