Shri Vile Parle Kelavani Mandal's

INSTITUTE OF TECHNOLOGY

DHULE (M.S.)

DEPARMENT OF COMPUTER ENGINEERING

Remark

Subject: Competitive Programming Lab (BTCOL606)

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Class : T.Y Comp   **Batch : T2**   **Division: T**

Signature

Expt. No. :13   **Date :**

Title : Problem 13:

Code:

```
// MOHAMMAD_ANAS_31_TY_COMP

#include <bits/stdc++.h>

using namespace std;

using ll = long long;


int main() {

    ios::sync_with_stdio(false);

    cin.tie(nullptr);


    vector<ll> dp(10001, LLONG_MAX);

    dp[0] = 0;

    dp[1] = 1;


    vector<ll> pow2(10001);
```

```cpp
pow2[0] = 1;
for (int i = 1; i <= 10000; ++i) {
    if (pow2[i-1] > LLONG_MAX / 2) {
        pow2[i] = LLONG_MAX;
    } else {
        pow2[i] = pow2[i-1] * 2;
    }
}


for (int i = 2; i <= 10000; ++i) {
    for (int k = 1; k < i; ++k) {
        if (dp[k] == LLONG_MAX || pow2[i-k] == LLONG_MAX) continue;
        // Check if 2 * dp[k] would overflow
        if (dp[k] > (LLONG_MAX - (pow2[i-k] - 1)) / 2) continue;
        ll moves = 2 * dp[k] + (pow2[i-k] - 1);
        if (moves < dp[i]) {
            dp[i] = moves;
        }
    }
}

int n;
while (cin >> n) {
    cout << dp[n] << '\n';
}
```
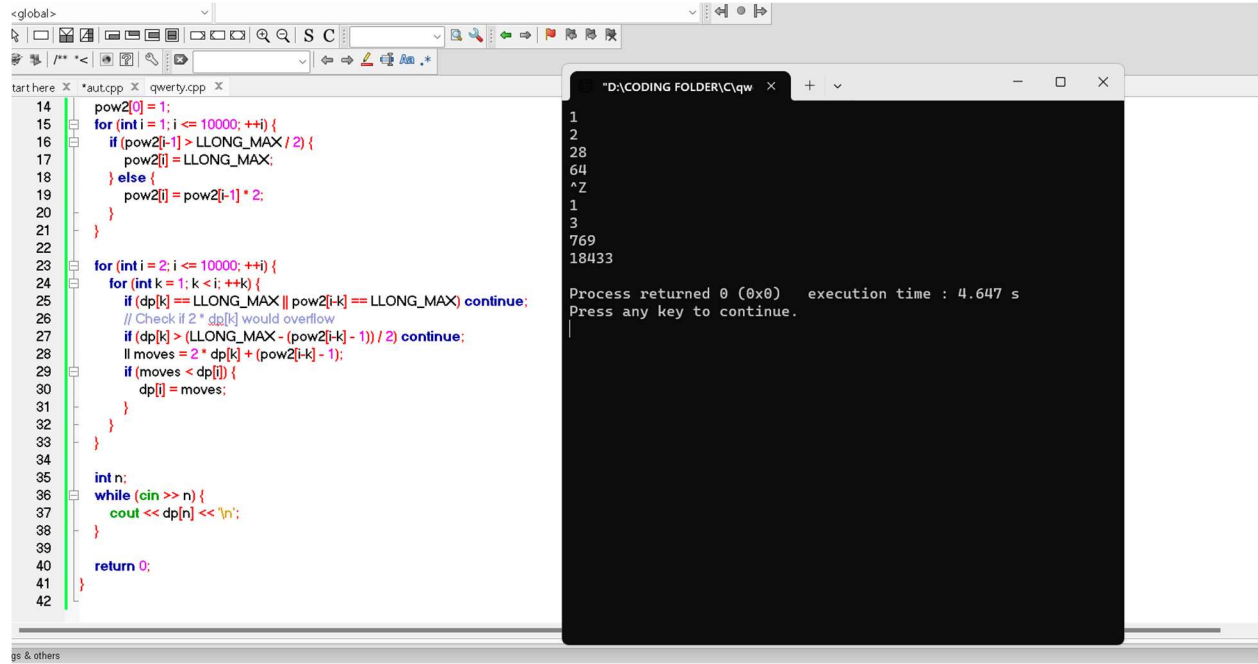
return 0;

}Output:

```cpp
14        pow2[0] = 1;
15        for (int i = 1; i <= 10000; ++i) {
16            if (pow2[i-1] > LLONG_MAX / 2) {
17                pow2[i] = LLONG_MAX;
18            } else {
19                pow2[i] = pow2[i-1] * 2;
20            }
21        }
22
23        for (int i = 2; i <= 10000; ++i) {
24            for (int k = 1; k < i; ++k) {
25                if (dp[k] == LLONG_MAX || pow2[i-k] == LLONG_MAX) continue;
26                // Check if 2 * dp[k] would overflow
27                if (dp[k] > (LLONG_MAX - (pow2[i-k] - 1)) / 2) continue;
28                ll moves = 2 * dp[k] + (pow2[i-k] - 1);
29                if (moves < dp[i]) {
30                    dp[i] = moves;
31                }
32            }
33        }
34
35        int n;
36        while (cin >> n) {
37            cout << dp[n] << '\n';
38        }
39
40        return 0;
41    }
42
```

```
1
2
28
64
^Z
1
3
769
18433

Process returned 0 (0x0)    execution time : 4.647 s
Press any key to continue.
```