lab 4
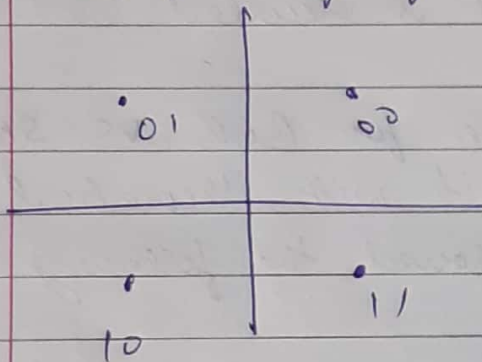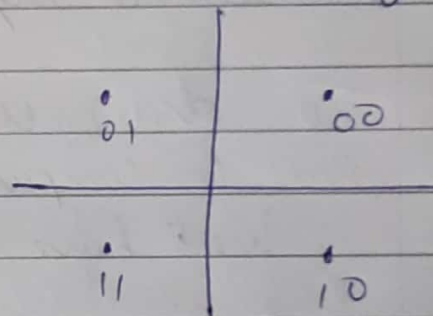
Generating 2000 message bits
Symbol.

Complex symbols are used to map the message bits to gray and without gray Code.

without gray   with gray

.01   .00   .01   .00

.   .11   .11   .10
10

$$00 \rightarrow 1+j1$$
$$01 = -1+j1$$
$$11 = 1-j1$$
$$10 = -1-j1$$

After mapping it the message bits according to gray and without gray code it is modulated and then awgn is adde added to it using randn function with SNR varying between -10 to 10.

The received signal is message signal plus noise. Then this received signal is compared with message bits and error is calculated for both gray label

and without gray label
Since the message signal is Complex
a 2D gaussian noise (complex) is added
to it.

From the plots it can be said that
the BER is more for without gray
label. in comparison with with gray
label code.

The experimental BER for gray code
follows the theoretical plot using Q
function.