Program 161:-

1. You are given the number of sides on a die (num_sides), the number of dice to throw (num_dice), and a target sum (target). Develop a program that utilizes dynamic programming to solve the Dice Throw Problem.

Program:-

```python
def dice_throw(num_sides, num_dice, target):
    dp = [[0] * (target + 1) for _ in range(num_dice + 1)]
    dp[0][0] = 1
    for dice in range(1, num_dice + 1):
        for sum_ in range(1, target + 1):
            dp[dice][sum_] = 0
            for face in range(1, num_sides + 1):
                if sum_ - face >= 0:
                    dp[dice][sum_] += dp[dice - 1][sum_ - face]
    return dp[num_dice][target]

num_sides = 6
num_dice = 3
target = 8
print(
    f"Number of ways to get the sum {target} with {num_dice} dice of {num_sides} sides: {dice_throw(num_sides, num_dice, target)}")
```

Output:-

```
C:\Users\afree\PycharmProjects\pythonProject\.venv\Scripts\python.exe C:\Users\afree\PycharmProjects\pythonProject\0.py
Number of ways to get the sum 8 with 3 dice of 6 sides: 21

Process finished with exit code 0
```

Time complexity:-O(s*d*t)