

2005 Paper 1 Question 1

Foundations of Computer Science

It is required to implement polynomials, which may contain any number of different variables, with the operations of *addition* and *equality test*.

- Computing that the sum of $xy^2 + 2xz - y$ and $y + 4xw - xz$ is $xz + xy^2 + 4xw$ is an example of polynomial addition.
 - Determining that $xy + z^2$ equals $zz + yx$ is an example of an equality test.
- (a) Design a suitable representation of polynomials, in ML. Justify the choices you make. [6 marks]
- (b) Describe how you would implement addition and the equality test, and express their efficiency using O -notation. It is not necessary to present ML code. [4 marks]