Oblig 3

Signals, Variables and Process Sensitivity

IN3160 / IN4160 Spring 2020

Version 1.3/12.07.2019

In exercise, we will explore signals, variables and the process sensitivity list in VHDL.

a)

Simulate the attached code in `delay.vhd` and `tb_delay.vhd`. When does the output data signal change, and what is the cause of this delay?

b)

Modify `delay.vhd` so that all of the variables are replaced by signals (TIP: signals cannot be declared within a process). In addition, modify `tb_delay.vhd` so that the chip is only in reset from the time 100 ns to 200 ns (TIP: change, for example, to the value `'1'` from time zero) and the input data should now change from `"00000000"` at 0 ns (i.e. start) to `"11110000"` at time 300 ns and to `"00001111"` at time 400 ns. When does the output data signal change now? Why is the output data equal to `"UUUUUUUU"` at time 50 ns?

c)

In this part of the exercise, the attached code in `variables_vs_signals.vhd` and `tb_variables_vs_signals.vhd` shall be simulated. Why is `output(7 downto 6)` always equal to `output(3 downto 2)`? Why is `output(5 downto 4)` different from `output(1 downto 0)`?

d)

Now the signals `sig1` and `sig2` are to be removed from the sensitivity list in `variables_vs_signals.vhd`. Why does `output(7 downto 6)` and `output(3 downto 2)` have different values than in exercise c?

Approval:

Answer to these questions shall be delivered using the portable document format (.pdf).

Peer review two other assignments. Be polite!
(Do not comment on grammar, spelling or punctuation unless it affects the meaning of the text. The purpose of reviewing is to allow both submitter and reviewer to learn)

1: For each question (a, b, c, d), does the answer seem correct?

> If yes, then comment that it is a good answer.
> If no, declare and note whether you consider the issue is a minor or a major one[1].
> Declare what would improve the answer most using one statement.
> (Do not to provide a detailed breakdown; one or two well-put sentence(s) should do).

2: Is the number of major issues two or greater?

> If yes, mark the assignment to be revised before approval.
> If no, mark this assignment as approved.

Review your own assignment and revise or re-submit as instructed.
If you do not agree upon the reviewers remarks or need help to improve your text, contact your lab supervisors before re-submitting[2].

Example on how to comment:

"n) Minor: Please revise signal f drawing, I believe it should change in clock cycle two and not three. "

"m) Major: Please revise the entity declaration; I believe the banana entity is required to interface with the angry_gorilla entity."

[1] A minor issue is something that is explained, but could improve with some changes. A major issue is something that is wrong, most likely because the respondent misunderstood or did not know how to solve the task.

[2] ***Report patronizing, condescending or otherwise malicious comments to the lab supervisors, course management or the administrative staff (studieadministrasjonen).***
Being polite when reviewing is a requirement for approval of all peer reviewed tasks.