DAY-3 WWC

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Section: KPIT-901

Problem-1

```cpp
main.cpp
1   #include <iostream>
2   using namespace std;
3
4   int fibonacci(int n) {
5       if (n <= 1)
6           return n;
7       return fibonacci(n - 1) + fibonacci(n - 2);
8   }
9
10  int main() {
11      int n;
12      cout << "Enter the number of terms in the Fibonacci series: ";
13      cin >> n;
14
15      cout << "Fibonacci series: ";
16      for (int i = 0; i < n; i++) {
17          cout << fibonacci(i) << " ";
18      }
19      cout << endl;
20
21      return 0;
22  }
23
```

```
input
Enter the number of terms in the Fibonacci series: 5
Fibonacci series: 0 1 1 2 3


...Program finished with exit code 0
Press ENTER to exit console.
```

Problem-2

```cpp
#include <iostream>
using namespace std;

bool isPowerOfThree(int n) {
    if (n <= 0)
        return false;
    while (n % 3 == 0) {
        n /= 3;
    }
    return n == 1;
}

int main() {
    int n;
    cout << "Enter an integer: ";
    cin >> n;

    if (isPowerOfThree(n)) {
        cout << n << " is a power of three." << endl;
    } else {
        cout << n << " is not a power of three." << endl;
    }

    return 0;
}
```

```
Enter an integer: 81
81 is a power of three.



...Program finished with exit code 0
Press ENTER to exit console.
```

Problem-3

```cpp
#include <iostream>
using namespace std;

int lastRemaining(int n) {
    int remaining = n;
    int step = 1;
    int head = 1;
    bool leftToRight = true;

    while (remaining > 1) {
        if (leftToRight || remaining % 2 == 1) {
            head += step;
        }
        step *= 2;
        remaining /= 2;
        leftToRight = !leftToRight;
    }

    return head;
}

int main() {
    int n;
    cout << "Enter the value of n: ";
    cin >> n;
```

```cpp
}

int main() {
    int n;
    cout << "Enter the value of n: ";
    cin >> n;

    cout << "The last remaining number is: " << lastRemaining(n) << endl;

    return 0;
}
```

input

```
Enter the value of n: 1234
The last remaining number is: 472


...Program finished with exit code 0
Press ENTER to exit console.
```

Problem-4

```cpp
#include <iostream>
#include <vector>
#include <string>
using namespace std;

bool isMatch(string s, string p) {
    int m = s.size();
    int n = p.size();

    vector<vector<bool>> dp(m + 1, vector<bool>(n + 1, false));

    dp[0][0] = true;

    for (int j = 1; j <= n; j++) {
        if (p[j - 1] == '*') {
            dp[0][j] = dp[0][j - 2];
        }
    }

    for (int i = 1; i <= m; i++) {
        for (int j = 1; j <= n; j++) {
            if (p[j - 1] == '.' || p[j - 1] == s[i - 1]) {
                dp[i][j] = dp[i - 1][j - 1];
            } else if (p[j - 1] == '*') {
                dp[i][j] = dp[i][j - 2];
                if (p[j - 2] == '.' || p[j - 2] == s[i - 1]) {
```

```cpp
    for (int i = 1; i <= m; i++) {
        for (int j = 1; j <= n; j++) {
            if (p[j - 1] == '.' || p[j - 1] == s[i - 1]) {
                dp[i][j] = dp[i - 1][j - 1];
            } else if (p[j - 1] == '*') {
                dp[i][j] = dp[i][j - 2];
                if (p[j - 2] == '.' || p[j - 2] == s[i - 1]) {
                    dp[i][j] = dp[i][j] || dp[i - 1][j];
                }
            }
        }
    }

    return dp[m][n];
}

int main() {
    string s, p;
    cout << "Enter the input string: ";
    cin >> s;
    cout << "Enter the pattern: ";
    cin >> p;

    if (isMatch(s, p)) {
        cout << "The string matches the pattern." << endl;
```

```
35  }
36  int main() {
37      string s, p;
38      cout << "Enter the input string: ";
39      cin >> s;
40      cout << "Enter the pattern: ";
41      cin >> p;
42
43      if (isMatch(s, p)) {
44          cout << "The string matches the pattern." << endl;
45      } else {
46          cout << "The string does not match the pattern." << endl;
47      }
48
49      return 0;
50  }
51
```

input

```
Enter the input string: abc
Enter the pattern: abc
The string matches the pattern.
```

Problem-5

main.cpp

```
1   #include <iostream>
2   using namespace std;
3
4   const int MOD = 1e9 + 7;
5
6   long long modPow(long long base, long long exp, int mod) {
7       long long result = 1;
8       while (exp > 0) {
9           if (exp % 2 == 1) {
10              result = (result * base) % mod;
11          }
12          base = (base * base) % mod;
13          exp /= 2;
14      }
15      return result;
16  }
17
18  int maxNiceDivisors(int primeFactors) {
19      if (primeFactors == 1) return 1;
20
21      int a = primeFactors / 3;
22      int b = primeFactors % 3;
23
24      if (b == 0) {
25          return modPow(3, a, MOD);
26      } else if (b == 1) {
27          return (modPow(3, a, MOD) * 4) % MOD;
```

```cpp
16  J
17
18  int maxNiceDivisors(int primeFactors) {
19      if (primeFactors == 1) return 1;
20
21      int a = primeFactors / 3;
22      int b = primeFactors % 3;
23
24      if (b == 0) {
25          return modPow(3, a, MOD);
26      } else if (b == 1) {
27          return (modPow(3, a - 1, MOD) * 4) % MOD;
28      } else { // b == 2
29          return (modPow(3, a, MOD) * 2) % MOD;
30      }
31  }
32
33  int main() {
34      int primeFactors;
35      cout << "Enter the number of prime factors: ";
36      cin >> primeFactors;
37
38      cout << "The number of nice divisors is: " << maxNiceDivisors(primeFactors) << endl;
39
40      return 0;
41  }
42
```

```
Enter the number of prime factors: 12
The number of nice divisors is: 81


...Program finished with exit code 0
Press ENTER to exit console.
```