

1. This function takes a string of hashtags as input and returns the length of the longest substring without repeating characters. It iterates through the string, checking each possible substring and breaking when a duplicate character is found. The variable “longest” keeps track of the maximum length of substrings without duplicates, and “hold” represents the length of the current substring being examined. The function returns the length of the longest unique-character substring found during the iteration.
2. This function prints a right-aligned triangular pattern of numbers based on the input integer “n”. It starts by printing spaces to right-align the numbers and then prints incrementing numbers on each row. The outer loop controls the rows, while the inner loops manage the spaces and the sequence of numbers. The first loop creates decreasing spaces, and the second loop prints the numbers from 1 to the current row's number. The pattern is printed row by row until the number “n” is reached.
3. The function `patient_health_data` calculates the median of two sorted arrays “d1” and “d2”. It checks if the total number of elements is odd or even. For an odd count, it iterates through both arrays, comparing elements and keeping track of the current index to find the middle element. For an even count, it tracks and compares elements from both arrays to find the two middle elements and returns their average. The function does this by directly comparing and advancing through the original arrays without creating a new one. This is done by tracking the indices separately and iterating the overall index separately.
4. The function `airplane_map` generates multiple 15x15 grid maps to represent airplane placements. For each map, it seeds the random number generator with a time-based string and an offset, then initializes a grid of zeros. It randomly selects coordinates and directions to drop airplane patterns, ensuring the drop zone is clear by checking surrounding cells. The airplanes are marked in the grid, with 1 representing the body and 2 for the head. The grid is then printed to the console and saved as a CSV file.