2025-10-26/array.py

```python
# Consider an array x[1..n - 1]
# containing distinct values from the set $1, 2, . . . , n.
# Propose a linear complexity algorithm
# to identify the value from {1, 2, . . . , n} that is not present in the array x.
# Note. Try to solve the problem using auxiliary memory space of size O(1)
# (this means not using auxiliary vectors).

n = int(input("Number of elements: "))
s = 0

for i in range(0, n - 1):
    x = int(input("x[{:d}]: ".format(i + 1)))
    s = s + x      # the sum of existing elements

# The sum of all possible values is n * (n+1) // 2
# The missing element is the difference between:
#  the sum of all possible values and
#  the sum of the existing elements in the array

m = n * (n + 1) // 2 - s
print(m)

# input: n (no. of elements)
# output: m (the missing element)
# time complexity: O(n) -> 1 for
# space complexity: O(1) -> 1 variable (n)

```