Determining a_0 is easy

$$a_0 = P_n(x_0) = f_0 := f(x_0)$$

To determine a_1 we have

$$P_n(x_1) = a_0 + a_1(x_1 - x_0)$$
$$f_1 = f_0 + a_1(x_1 - x_0)$$
$$\Rightarrow a_1 = \frac{f_1 - f_0}{x_1 - x_0}$$

Def: The <u>zeroth divided difference</u> of the function f with respect to x_i is denoted by $f[x_i]$ and is defined as

$$f[x_i] = f(x_i)$$

The remaining divided differences are defined inductively

Def: The <u>first divided difference</u> of f with respect to x_i, x_{i+1} is denoted by $f[x_i, x_{i+1}]$ and is defined as follows

$$f[x_i, x_{i+1}] = \frac{f[x_{i+1}] - f[x_i]}{x_{i+1} - x_i}$$