

Construct an algorithm that has input an integer $n \geq 1$, numbers x_0, x_1, \dots, x_n , and a number x and that produces as output the product $(x-x_0)(x-x_1)\dots(x-x_n)$

ChatGPT

Sure, here is a Python function implementing the algorithm:

python

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```
def product_poly(x, list_x):
    for i in range(1, len(list_x)):
        return x*(x-list_x[i])
```

Here's how you can use the function:

python

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```
list_x = [3, 1, 2, 3, 4]
x = 5
print(product_poly(x, list_x))
```

Please note, the input list `list_x` should contain $n+1$ numbers as the problem implies x_0, x_1, \dots, x_n .

So, for $n = 3$, the list should contain 4 numbers.

This Python function loops over each of the numbers in `list_x` (which represents x_0, x_1, \dots, x_n) and multiplies the accumulated product by the difference between x and the current number. The result is the product $(x-x_0)(x-x_1)\dots(x-x_n)$.