Assignment # 7 Barak Barclay April 30, 2019

CS 4730 Algorithmic Game Theory

Homework #7 Student: Barak Barclay

**Answers to homework problems:**

1. For 0<= a <= 1, Nash flow = a

For a > 1, Nash flow = 1/a

1. For 0<= a <= 1, total latency of a Nash flow = a

For a > 1, total latency of a Nash flow = 1

1. For 0<= a < 1,

xHOpt = 1

xLOpt = 0

L = xH \* axH + xL

L = axH2 + 1 - xH

d/dx(L) = 2axH – 1 = 0

For a >= 1,

xHOpt = 1/2a

xLOpt = 1 – 1/2a

1. For 0<= a < 1, L = a

L = 1/2a \* a/2a + 1 – 1/2a

For a >= 1, L = 1 - 1/4a

1. PoA(Ga >= 0) = 1/ (1 - 1/4a) where a = 1

PoA(Ga >= 0) = 4/3

1. PoA(Ga >= 2) = 1/ (1 - 1/4a) where a = 2

PoA(Ga >= 2) = 8/7