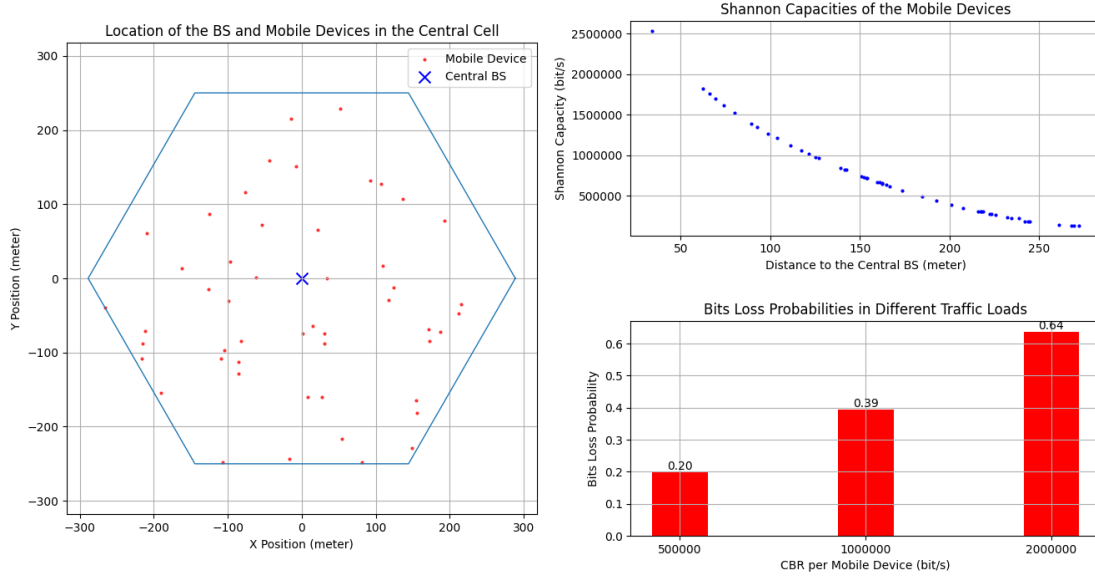


HW4 Report

For each problem n , there is only one resulting figure consisting of 3 graphs, where the graph for problem $n-1$ is on the left, $n-2$ is on the top right, and $n-3$ is on the bottom right.

Problem 1



1-2

Let m_1, m_2, \dots, m_{50} be the mobile devices in the central cell, and b_1, b_2, \dots, b_{19} be the 19 base stations, where b_1 is the central base station.

Let \mathbf{x}_i be the coordinate of b_i and \mathbf{y}_j be the coordinate of m_j . Note that $\mathbf{x}_1 = (0, 0)$.

The Shannon capacity of m_i , denoted as C_i , can be calculated by:

$$C_i = B \lg(1 + \text{SINR}_i),$$

where $B = \frac{10^7}{50}$ (Hz) is the channel bandwidth of each mobile device, and SINR_i is the SINR of m_i .

In addition, SINR_i can be calculated by:

$$\text{SINR}_i = \frac{P_{b_1} G_T G_R \cdot g(\|\mathbf{y}_i - \mathbf{x}_1\|)}{k \cdot 300.15 \cdot B + \sum_{1 < j \leq 19} P_{b_j} G_T G_R \cdot g(\|\mathbf{y}_i - \mathbf{x}_j\|)}.$$

1-3

$X_l = 5 \cdot 10^5$ (bit/s), $X_m = 10^6$ (bit/s), $X_h = 2 \cdot 10^6$ (bit/s)