AP Experiment 10

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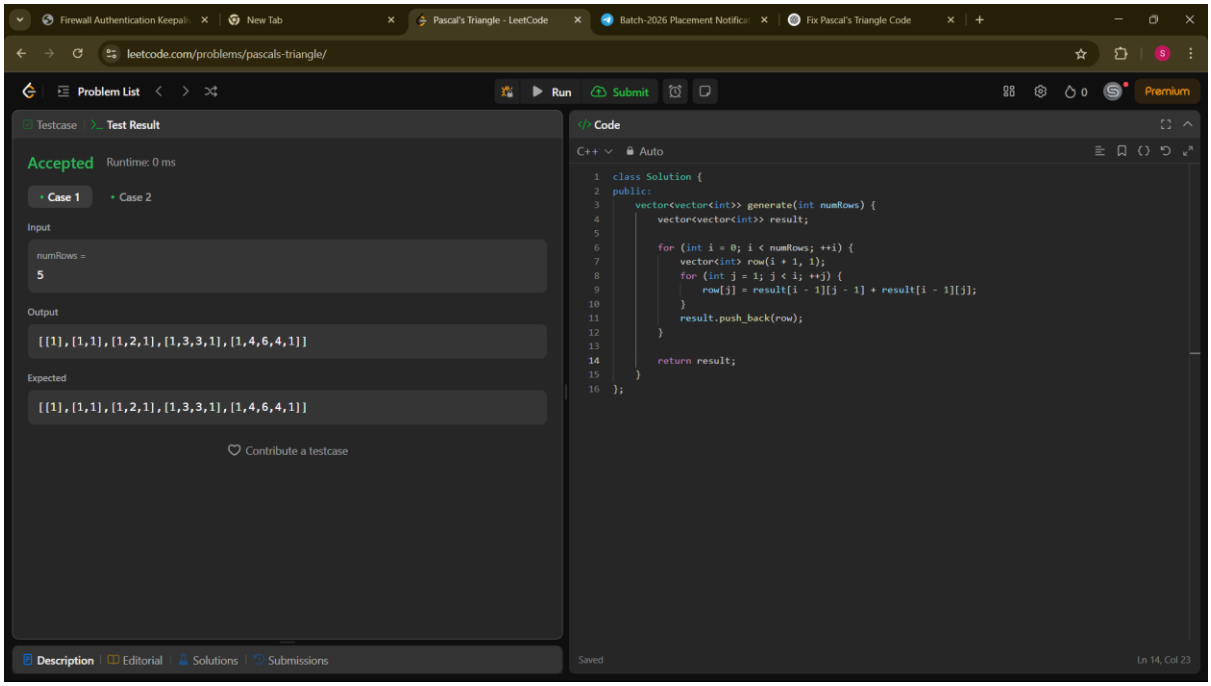
Q1. Pascal's Triangle https://leetcode.com/problems/pascals-triangle/

CODE:

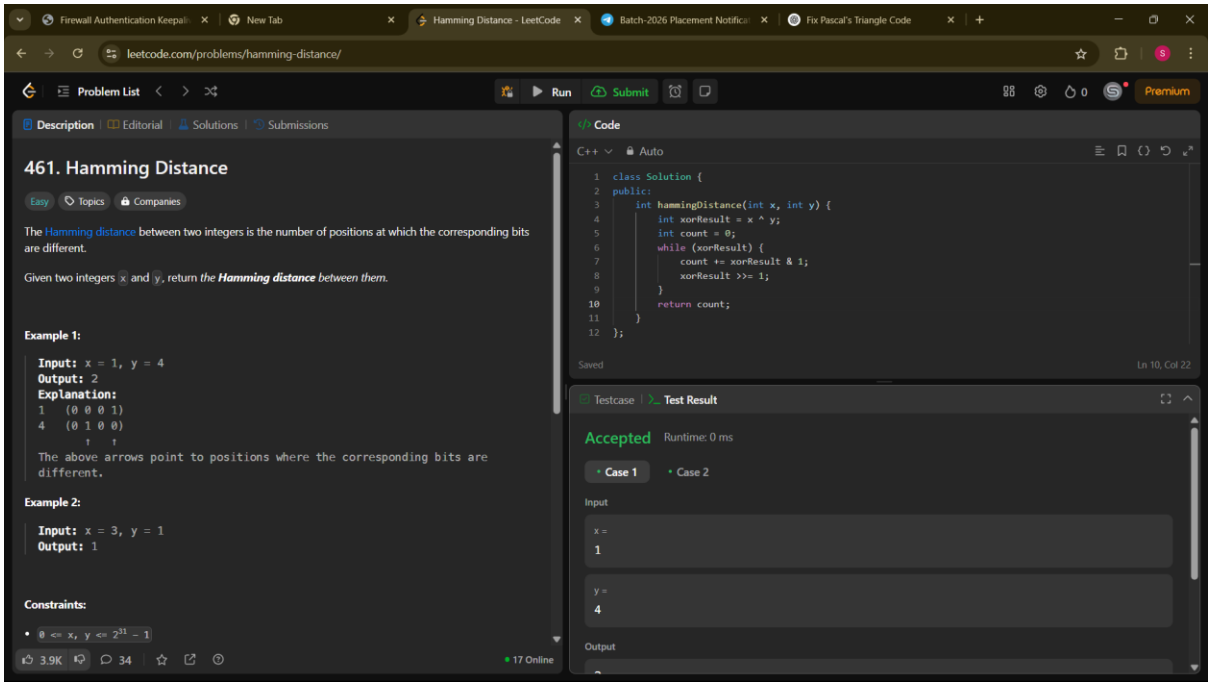
```
class Solution {
public:
    vector<vector<int>> generate(int numRows) {
        vector<vector<int>> result;

        for (int i = 0; i < numRows; ++i) {
            vector<int> row(i + 1, 1);
            for (int j = 1; j < i; ++j) {
                row[j] = result[i - 1][j - 1] + result[i - 1][j];
            }
            result.push_back(row);
        }

        return result;
    }
};
```



Q2. Hamming Distance https://leetcode.com/problems/hamming-distance/

CODE:

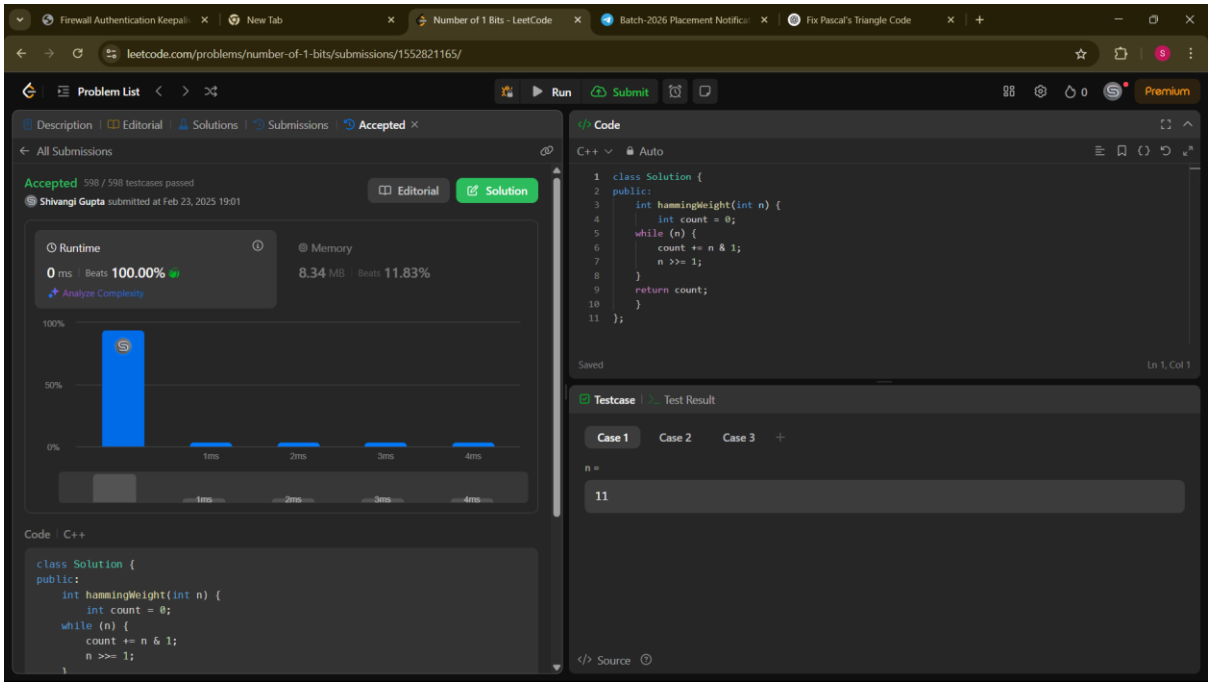
```
class Solution {
public:
    int hammingDistance(int x, int y) {
        int xorResult = x ^ y;
        int count = 0;
        while (xorResult) {
            count += xorResult & 1;
            xorResult >>= 1;
        }
        return count;
    }
};
```



Q3. Number of 1 Bits https://leetcode.com/problems/number-of-1-bits/description/

CODE:

```
class Solution {
public:
    int hammingWeight(int n) {
        int count = 0;
    while (n) {
        count += n & 1;
        n >>= 1;
    }
    return count;
    }
};
```

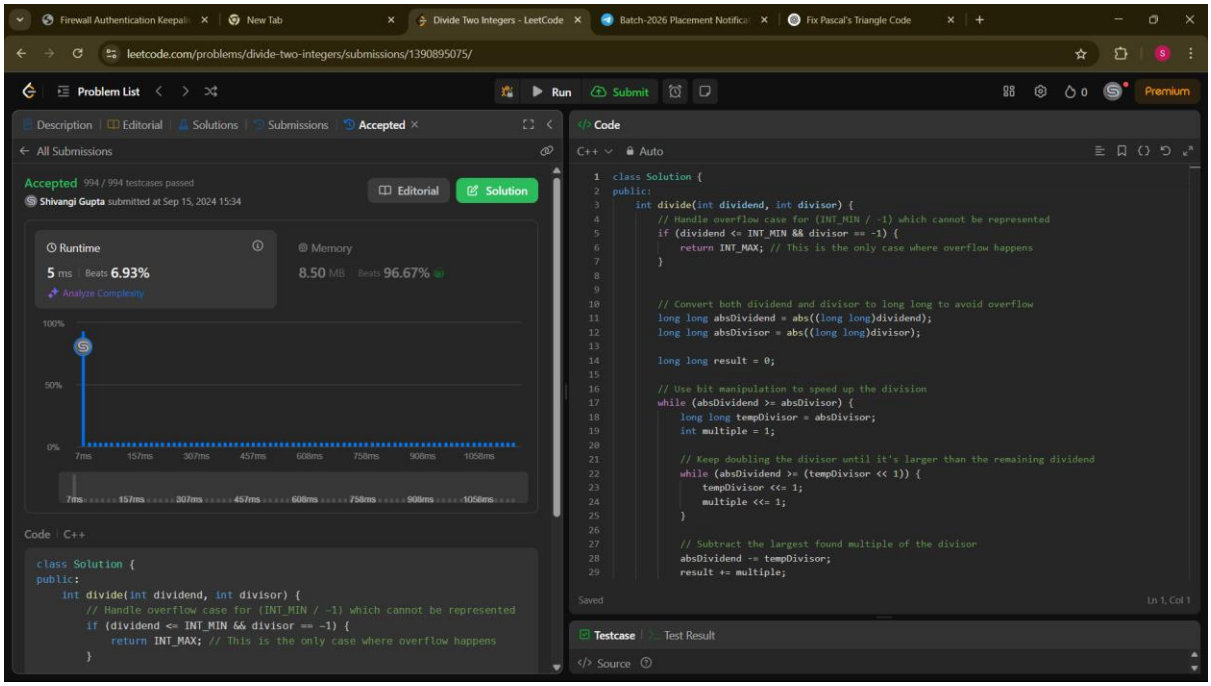


Q4. Divide two integers https://leetcode.com/problems/divide-two-integers/description/

CODE:

```
class Solution {
public:
    int divide(int dividend, int divisor) {
        // Handle overflow case for (INT_MIN / -1) which cannot be represented
        if (dividend <= INT_MIN && divisor == -1) {
            return INT_MAX; // This is the only case where overflow happens
        }


        // Convert both dividend and divisor to long long to avoid overflow
        long long absDividend = abs((long long)dividend);
        long long absDivisor = abs((long long)divisor);


        long long result = 0;
```

```
        // Use bit manipulation to speed up the division
        while (absDividend >= absDivisor) {
            long long tempDivisor = absDivisor;
            int multiple = 1;

            // Keep doubling the divisor until it's larger than the remaining dividend
            while (absDividend >= (tempDivisor << 1)) {
                tempDivisor <<= 1;
                multiple <<= 1;
            }

            // Subtract the largest found multiple of the divisor
            absDividend -= tempDivisor;
            result += multiple;
        }

        // Determine the sign of the result
        if ((dividend < 0 && divisor > 0) || (dividend > 0 && divisor < 0)) {
            result = -result;
        }

        return result;
    }
};
```



Q5. Valid parentheses https://leetcode.com/problems/valid-parentheses/description/

Code:

```
class Solution {
public:
    bool isValid(string s) {
        stack<char> st;
       for (char c : s) {
          if (c == '(' || c == '{' || c == '[') {
             st.push(c);
          } else {
             if (st.empty()) return false;
             char top = st.top();
             if ((c == ')' && top != '(') ||
                (c == '}' && top != '{') ||
                (c == ']' && top != '[')) {
                return false;
             }
             st.pop();
```

```
        }
    }
    return st.empty();
  }
};
```