# Homework 3 The processor instruction set

1. When a new processor is designed the instruction set must be finalised first. A new processor with a 32-bit word length is being developed for use in a mobile phone.  
   1. It has been decided that the processor will use 60 different instructions. How many bits should be used for the opcode? [1 mark]
   2. If there are two bits available for the addressing mode, what is the maximum value that can be used for the operand? (Show your working.) [3 marks]
   3. How much memory, in MiB, can the processor work with, assuming one address references one word of data? (Show your working.) [3 marks]
   4. It has been suggested that this may not be enough addressable memory. The number of bits for the addressing mode cannot change, and nor can the word length. Explain how more memory can be addressed by changing the number of bits for the opcode and explain the drawback of doing this. [3 marks]

[Total 10 Marks]