Def. $P(x)$ is called the n^{th} Lagrange interpolating polynomial.

Note: $P(x)$ is unique!

2) Example.

Ex. Find the appropriate Lagrange interpolating polynomial using the table

	x_0	x_1	x_2	x_3
x	0	0.5	1	1.5
$f(x)$	1	2	3	4

Thus, we will build a polynomial of degree 3.

First we build the basis polynomials

$$L_{3,0}(x) = \frac{(x-0.5)(x-1)(x-1.5)}{(-0.5)(-1)(-1.5)}$$

$$L_{3,1}(x) = \frac{x(x-1)(x-1.5)}{(0.5)(0.5-1)(0.5-1.5)}$$

$$L_{3,2}(x) = \frac{x(x-0.5)(x-1.5)}{(1-0)(1-0.5)(1-1.5)}$$

$$L_{3,3}(x) = \frac{x(x-0.5)(x-1)}{(1.5-0)(1.5-0.5)(1.5-1)}$$