Computer Networks (SWE3022): Homework 1

Instructor: Jaehoon (Paul) Jeong

Date: September 17th, 2025

Due: October 1st 15:00, 2025

**Total Credits: 100 points**

**Note:** Write your answers in English



Internet

Figure 1. Wireless Networks in the Internet

1. What does it mean for a wireless network to be operating in “infrastructure mode”? If the network is not in infrastructure mode, what mode of operation is it in, and what are the differences between that mode of operation and infrastructure mode? (10 points)



1. Cookies (15 points)

**(a)** What are the main purpose and usage of the Cookies? (5 points)

**(b)** Consider an e-commerce site that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies step by step. (10 points)

**3.** When your computer (denoted X) accesses a server computer (denoted Y) running a website called “www.google.com” by a web browser, explain the procedure until you see the website page in terms of DNS resolution, HTTP, transport layer (i.e., TCP), network layer (i.e., IP), and link layer. Assume that your computer is located at your home network via a cable modem connected to an Internet Service Provider, and the web server for “www.google.com” is multi-hop away from your home network. (20 points)

**4.** This is a problem about Domain Name System (DNS). (15 points)

**(a)** Explain the DNS, and the three classes of DNS servers (i.e., Root, Top-Level Domain (TLD), and Authoritative DNS Servers). (5 points)

**(b)** Explain two DNS name resolutions such as iterative resolution and recursive resolution along with figures for a given target DNS name (e.g., gaia.cs.umass.edu). (10 points)

**5.** In Wireless Networks, there are two famous problems such as Hidden Terminal Problem and Exposed Terminal Problem. (20 points)

**(a)** Explain the Hidden Terminal Problem and its solution. (10 points)

**(b)** Explain the Exposed Terminal Problem and its solution. (10 points)

**6.** Magazine paper analysis (20 points)

텍스트, 폰트, 출판, 종이이(가) 표시된 사진

자동 생성된 설명

Read the attached paper “IoT Edge-Cloud: An Internet-of-Things Edge-Empowered Cloud System for Device Management in Smart Spaces” and analyze this paper in 1 page in terms of summary, advantages, disadvantages, and possible improvements.

<https://ieeexplore.ieee.org/abstract/document/10163750>

<http://iotlab.skku.edu/publications/international-journal/IOT-Edge-Cloud.pdf>