degree of $P(x) \leq$ # conditions $- 1$

$$\text{\# conditions} = \sum_{i=0}^{n} (m_i + 1) = \sum_{i=0}^{n} m_i + n + 1$$

$$\Rightarrow \text{degree of polynomial} \leq \sum_{i=0}^{n-1} m_i + n$$

<u>Def.</u> A polynomial approximating f and its derivatives is called <u>osculating polynomial.</u>

<u>Def:</u> In the case when $m_i = 1$ for $i = 0, \dots, n$ the approximating polynomial is called <u>Hermite polynomial</u>.

2) Using Newton's interpolatory divided-difference formula to form Hermit's polynomial.

Recall,
$$P(x) = f[x_0] + \sum_{k=1}^{n} f[x_0, \dots, x_k](x - x_0) \dots (x - x_{k-1})$$

Theorem 3.6 $\Rightarrow$
$$f[x_0, \dots, x_n] = \frac{f^{(n)}(\xi)}{n!}$$
where ξ in (a, b) defined by the points $x_0, \dots, x_n$.