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Exercise Sheet 3 (Theory)
(11 Points)

Please note: Solutions must be submitted (individually or in pairs) until 29.10.2018 at 10:00 AM (post box in OH16, ground floor, in front of room E16). Submitting solutions via mail is *not* possible. Discussion: 07.-09.11.2018.

1 Java (2 Points)

Which are the advantages and disadvantages of using Java for the design of embedded systems?

2 Aliasing (1 Point)

What is aliasing? Consider an input signal with frequency 20Hz, e.g., the song of a fin whale. Which is the minimum sampling rate required to avoid aliasing?

3 SDF vs. Petri Nets (2 Points)

What is the difference between SDF and Petri nets?

4 Successive Approximation Converter (3 Points)

Draw a circuit diagram of a successive approximation converter with a resolution of 8 bit. Explain in your own words how this successive approximation converter works.

5 Flash A/D Converter (3 Points)

The specifications of a flash A/D converter ar as follows (A = least significant bit, B = most significant bit):

V_{in}	C_1	C_2	C_3	A	B
$0 - 0.25V$	$0V$	$0V$	$0V$	0	0
$0.25 - 0.5V$	$0V$	$0V$	$12V$	0	1
$0.5 - 0.75V$	$0V$	$12V$	$12V$	1	0
$0.75 - 1V$	$12V$	$12V$	$12V$	1	1

Complete the given circuit diagram:

- Add an additional comparator that indicates an overflow condition if the analog input voltage exceeds V_{in} 1V.

- Add all required wires.

- Annotate the positive and negative inputs of each comparator with $+$ or. $-$, respectively.

V_{in}

$V_{ref} = 1V$

R_1

R_2

R_3

R_4

$0V$

C_1

C_2

C_3

A

B