HW 1 (Due date 27 March 2020)

1. (20 pts.) Solve the drawback of coded systems in low SNR scenario (worse than un-coded system) with at least two concepts.
   1.在不同的 SNR 使用不同的 coding 方式，甚至不要 coding
   2.控制 SNR 大小，如果 SNR 過低就要提高發射器功率
2. (20 pts.) Prove the uniqueness of identity in the group **G** with the operation "#". Assume I is a identity element with operation “#”, and I’ is another identity element.
   I = I # I’ = I

3. (20 pts.) Check “The real-number field {***R***, +, *} as a sub-field of the complex-number field {***C***, +, *}”.
   condiction1 : the 0 exist.
   0 is in {***R***, +, *}
   Satisfy!
   Condiction2: {***R***, +, *} is in {***C***, +, *}.
   a + bi belongs to {***C***, +, *}
   a + bi belongs to {R, +, *} when b = 0

4. (40 pts.) Verify that the polynomial $X^5 + X^2 + 1$ is a primitive polynomial.
   Refer to primitive_polynomial.c