

Problem1:

```
1 import time
2
3 def count_ways_to_summit(n):
4     if n <= 1:
5         return n
6
7     #for two ways: 1 step or 2 steps
8     first = 1
9     second = 1
10
11     #start from step 2 to n
12     for _ in range(2, n + 1):
13         current = first + second
14         first = second
15         second = current
16
17     return second
18
19
20 n = int(input("Enter the number of steps to the mountain peak: "))
21
22 start_time = time.perf_counter()
23 ways = count_ways_to_summit(n)
24 end_time = time.perf_counter()
25
26 elapsed_time = end_time - start_time
27
28 #it asked for number of ways and not the actual paths.
29 print(f"for {n} steps, there are {ways} distinct ways to reach the mountain peak.")
30 print(f"Time taken to compute: {elapsed_time:.10f} seconds")
31
```

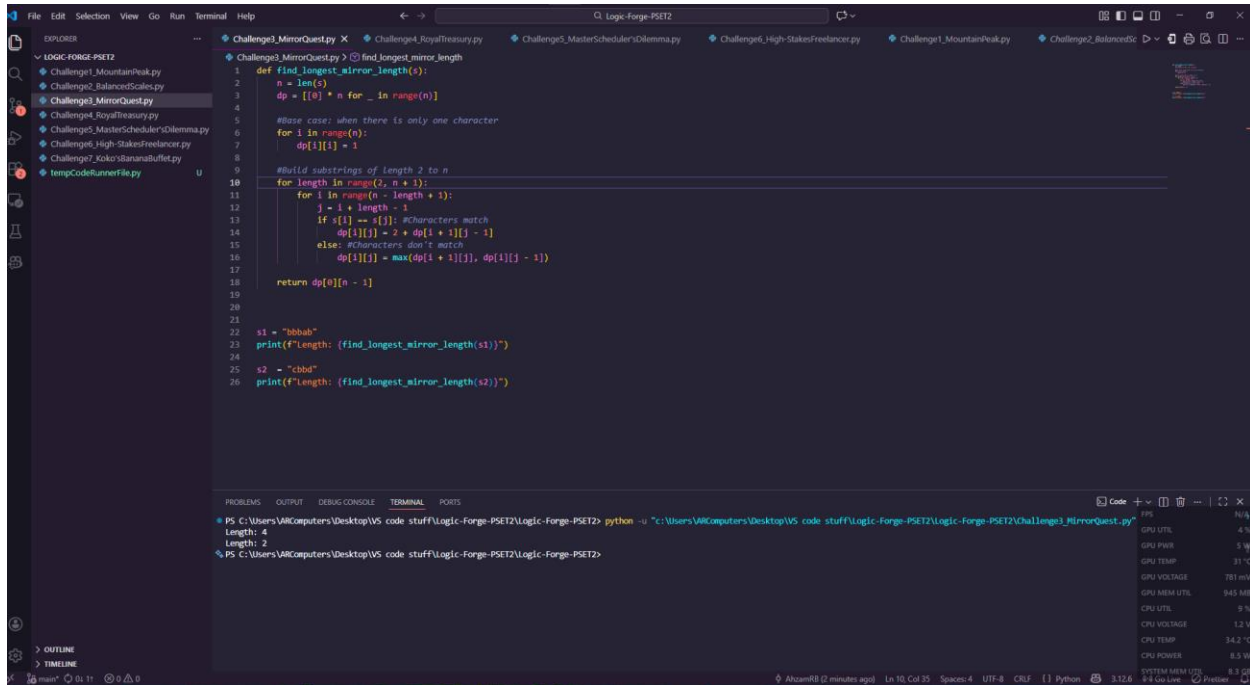
File "C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\tempCodeRunnerFile.py", line 1, in <module>
PS C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2> python -u "C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge1_MountainPeak.py"
Enter the number of steps to the mountain peak: 4
For 4 steps, there are 5 distinct ways to reach the mountain peak.
Time taken to compute: 0.0000099000 seconds
PS C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2> python -u "C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge1_MountainPeak.py"
Enter the number of steps to the mountain peak: 3
For 3 steps, there are 3 distinct ways to reach the mountain peak.
Time taken to compute: 0.0000410000 seconds
PS C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2> python -u "C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge1_MountainPeak.py"
Enter the number of steps to the mountain peak: 2
For 2 steps, there are 2 distinct ways to reach the mountain peak.
Time taken to compute: 0.0000010000 seconds
PS C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2>

Problem2:

```
1 import time
2
3 def can_balance_scales(arr):
4     total_sum = sum(arr)
5
6     #cant split if odd
7     if total_sum % 2 != 0:
8         return False
9
10    target = total_sum // 2
11
12    #we start with 0.
13    possible_sums = {0}
14
15    for numbers in arr:
16
17        current_sums = set()
18
19        for sumsum in possible_sums:
20
21            new_sum = sumsum + numbers
22
23            if new_sum <= target:
24                current_sums.add(new_sum)
25
26        #Add the new sums to the collection of possible sums
27        possible_sums.update(current_sums)
28
29        if target in possible_sums:
30            return True
31
32    return False
33
34
```

PS C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2> python -u "C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge2_BalancedScales.py"
Arr1: True
Time taken to compute: 0.0001293000 seconds
Arr2: False
Time taken to compute: 0.0000430000 seconds
Arr3: True
Time taken to compute: 0.0001100000 seconds
PS C:\Users\VARComputers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2>

Problem3:



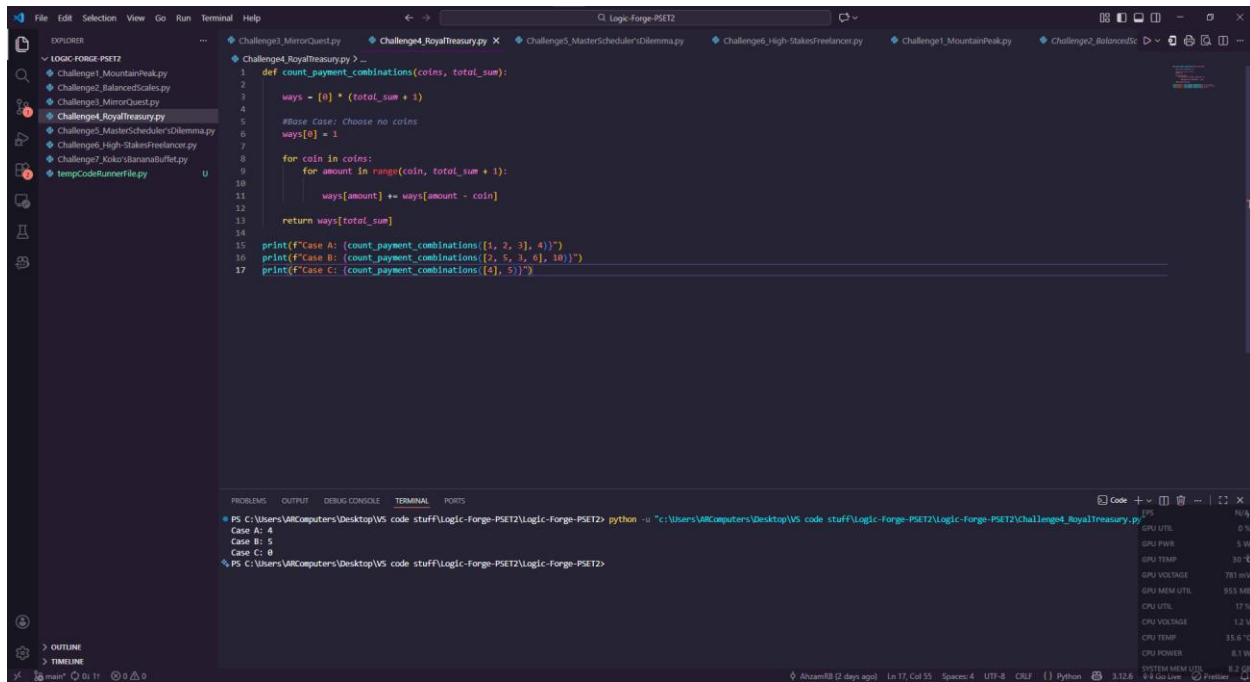
```
1 def find_longest_mirror_length(s):
2     n = len(s)
3     dp = [[0] * n for _ in range(n)]
4
5     #Base case: when there is only one character
6     for i in range(n):
7         dp[i][i] = 1
8
9     #Build substrings of length 2 to n
10    for length in range(2, n + 1):
11        for i in range(n - length + 1):
12            j = i + length - 1
13            if s[i] == s[j]: #Characters match
14                dp[i][j] = 2 + dp[i + 1][j - 1]
15            else: #Characters don't match
16                dp[i][j] = max(dp[i + 1][j], dp[i][j - 1])
17
18    return dp[0][n - 1]
19
20
21
22 s1 = "bbbab"
23 print(f"Length: {find_longest_mirror_length(s1)}")
24
25 s2 = "cbbd"
26 print(f"Length: {find_longest_mirror_length(s2)}")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\VAIC\Computers\Desktop\VS code stuff\Logic-Forge-PSET2> python -u "C:\Users\VAIC\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge3_MirrorQuest.py"
Length: 4
Length: 2
PS C:\Users\VAIC\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2>
```

System Info: CPU: 4.5%, GPU: 8 W, CPU TEMP: 31 °C, CPU VOLTAGE: 781 mV, CPU MEM UTIL: 9.65 MB, CPU UTIL: 9 %, CPU VOLTAGE: 1.2 V, CPU TEMP: 34.2 °C, CPU POWER: 8.5 W, SYSTEM MEM UTIL: 6.3 GB

Problem4:



```
1 def count_payment_combinations(coins, total_sum):
2
3     ways = [0] * (total_sum + 1)
4
5     #Base Case: Choose no coins
6     ways[0] = 1
7
8     for coin in coins:
9         for amount in range(coin, total_sum + 1):
10             ways[amount] += ways[amount - coin]
11
12    return ways[total_sum]
13
14
15 print(f"Case A: {count_payment_combinations([1, 2, 3], 4)}")
16 print(f"Case B: {count_payment_combinations([2, 5, 3, 6], 10)}")
17 print(f"Case C: {count_payment_combinations([4], 5)}")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\VAIC\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2> python -u "C:\Users\VAIC\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge4_RoyalTreasury.py"
Case A: 4
Case B: 5
Case C: 0
PS C:\Users\VAIC\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2>
```

System Info: CPU: 0 %, GPU: 8 W, CPU TEMP: 30 °C, CPU VOLTAGE: 781 mV, CPU MEM UTIL: 9.55 MB, CPU UTIL: 17 %, CPU VOLTAGE: 1.2 V, CPU TEMP: 35.6 °C, CPU POWER: 8.1 W, SYSTEM MEM UTIL: 6.2 GB

Problem5:

```
File Edit Selection View Go Run Terminal Help
Logic-Forge-PSET2
Challenge1_MirrorQuest.py Challenge2_RoyalTreasury.py Challenge3_MasterSchedulerDilemma.py X Challenge4_High-StakesFreelancer.py Challenge5_MountainPeak.py Challenge6_BalancedScales.py
LOGIC-FORGE-PSET2
Challenge1_MountainPeak.py
Challenge2_BalancedScales.py
Challenge3_MirrorQuest.py
Challenge4_RoyalTreasury.py
Challenge5_MasterSchedulerDilemma.py
Challenge6_High-StakesFreelancer.py
Challenge7_Koko'sBananaDistribution.py
tempCodeRunnerFile.py
def min_cancelled_bookings(intervals):
    intervals.sort(key=lambda x: x[1]) #Sort by ending time as [[0, 1], [0, 1], ...]
    kept = 0
    last_end = 0
    for start, end in intervals:
        if start >= last_end:
            kept += 1
            last_end = end
    return len(intervals) - kept

intervals1 = [[1, 2], [2, 3], [3, 4], [1, 3]]
intervals2 = [[1, 3], [1, 3], [1, 3]]
intervals3 = [[1, 2], [5, 10], [18, 35]]

print(f"Number of cancelled bookings for intervals1 = {min_cancelled_bookings(intervals1)}")
print(f"Number of cancelled bookings for intervals2 = {min_cancelled_bookings(intervals2)}")
print(f"Number of cancelled bookings for intervals3 = {min_cancelled_bookings(intervals3)}")

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\VA\Computers\Desktop\VS code stuff\Logic-Forge-PSET2> python -u "c:\Users\VA\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge5_MasterSchedulerDilemma.py"
Number of cancelled bookings for intervals1 = 1
Number of cancelled bookings for intervals2 = 2
Number of cancelled bookings for intervals3 = 0
PS C:\Users\VA\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2>
```

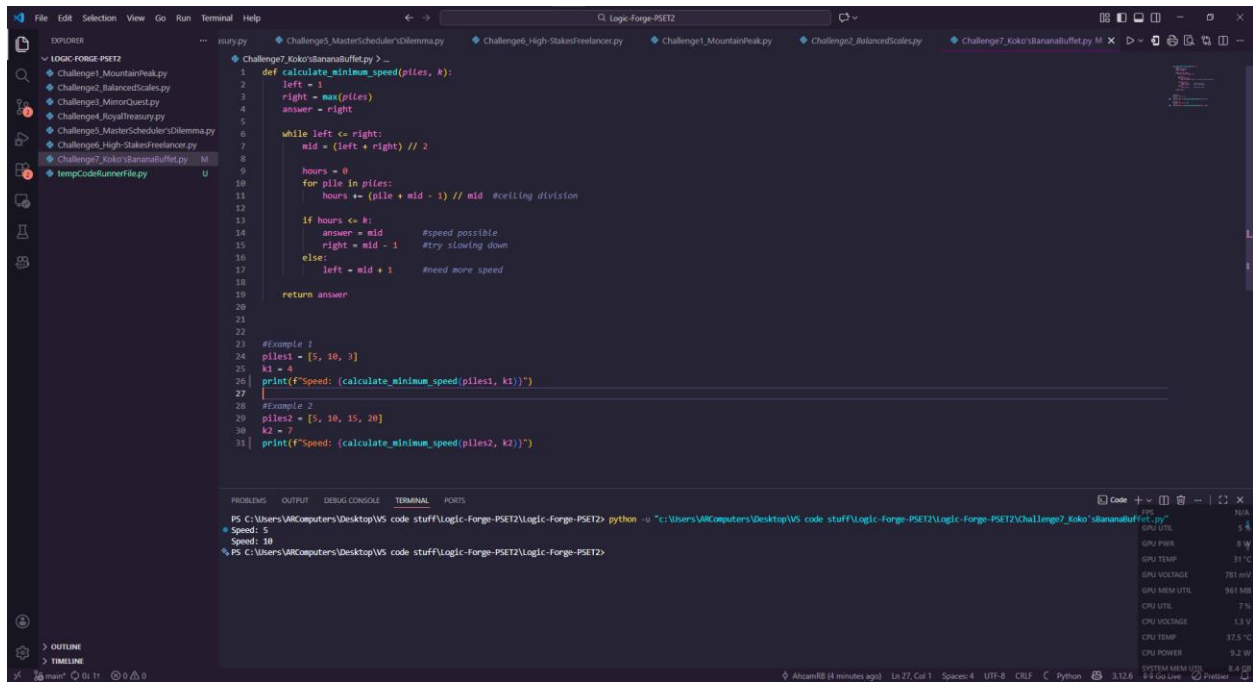
Problem6:

```
File Edit Selection View Go Run Terminal Help
Logic-Forge-PSET2
Challenge1_MirrorQuest.py Challenge2_RoyalTreasury.py Challenge3_MasterSchedulerDilemma.py Challenge4_High-StakesFreelancer.py X Challenge5_MountainPeak.py Challenge6_BalancedScales.py
LOGIC-FORGE-PSET2
Challenge1_MountainPeak.py
Challenge2_BalancedScales.py
Challenge3_MirrorQuest.py
Challenge4_RoyalTreasury.py
Challenge5_MasterSchedulerDilemma.py
Challenge6_High-StakesFreelancer.py
Challenge7_Koko'sBananaDistribution.py
tempCodeRunnerFile.py
def maximize_freelance_profit(deadlines, profits):
    #Combines deadlines and profits
    jobs = list(zip(deadlines, profits))
    max_deadline = max(deadlines)
    #sorts the jobs by their profits in descending
    jobs.sort(key=lambda x: x[1], reverse=True)
    time_slots = [False] * (max_deadline + 1)
    total_jobs = 0
    total_profit = 0
    for deadline, profit in jobs:
        for t in range(deadline, 0, -1):
            if not time_slots[t]: #if slot free
                time_slots[t] = True #mark slot as occupied
                total_profit += profit #add profit
                total_jobs += 1
                break
    return [total_jobs, total_profit]

#Example 1
deadlines1 = [4, 1, 1, 1]
profits1 = [20, 10, 40, 30]
print(f"Example 1 Output: {maximize_freelance_profit(deadlines1, profits1)}")

#Example 2
deadlines2 = [2, 1, 2, 1, 1]
profits2 = [100, 19, 29, 25, 15]
```

Problem7:



```
1 def calculate_minimum_speed(piles, k):
2     left = 1
3     right = max(piles)
4     answer = right
5
6     while left <= right:
7         mid = (left + right) // 2
8
9         hours = 0
10        for pile in piles:
11            hours += (pile + mid - 1) // mid #ceiling division
12
13        if hours <= k:
14            answer = mid #speed possible
15            right = mid - 1 #try slowing down
16        else:
17            left = mid + 1 #need more speed
18
19    return answer
20
21
22
23 #Example 1
24 piles1 = [5, 10, 3]
25 k1 = 4
26 print(f"Speed: {calculate_minimum_speed(piles1, k1)}")
27
28 #Example 2
29 piles2 = [5, 10, 15, 20]
30 k2 = 7
31 print(f"Speed: {calculate_minimum_speed(piles2, k2)}")
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\VA\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2> python -u "C:\Users\VA\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2\Challenge7_Koko'sBanana Buffet.py"
Speed: 5
Speed: 18
PS C:\Users\VA\Computers\Desktop\VS code stuff\Logic-Forge-PSET2\Logic-Forge-PSET2>
```

Metric	Value
CPU	N/A
GPU UTIL	5 %
GPU POWER	0 W
GPU TEMP	31 °C
GPU VOLTAGE	781 mV
GPU MEMORY UTIL	961 MB
CPU UTIL	7 %
CPU VOLTAGE	1.3 V
CPU TEMP	37.5 °C
CPU POWER	9.2 W
SYSTEM MEMORY (RAM) UTIL	8.4 GB

Atom 1.61.0 (4 minutes ago) La ZY, Col 1 Spaces: 4 UTF-8 CRLF Python 3.12.4 8.4 GB free 100% Free