

DAY-3 WWC

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Sec on: KPIT-901

Problem-1

```
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

```
main.cpp
1  #include <iostream>
2  using namespace std;
3
4  bool isPowerOfThree(int n) {
5      if (n <= 0)
6          return false;
7      while (n % 3 == 0) {
8          n /= 3;
9      }
10     return n == 1;
11 }
12
13 int main() {
14     int n;
15     cout << "Enter an integer: ";
16     cin >> n;
17
18     if (isPowerOfThree(n)) {
19         cout << n << " is a power of three." << endl;
20     } else {
21         cout << n << " is not a power of three." << endl;
22     }
23
24     return 0;
25 }
26
```

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

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

Problem-3

```
main.cpp
1  #include <iostream>
2  using namespace std;
3
4  int lastRemaining(int n) {
5      int remaining = n;
6      int step = 1;
7      int head = 1;
8      bool leftToRight = true;
9
10     while (remaining > 1) {
11         if (leftToRight || remaining % 2 == 1) {
12             head += step;
13         }
14         step *= 2;
15         remaining /= 2;
16         leftToRight = !leftToRight;
17     }
18
19     return head;
20 }
21
22 int main() {
23     int n;
24     cout << "Enter the value of n: ";
25     cin >> n;
26
27     cout << "The last remaining number is: " << lastRemaining(n) << endl;
28
29     return 0;
30 }
31
```

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

```
main.cpp
1  #include <iostream>
2  #include <vector>
3  #include <string>
4  using namespace std;
5
6  bool isMatch(string s, string p) {
7      int m = s.size();
8      int n = p.size();
9
10     vector<vector<bool>> dp(m + 1, vector<bool>(n + 1, false));
11
12     dp[0][0] = true;
13
14     for (int j = 1; j <= n; j++) {
15         if (p[j - 1] == '*') {
16             dp[0][j] = dp[0][j - 2];
17         }
18     }
19
20     for (int i = 1; i <= m; i++) {
21         for (int j = 1; j <= n; j++) {
22             if (p[j - 1] == '.' || p[j - 1] == s[i - 1]) {
23                 dp[i][j] = dp[i - 1][j - 1];
24             } else if (p[j - 1] == '*') {
25                 dp[i][j] = dp[i][j - 2];
26                 if (p[j - 2] == '.' || p[j - 2] == s[i - 1]) {
```

```
main.cpp
20         for (int i = 1; i <= m; i++) {
21             for (int j = 1; j <= n; j++) {
22                 if (p[j - 1] == '.' || p[j - 1] == s[i - 1]) {
23                     dp[i][j] = dp[i - 1][j - 1];
24                 } else if (p[j - 1] == '*') {
25                     dp[i][j] = dp[i][j - 2];
26                     if (p[j - 2] == '.' || p[j - 2] == s[i - 1]) {
27                         dp[i][j] = dp[i][j] || dp[i - 1][j];
28                     }
29                 }
30             }
31         }
32
33         return dp[m][n];
34     }
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         }
```

```
34 }
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;
```

```

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 - 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.