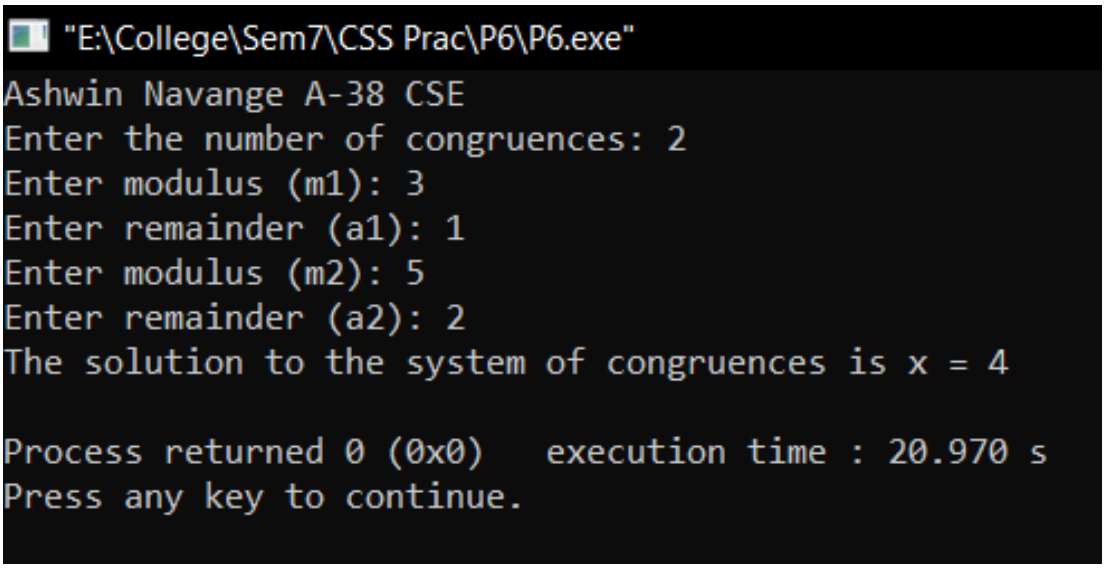
PRACTICAL - 06

Code:

```
// Ashwin Navange A-38 CSE
#include <iostream>
using namespace std;

long long extended_gcd(long long a, long long b, long long &x, long long &y) {
   if (a == 0) {
      x = 0;
      y = 1;
      return b;
   }
   long long x1, y1;
   long long gcd = extended_gcd(b % a, a, x1, y1);
   x = y1 - (b / a) * x1;
   y = x1;
   return gcd;
}
long long chinese_remainder_theorem(long long num[], long long rem[], int n) {
   long long prod = 1;
   for (int i = 0; i < n; i++) {
      prod *= num[i];
   }
   long long result = 0;
   for (int i = 0; i < n; i++) {
      long long pp = prod / num[i];
      long long x, y;
      extended_gcd(num[i], pp, x, y);
      result += rem[i] * pp * x;
   }
   return result % prod;
}
int main() {
   int n;
   cout << "Ashwin Navange A-38 CSE"<<endl;
   cout << "Enter the number of congruences: ";
   cin >> n;
   long long num[n], rem[n];
   for (int i = 0; i < n; i++) {
      cout << "Enter modulus (m" << i + 1 << "): ";
      cin >> num[i];
      cout << "Enter remainder (a" << i + 1 << "): ";
      cin >> rem[i];
   }
   long long result = chinese_remainder_theorem(num, rem, n);
   cout << "The solution to the system of congruences is x = " << result << endl;
   return 0;
}
```

Output:


"E:\College\Sem7\CSS Prac\P6\P6.exe"
Ashwin Navange A-38 CSE
Enter the number of congruences: 2
Enter modulus (m1): 3
Enter remainder (a1): 1
Enter modulus (m2): 5
Enter remainder (a2): 2
The solution to the system of congruences is x = 4
Process returned 0 (0x0) execution time : 20.970 s
Press any key to continue.