City University of Hong Kong
Department of Electrical Engineering

EE3009 Data Communications and Networking

Solution to Assignment 2

1. To maximize the successful transmission rate is to maximize the probability of successful transmission.

   Pr(success) = number of stations × Pr(one station transmits on one bus and at the next slot)
   ×Pr(no other stations transmit on the same bus at the next slot)

   $= 4(\frac{1}{2}p)(1-\frac{1}{2}p)^3 = 2p(1-\frac{1}{2}p)^3$

   Take the derivative of p ,

   $\frac{d}{dp}$Pr(success) = $2(1-\frac{1}{2}p)^3 - 3p(1-\frac{1}{2}p)^2$

   set it to 0 => $(1-\frac{1}{2}p)^2(2-4p) = 0$

   $p=1/2$.

2. The transmission activity of each station is shown below.