

Solutions to UVa 498 and UVa 10341

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1 Problem: UVa 498 - Polly the Polynomial

1.1 Solution Explanation

This problem requires evaluating a polynomial at given points using Horner's method for efficiency.

1.2 C++ Solution

```
1  #include <bits/stdc++.h>
2
3  using namespace std;
4
5  long long evaluatePolynomial(vector<long long>& coefficients,
6                               long long x)
7  {
8      long long result = 0;
9      for (int i = 0; i < coefficients.size(); i++)
10     {
11         result = result * x + coefficients[i];
12     }
13     return result;
14 }
15
16 int main()
17 {
18     string line;
19
20     while (getline(cin, line))
21     {
22         vector<long long> coefficients;
```

```

23         long long num;
24
25         while (ss >> num) coefficients.push_back(num);
26
27         getline(cin, line);
28         ss.clear();
29         ss.str(line);
30
31         bool first = true;
32         while (ss >> num)
33         {
34             if (!first) cout << "␣";
35             cout << evaluatePolynomial(coefficients, num);
36             first = false;
37         }
38         cout << endl;
39     }
40
41     return 0;
42 }

```

Listing 1: C++ Solution for UVa 498

GitHub Link: [Uva 498 Solution](#)

2 Problem: UVa 10341 - Solve It

2.1 Solution Explanation

This problem requires solving a nonlinear equation using the **bisection method**.

- Evaluate the function at $x = 0$ and $x = 1$ to check if a root exists.
- If $f(0) \times f(1) > 0$, no solution exists.
- Otherwise, apply the **bisection method** to find the root within an accuracy of 10^{-7} .

2.2 C++ Solution

```

1 #include <bits/stdc++.h>
2 using namespace std;
3
4 const double EPS = 1e-7;
5

```

```

6  int p, q, r, s, t, u;
7
8  double f(double x)
9  {
10     return p * exp(-x) + q * sin(x) + r * cos(x) + s * tan(x)
        + t * x * x + u;
11 }
12
13 double bisection()
14 {
15     double lo = 0, hi = 1, mid;
16     while (hi - lo > EPS)
17     {
18         mid = (lo + hi) / 2.0;
19         if (f(lo) * f(mid) <= 0)
20             hi = mid;
21         else
22             lo = mid;
23     }
24     return (lo + hi) / 2.0;
25 }
26
27 int main()
28 {
29     while (cin >> p >> q >> r >> s >> t >> u)
30     {
31         if (f(0) * f(1) > 0)
32         {
33             cout << "No solution\n";
34         }
35         else
36         {
37             printf("%.4f\n", bisection());
38         }
39     }
40     return 0;
41 }

```

Listing 2: C++ Solution for UVa 10341

GitHub Link: [Uva 10341 Solution](#)