

2008 Paper 1 Question 2

Operating Systems

Let N be the 16-bit value $1001\ 0101\ 0000\ 0000_2$.

- (a) What is the value of N when interpreted as:
- (i) An unsigned integer? [1 mark]
 - (ii) A sign-and-magnitude format integer? [1 mark]
 - (iii) A 2's complement integer? [2 marks]
 - (iv) A floating-point number with a 5-bit bias-15 exponent and a normalised mantissa? [State any assumptions you make.] [4 marks]
- (b) Imagine N has been loaded into the 16-bit register $r1$. Explain what the values of the C (carry) and V (overflow) flags would be after the CPU executes the instruction `add r0 ← r1, r1`. [2 marks]