Homework Set #1

> The intention is that you do the exercises yourself. Oral discussion (without using pen/paper) between students is allowed, but the solution should be written down individually.
> The homework must be submitted one day before each tutorial session either on paper (before 6 PM) or via email (before mid night).
> Every correctly solved problem gives 1 point, partially correct gives 0.5 point, mostly wrong 0 point.

Numbers below refer to problems in the text book: Amos Lapidoth, "A Foundation in Digital Communication".

1. Exercise 12.1

2. Exercise 12.2

3. Exercise 12.3

4. Exercise 13.1

5. Exercise 13.2

6. Exercise 13.3
   (Hint for Ex. 13.3: Consider the following example: Let X_ν be a stochastic process defined as

$$X_\nu = \left\{ \begin{array}{ll} -1 & \text{with prob.} = \frac{1}{2} \\ +1 & \text{with prob.} = \frac{1}{2} \end{array} \right\} \quad \text{for odd values of } \nu \text{ in } \mathbb{Z},$$

$$X_\nu = \left\{ \begin{array}{ll} -\sqrt{\frac{3}{2}} & \text{with prob.} = \frac{1}{3} \\ 0 & \text{with prob.} = \frac{1}{3} \\ +\sqrt{\frac{3}{2}} & \text{with prob.} = \frac{1}{3} \end{array} \right\} \quad \text{for even values of } \nu \text{ in } \mathbb{Z}, \qquad (1)$$

   and let $Y_\nu = g(X_\nu) = X_\nu^4$. Is X_ν WSS? Is Y_ν WSS? What can you conclude from this example?)

7. Exercise 13.6

8. Exercise 13.7

9. Exercise 13.8