**CS 5197/6097 Wireless and Mobile Networking**

**Homework No. 1 dated Wednesday August 23, 2017 (due in one week)**

**P2.2.** A random digit generator on a computer is activated three times consecutively to simulate a random three-digit number.

1. How many random three-digit numbers are possible?
2. How many numbers will begin with the digit 2?
3. How many numbers will end with the digit 9?
4. How many numbers will begin with the digit 2 and end with the digit 9?
5. What is the probability that a randomly formed number ends with 9 given that it begins with a 2?

**P2.3.** A snapshot of the traffic pattern in a cell with 10 users of a wireless system is given as follows:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| User Number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Call Initiation Time | 0 | 2 | 0 | 3 | 1 | 7 | 4 | 2 | 5 | 1 |
| Call Holding Time | 5 | 7 | 4 | 8 | 6 | 2 | 1 | 4 | 3 | 2 |

1. Assuming the call setup/connection and call disconnection time to be zero, what is the average duration of a call?
2. What is the minimum number of channels required to support this sequence of calls?

Hint: By plotting the number of calls by all users, we can determine how many users need to have a channel simultaneously.

1. Show the allocation of channels to different users for part (b) of this problem.

Hint: Allocation of channels to various users can be found this way.

1. Given the number of channels obtained in part (b), for what fraction of time are the channels utilized?

**P2.4.** A department survey found that four of ten graduate students use CDMA cell phone service. If three graduate students are selected at random, what is the probability that the three graduate students use CDMA cell phones?