DAT093
Introduction to Electronic System Design

Starting a clocked sequence

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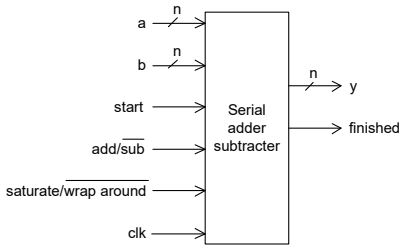
Objective

How do we start a serial calculation like a serial adder or multiplier?

In lab assignment 1 we have a serial adder



The calculation is started by a start signal.

How should the start signal behave?

Should it fulfil some specific requirements?

Objective

What options do we have for the pulse?

- A pulse that could last for ever

  This means that it could actually be a step, not a pulse

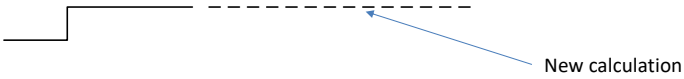
- A pulse that is only one clock cycle long

- A pulse of any length as long as it is a pulse and not a step

Let´s look at the three alternatives

A pulse that could last for ever

We can monitor the change from zero to one and start the calculation on that change



This is fine for the first calculation but what if the signal is still high when we want to start a new calculation?

We must make sure that the pulse is gone when the calculation is finished

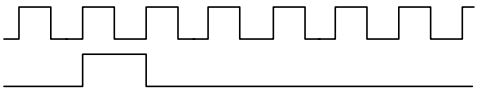
This is an unnecessary demand on the start pulse

A pulse that could last for ever cont.

We monitor the change in the start signal but notice that we shouldn´t trigger on it.

The clocked part of a process should only be triggered by the clock signal.

A pulse that is only one clock cycle long



This works but is also an unnecessary demand on the start pulse

A pulse of any length as long as it is a pulse

We should once again monitor the activation of the start pulse but also the termination of the pulse.

When the start signal goes high we initiate the calculation, maybe calculate the first bit.

We continue with the rest of the calculations when the start pulse goes low again.

This way we´re independent of the length of the pulse.

A pulse of any length as long as it is a pulse cont.

This requires that when the pulse goes away we must know that a pulse have occured so we can move on.

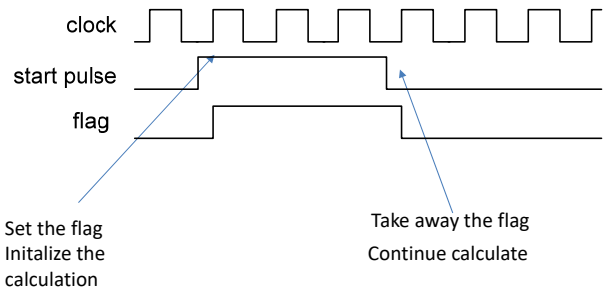
The requirement can not just be that the signal should be low because then we would do calculations before the pulse have occured.

We must set a flag when the pulse occurs.

When the pulse is gone we check the flag and if it´s set then we know that we have had a stat pulse and can continue calculating.

At this time we should also reset the flag.

A pulse of any length as long as it is a pulse cont.



The same behavor could have been created using a state machine approach.