

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment 1

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Subject Name: AP LAB-II

Subject Code: 22CSP-351

1. Aim:

Problem 1.2.1: Two Sum

- **Problem Statement:** Given an array of integers `nums` and an integer `target`, return the indices of the two numbers such that they add up to `target`. Each input has exactly one solution, and you cannot use the same element twice.

Problem 1.2.2: Jump Game II

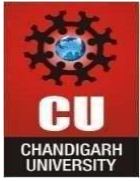
- **Problem Statement:** You are given a 0-indexed array `nums` of length `n`. You are initially positioned at `nums[0]`. Each element `nums[i]` represents the maximum length of a forward jump from index `i`. Return the minimum number of jumps to reach `nums[n - 1]`.

Problem 1.2.3: Simplify Path

- **Problem Statement:** Given a string `path`, which is an absolute path to a file or directory in a Unix-style file system, convert it to the simplified canonical path.

2. Algorithm:

1. Initialize an empty hash map (dict).
2. Iterate through the `nums` array:
3. For each element `num`, calculate the complement: `complement = target - num`.
4. Check if the complement exists in the hash map:
5. If it does, return the indices of the complement and the current number.
6. If it doesn't, add the current number and its index to the hash map.
7. Return the indices of the two numbers that add up to the target.



Code: 1.2.1

```
class Solution(object):
    def twoSum(self, nums, target):
        s1 = []
        s2 = []

        for i in range(len(nums)):
            s1.append((nums[i], i))

        while s1:
            num1, idx1 = s1.pop()
            s2.append((num1, idx1))

            for num2, idx2 in s2:
                if num1 + num2 == target and idx1 != idx2:
                    return [idx1, idx2]

        return []

sol = Solution()
nums = [2, 7, 11, 15]
target = 9
print(sol.twoSum(nums, target))
```

Output:

Testcase | Test Result
Accepted Runtime: 0 ms

Case 1 Case 2 Case 3

Input

nums =
[2, 7, 11, 15]

target =
9

Stdout

[0, 1]

Output

[0, 1]

Expected

[0, 1]



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CODE: 1.2.2

```
</> Code
Python Auto

1 class Solution(object):
2     def jump(self, nums):
3         """
4         :type nums: List[int]
5         :rtype: int
6         """
7         n = len(nums)
8         if n <= 1:
9             return 0
10
11         jumps = 0
12         farthest = 0
13         current_end = 0
14
15         for i in range(n - 1):
16             farthest = max(farthest, i + nums[i])
17             if i == current_end:
18                 jumps += 1
19                 current_end = farthest
20                 if current_end >= n - 1:
21                     break
22
23         return jumps
24
```

OUTPUT:

☒ Testcase ☒ Test Result

Accepted Runtime: 0 ms

Case 1

Case 2

Input

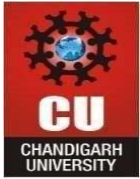
nums =
[2,3,1,1,4]

Output

2

Expected

2



CODE: 1.2.3

</> Code

Python Auto

```
1 class Solution(object):
2     def simplifyPath(self, path):
3
4         stack = []
5         parts = path.split("/")
6
7         for part in parts:
8             if part == "..":
9                 if stack:
10                    stack.pop() # Go up one directory level
11             elif part and part != ".":
12                 stack.append(part) # Add valid directory/file name
```

OUTPUT:

☒ Testcase Test Result

Accepted Runtime: 0 ms

• Case 1 • Case 2 • Case 3 • Case 4 • Case 5

Input

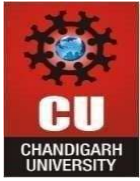
path =
"/home/"

Output

"/home"

Expected

"/home"



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5. Learning Outcomes:-

- **Array Manipulation** – Solve problems using arrays and index-based operations.
- **Efficient Algorithms** – Apply hashing and greedy methods for optimization.
- **Stack Usage** – Use stacks for directory path simplification.
- **Edge Case Handling** – Manage constraints like duplicates and empty inputs.
- **Problem-Solving Skills** – Break down problems and debug efficiently.