

## سؤال اول) آب خوردن

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

int main() {
    long long k = 1388;
    for (int i=2; i<=2010; i++)
        k = (k * 1388) % 1000000;

    int s = 1;
    for (; k > 0; k /= 10)
        s *= k % 10;
    cout << s << endl;
    return 0;
}
```

## سؤال دوم) اعداد اول‌ناچی

```
#include <iomanip>
#include <iostream>
#include <vector>
using namespace std;

const int MAX = 1000*1000;

vector<int> fibo;

int main() {
    fibo.push_back(2);
    fibo.push_back(3);
    while (true) {
        int n = fibo.size();
        int k = fibo[n-1] + fibo[n-2];
        if (k > MAX) break;
        fibo.push_back(k);
    }

    int all = 0, good = 0;
    for (int i=MAX/10; i<MAX; i++) {
        all++;
        for (int j=0; j<fibo.size() && fibo[j] <= i; j++)
            if (i % fibo[j] == 0)
                goto hell;
        good++;
    hell: ;
    }

    double d = double(good) / all * 100;
    cerr << fixed << setprecision(10) << d << endl;

    return 0;
}
```

## سؤال سوم) تولدت مبارک!

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

typedef long long LL;

const int MAX_N = 100;

LL c[MAX_N][MAX_N];

int main() {
    int n = 66;
    c[0][0] = 1;
    for (int i=1; i<=n; i++) {
        c[i][0] = c[i][i] = 1;
        for (int j=1; j<i; j++)
            c[i][j] = c[i-1][j] + c[i-1][j-1];
    }

    LL k = c[66][33];
    int sum = 0;
    for (; k>0; k/= 10)
        sum += (k%10);
    cout << sum << endl;

    return 0;
}
```

## سؤال چهارم) چهارمین پرمقسوم‌علیه‌ترین

```

#include <iostream>
#include <vector>
using namespace std;

const int N = 10*1000*1000;
bool p[N];
int f[N], a[N];
vector<int> primes;

bool fcmp(const int &x, const int &y)
{ return f[x] > f[y]; }

int main() {
    for (int i=2; i<=N; i++)
        if (!p[i]) {
            for (int j=i; j<=N; j+=i)
                p[j] = true;
            primes.push_back(i);
        }

    for (int i=1; i<=N; i++) {
        int k = i;
        int ans = 1;
        for (int j=0; j<primes.size(); j++) {
            int y = primes[j];
            if (y * y > k) break;
            int c = 0;
            for (; k % y == 0; k /= y)
                c++;
            ans *= (c+1);
        }

        if (k > 1)
            ans *= (1 + 1);
        f[i] = ans;
    }

    for (int i=1; i<=N; i++) a[i] = i;
    sort(a+1, a+N+1, fcmp);
    cout << a[4] << endl;

    return 0;
}

```

## سؤال پنجم) ماهی سیاه کوچولو

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

vector<int> path;

int numones(int x) {
    int c = 0;
    for (; x > 0; x/= 2)
        c += (x % 2);
    return c;
}

int mask;
#define cell(x,y) ((mask >> (x*5+y)) & 1)

int main() {
    for (int i=0; i<(1<<8); i++)
        if (numones(i) == 4)
            path.push_back(i);

    int ans = 0;
    for (mask = 0; mask <(1<<25); mask++) {
        if (cell(0,0) == 0 || cell(4,4) == 0) continue;

        int c = 0;
        for (int k=0; k<(int)path.size(); k++) {
            int curx = 0, cury = 0;
            for (int j=0; j<8; j++) {
                if ((path[k] >> j) & 1) curx++; else cury++;
                if (cell(curx,cury) == 0) goto nextpath;
            }
            c++;
            nextpath: ;
        }
        ans += (c == 1);
    }

    cout << ans << endl;

    return 0;
}
```

## سؤال ششم) بارم بندی

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

#define FA(x) for (a[x] = (x?a[x-1]:10); a[x] <= 25; a[x]++)

int main() {
    int a[6];
    int m = 0;
    FA(0) FA(1) FA(2) FA(3) FA(4) {
        a[5] = 100;
        for (int i=0; i<5; i++)
            a[5] -= a[i];
        if (a[5] < 10 || a[5] > 25 || a[5] < a[4])
            continue;

        vector<int> v; v.clear();
        for (int i=0; i < (1 << 6); i++) {
            int g = 0;
            for (int k=0; k<6; k++)
                if ((i >> k) & 1) g += a[k];
            v.push_back(g);
        }

        int r = v.size();
        sort(v.begin(), v.end());
        for (int i=1; i<v.size(); i++)
            if (v[i] == v[i-1]) r--;
        m = max(r,m);
    }

    cout << m << endl;

    return 0;
}
```