Wireless Multimedia System
Quiz 1 (15 min), Sep 24, 2008

Name: _____

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Exercise Topic: Fairness for upstream and downstream connections of 802.11b

IEEE 802.11b uses the CSMA/CA protocol to share the radio channel in a fair way. In this question, we study the problem of maintaining fairness for upstream and downstream connections in wireless local area networks (WLANs) based upon the IEEE 802.11 standard. Current implementations of 802.11 use the so-called Distributed Coordination Function (DCF), which provides similar medium access priority to all stations. Although this mode of operation ensures fair access to the medium at the MAC level, it does not provide any provisions for ensuring fairness among the upstream and downstream connections. Connection unfairness may result in significant degradation of performance leading to users perceiving unsatisfactory quality of service. Can you explain why current 802.11 might produce this so-called "critical unfairness" between upstream and downstream connection as the attached Figure 2. N upstream mobile stations (e.g. N UDP flows) might occupy more bandwidth than N downstream mobile stations (e.g. N UDP flows).