Name	Signature	Student Id Nr	Points

## 581305-6 Computer Organization I, miniexam 2, 8.12.2016 (10p)

Write your answer on this exam paper in the space given. Please notice, that the exam paper is 2-sided.

a) [2 p] Integer length is 16 bits and it is stored with biased representation. Why is the bias usually 2<sup>15</sup>-1 (32767)?
When would it be sensible to have bias value 100?

b) [2 p] A 32-bit value 0xFFFFFDC is stored into byte address 0x33445566. It represents 32-bit 2's complement Big-Endian integer value. Which bits are stored in byte addresses 0x33445566-0x33445569? What is the decimal value of this 32-bit integer?

c) [2 p] What does the "normalization" mean in IEEE floating point standard? What do you gain with it? What is the normalized 32-bit representation of 2.75?

d) [2 p] Why is it advisable to use CRC (Cyclic Redundancy Code) for web traffic data protection, and not Hamming code or a parity bit? Why is it advisable to use Hamming code to protect an internal bus within a processor, and not CRC or a parity bit?

e) [2 p] Assume that memory bus has 64 wires for data transmission. They are protected with Hamming code using extra wires, so that all 1-bit errors will be found and corrected. How many extra wires are needed for the Hamming code? Is the Hamming code computation in this case done at hardware or software level? Explain.