



## G51CSA

### Second Homework

Deadline: Friday, 15<sup>th</sup> November 2002. Before 10:00 class, LT2

1. Consider a hypothetical microprocessor generating a 16-bit address (for example assume that both the program counter and the address register are 16-bit wide) and having a 16-bit data bus.
  - (a) What is the maximum memory address space that the processor can access directly if it is connected to a "16-bit memory" (i.e., each memory location holds 16 bits)
  - (b) What is the maximum memory address space that the processor can access directly if it is connected to a "8-bit memory" (i.e., each memory location holds 8 bits)
2.
  - (a) What is the effect of shifting an unsigned number in a register two bits to the left? One bit to the right? Assume that 0's are inserted to replace bit locations at the end of the register that have become empty due to shift
  - (b) Suppose that number is signed, that is, stored using 2's complement. Now what is the effect of shifting the number
  - (c) Suppose that the shift excludes the sign bit, so that the sign bit always remains the same. Furthermore, suppose that during a right shift, the sign bit is always used as the insertion bit at the left end of the number (instead of 0). Now what is the effect of these shifts?
- 3 Calculate the following decimal number subtraction using IEEE single precision floating point arithmetic and express the normalised result in hexadecimal. Describe each step of the calculation procedure clearly

$$125.25 - 75.5$$