

Weekly Homework no. 2 (WH₂)

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Format: Only pdf format is accepted. Include your name and ID in the document.

--- Study Guide ---

1. **To be read carefully:** These weekly homework assignments do count to the supplementary component of your grade to Term 1, note Weekly Homework does not count to the passing grade which is based exclusively on the official exams. The Weekly Homework is a valuable means for you to remain fully involved with the course while away from campus, moreover, each WH assignment contributes to the supplementary component of your grade.
2. At all times, have the textbook by Peterson & Davie at hand. Most of the material that we have taught so far belongs in book chapters 1 and 2. Find the 6th edition to the book, here:

<https://github.com/SystemsApproach/book/releases/download/v6.1/book.pdf>

3. A key resource as you study the lessons contained in the assigned presentations is the Questionnaires, which you can find at the following link under section titled "Questionnaires"

<http://paloalto.unileon.es/cn/>

4. Check out the Questionnaires that are to be solved this week and which are listed in the deliverables section, below. By this time, all the course topics needed for these questionnaires have been taught in the Lectures or proposed for self-study while we are away from campus.

Try to resolve the relevant exercises on your own; only after working your solutions is it acceptable to consult the solutions published in paloalto.unileon.es/cn. I may ask you to submit your personal solution

to some exercise from some Q in which case I expect that you add some value to the solution that was already published by me.

5. If you need assistance, contact me via the email given above; I recommend that you send your comments and your questions to the **class forum** in the Agora.

Weekly Homework (WH₂)

This section is to be included in your homework submission. These exercises will be assessed and will count to your Term 1 supplementary grade (Not toward the pass grade but only to the supplementary grade). You must submit your original work and cite sources in case you used some.

Base documentation

1. **Presentation for section 5 of Chapter 1** (Slides 15 through 27)
<http://paloalto.unileon.es/cn/lect/CN-Ch1-2018-Section5.pdf>
2. **Section 2.4.2 Cyclic Redundancy Check from P&D textbook** (See above for the download URL)
3. **CN Questionnaires and past exams at** paloalto.unileon.es/cn

Exercises

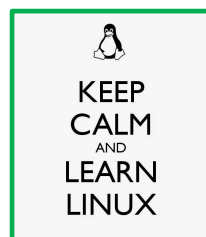
1. **Assume the integer subset $\{0, 1\}$. Demonstrate that the one-bit addition and subtraction operations are the same.**
2. **Assume a generator polynomial $C(x)$ which order is k . $C(x)$ is used by the CRC circuit of a NIC. Explain de different *numbers* of errors that can be detected by the circuit.**
3. **Consider the preceding CRC circuit, again. How many errors can the circuit correct?**
4. **Consider the generator polynomial $C(x)$ given by the bit-vector denoted in decreasing order, from left-to-right: $(1,1,0,1,1)$. Check the resulting CRC circuit by feeding the following data bit-vector, again in decreasing order, from left-to-right: $(1, 1, 0, 0, 1, 0)$.**
5. **Continuing from the preceding exercise, assume that the data bit-vector is sent to the receiver along with the calculated CRC (Data +**

Redundancy). The receiver must check the CRC for errors. The CRC-checking procedure applied by the receiver consists of:

- a. Receive $M(x)$, in our case the data bit vector which size is 6 bits. Store $M(x)$.
- b. Receive $C(x)$, the CRC computed by the sender and store it.
- c. Calculate the CRC by applying the procedure explained in the WebConference-lecture of 26th-March, taking into account, though, that instead of padding $M(x)$ (The data polynomial) with as many zeroes as the order of $C(x)$, you will have to pad the $M(x)$ column with the bits from the received CRC. Pay attention not to invert the order of the CRC bits as you use each of them to pad $M(x)$. If no error took happened, then the new CRC that you are computing should yield all zeroes, *i.e.*, your CRC should be equal to (0,0,0,0) in this case.

Search the documents in paloalto.unileon.es/cn for an exercise similar to this.

6. Check that your C compiler is correctly installed. Download a simple test program by consulting the last exercise in CN practice 1 (Network interfaces, etc.). I plan to resume our practices next week; you need your Linux and your gcc compiler.



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