Problem

- Given a string which consists of 'N', 'S', 'E', 'W'

  N - North You start at origin (0, 0)
  S - South
  E - East
  W - West

- Return true if path crosses at any point.

Approach #1

1) Create a set of Point in which Point has x and y w/ (0, 0) inserted.

2) Enumerate over each character in input string
   If c is 'N' → Point.y += 1
   If c is 'S' → Point.y -= 1
   If c is 'E' → Point.x += 1
   If c is 'W' → Point.x -= 1

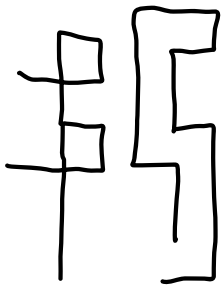
   If Point exists in set => true
   Else insert new Point and continue

3) If enumerated all points, then no intersection has occurred. Return false.

Time: O(n) Space: O(n)

Can we improve space to be constant?

Input: N E S W W



$x = 0$ 0 0 1 1 0

$y = 0$ 0 1 1 0 0

↘ 1

1

I do not believe so. You have to track every point travelled to or else that untracked point COULD have been the point of intersection.