You, along with your pet dog 'Snoopy Zoo', are part of a Mystery Solving Group and have been informed that a shape-shifting ghoul has been terrorizing a local neighborhood. You plan a stealth mission to go house by house and check for the monster. However, the ghoul is smart enough to find it suspicious if you go to any two adjacent houses, causing the ghoul to get scared and change neighborhoods. Being a smart student who has taken CS/ECE 374 you decide to inspect as many people as you can in one direction in the interest of time.

1. Your job is to calculate what is the best path you can take to maximize your chances of catching the shape-shifter.

   Suppose you are given $Residents[1....n]$ as the number of residents in a house of a linear neighborhood where $Residents[i]$ is the number of residents in the ith House from the start of the neighborhood.

   For example, consider an instance where $n = 4$, $Residents = [2, 4, 6, 2]$. Inspecting the first and the third house will allow you to check a total of $2 + 6 = 8$ in the neighborhood. On the other hand, if one skips the first house and inspects the second house and the fourth house, the total number of people inspected is only $4 + 2 = 6$.

   Describe and analyze an algorithm to determine the maximum total number of people you can inspect without alerting the ghoul given the array $Residents[1..n]$ as the input.

2. Even though you cheked the most number of people you possibly could, the ghoul seems to have ran away. You follow the trails and find out that it has moved to another neighborhood. This time the ghoul decides to move into a circular neighborhood. Making your search more difficult.

   Describe and analyze an algorithm to determine the maximum total number of people you can inspect without alerting the ghoul given the array $Residents[1..n]$ as the input, this time depicting a circular neighborhood.

3. **To think about later:** Due to *extereme bad luck*, the ghoul somehow manged to slip yet again. This time moving into a block style 2D neighborhood represented by $Residents[1..n][1..m]$ where $Residents[i][j]$ is the number of residents in the jth house on the ith lane. Now allowing you to move in two directions instead of one.

   Describe and analyze an algorithm to determine the maximum total number of people you can inspect without alerting the ghoul given the array $Residents[1..n][1..m]$ as the input, this time depicting a 2D neighborhood.