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Exercise Sheet 4

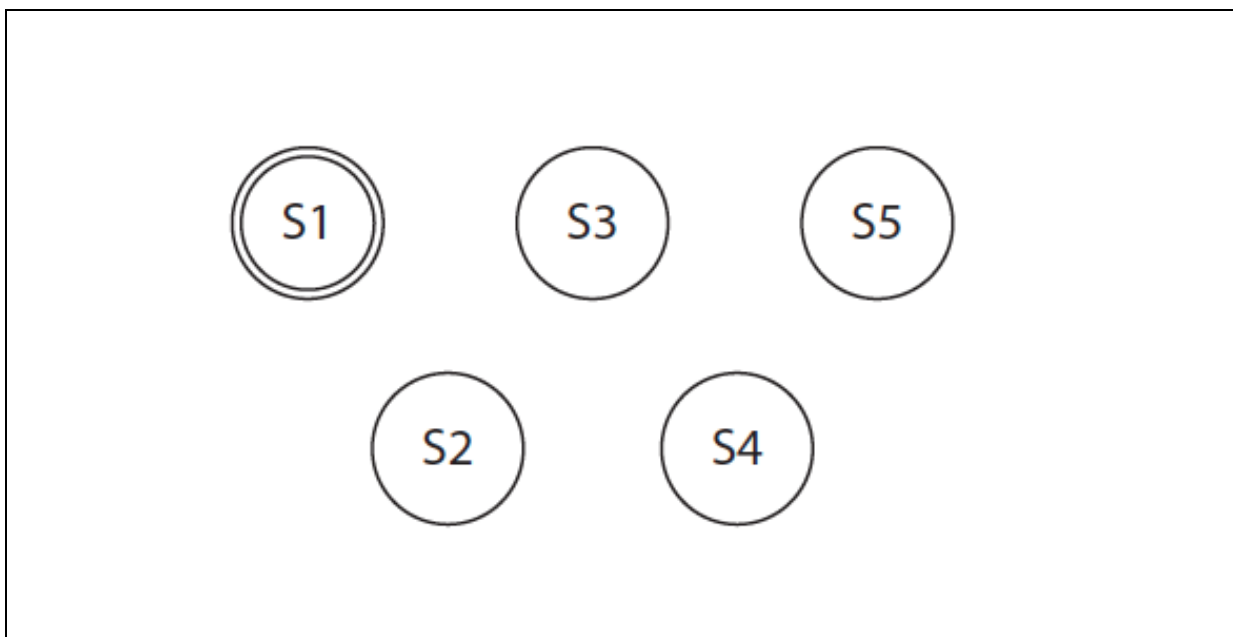
Computer Engineering and Communication Networks

Handout: 25.10.2018
Discussion: 01.11.2018 (start 10:00 a.m.)

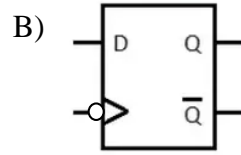
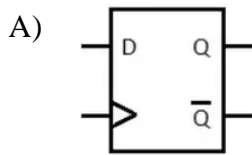
1. Sequential Circuits

1.1. Model a Mealy-FSM that shows the following behavior:

- As input only “a”, “b”, and “c” can be handled.
- As output only “0” or “1” can be produced.
- Before the sequence “abca” is given as input, the FSM produces all the time “0” as an output.
- After the sequence “abca” was given as an input, the FSM produces all the time “1” as an output.
- The states standing for the following:
 - S1 is the start state for the FSM
 - S2 equals “a”
 - S3 equals “ab”
 - S4 equals “abc”
 - S5 equals “abca”



- 1.2. What is the condition that must be always observed in an RS flipflop?
- 1.3. Which one of this two D Flipflops is triggered in the negative edge?



- 1.4. Which type of flipflop presents a control function to change stored value?
- 1.5. What is the Control Table for the following flipflops:
 - 1.5.1. RS Flipflop
 - 1.5.2. JK Flipflop

2. Computer Engineering

- 2.1. What components from the von-Neunam architecture are inside a micro-processor?
- 2.2. What is the purpose of the BIOS?
- 2.3. In which type of memory the BIOS is usually stored?
- 2.4. What is the main difference between northbridge and southbridge?
- 2.5. What are exceptions and interrupts? Give an example of an interruption and an example of an exception.
- 2.6. Where does the micro-processor stores the data when performing a given operation?
- 2.7. What do flag registers store? How many bits do they store?
- 2.8. Where does the stack is typically located? Which principle is used to store/fetching data? Name the two possible operations in a stack.
- 2.9. What are the stack operations for the $C:=A+B$ operation using the zero addresses instruction type?
- 2.10. Give an example of:
 - 2.10.1. Problem-oriented language.
 - 2.10.2. Assembly language.
- 2.11. How does the typical storage hierarchy look like?
- 2.12. What is the purpose of busses and interfaces?
- 2.13. What is the difference between a Hard Disk Drive and a Solid State Disk?