

WORKSHEET 1

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DOMAIN CAMP: 16-01-2023 to 28-01-2023

Subject Name: IT Skills (DSA)

UID: 21BCS8129

Section/Group: DWWC-77

Question 1. FIRE & ICE

```
Language: C++14

1  #include <stdio.h>
2
3  #include<inttypes.h>
4
5
6
7  void multiply(uint64_t F[2][2], uint64_t M[2][2],uint64_t k);
8
9
10
11 void power(uint64_t F[2][2], uint64_t n,uint64_t k);
12
13 uint64_t fib(uint64_t n,uint64_t k)
14
15 {
16
17     uint64_t F[2][2] = {{1,1},{1,0}};
18
19     if (n == 0)
20
21         return 0;
22
23     power(F, n-1,k);
24
25     return F[0][0];
26
27 }
28
29
30
31 /* Optimized version of power() in method 4 */
32
33 void power(uint64_t F[2][2], uint64_t n,uint64_t k)
34
```

```

34
35 {
36
37     if( n == 0 || n == 1)
38         return;
39
40     uint64_t M[2][2] = {{1,1},{1,0}};
41
42
43
44
45     power(F, n/2,k);
46
47     multiply(F, F,k);
48
49
50     if (n%2 != 0)
51         multiply(F, M, k);
52
53 }
54
55
56
57
58
59 void multiply(uint64_t F[2][2], uint64_t M[2][2],uint64_t k)
60
61 {
62
63     uint64_t x = (F[0][0]*M[0][0] + F[0][1]*M[1][0])%k;
64     uint64_t y = (F[0][0]*M[0][1] + F[0][1]*M[1][1])%k;
65     uint64_t z = (F[1][0]*M[0][0] + F[1][1]*M[1][0])%k;
66     uint64_t w = (F[1][0]*M[0][1] + F[1][1]*M[1][1])%k;
67
68
69     F[0][0] = x;
70     F[0][1] = y;
71     F[1][0] = z;
72     F[1][1] = w;
73
74
75
76
77
78
79
80
81 }
82

```

```

82
83 int main()
84
85 {
86
87     uint64_t n,k,t;
88
89     scanf("%llu",&t);
90
91     while(t-->0)
92     {
93
94         scanf("%llu",&n);
95         scanf("%llu",&k);
96
97         printf("%llu\n", (2*fib(n,k))%k);
98
99     }
100
101     return 0;
102
103
104
105 }

```

SOLUTION:

Status: ✔ Correct Answer

Submission ID: [84133067](#)

Score: 100

Time: 0.58s

Memory: 5.3M

Sub-Task	Task #	Result (time)
1	0	AC (0.323320)
Subtask Score: 10.00%		Result - AC
2	1	AC (0.559308)
Subtask Score: 30.00%		Result - AC
3	2	AC (0.579833)
Subtask Score: 60.00%		Result - AC
Total Score = 100.00%		

Question 2. GOLD MINING

```

Language: C++14
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      // your code goes here
6      int t;
7      cin>>t;
8      while(t--){
9          int N,X,Y;
10         cin>>N>>X>>Y;
11         int max_g = (N+1)*Y;
12
13         if(max_g>=X)
14             cout<<"YES"<<" ";
15         else
16             cout<<"NO"<<" ";
17     }
18     return 0;
19 }

```

SOLUTION:

Status: ✓ Correct Answer

Submission ID: [84135059](#)

Score:	Time:	Memory:
100	0.01s	5.3M

Sub-Task	Task #	Result (time)
1	1	AC (0.003820)
1	2	AC (0.005502)
1	3	AC (0.005810)

Subtask Score: 100.00%

Result - AC

Total Score = 100.00%

Question 3. SMALL FCATORIALS

```

Language: C++14
1 // We have populated the solutions for the 10 easiest problems for your support.
2 // Click on the SUBMIT button to make a submission to this problem.
3
4 #include <bits/stdc++.h>
5 #include <boost/multiprecision/cpp_int.hpp>
6 #include <iostream>
7 using namespace std;
8 using namespace boost::multiprecision;
9
10 cpp_int fact(int n){
11
12     if (n<=1){
13         return 1;
14     }
15     return n*fact(n-1);
16 }
17
18 int main() {
19     // your code goes here
20     int t;
21     cin>>t;
22     while(t-->0)
23     {
24         int n;
25         cin>>n;
26         cout<<fact(n)<<endl;
27     }
28     return 0;
29 }
30
31

```

SOLUTION:

Status: ✓ Correct Answer			Submission ID: 84132016
Time: 0.00s	Memory: 5.3M		

Question 4. SUM OF DIGITS

```
Language: C++14

1 // We have populated the solutions for the 10 easiest problems for your support.
2 // Click on the SUBMIT button to make a submission to this problem.
3
4 #include <iostream>
5 using namespace std;
6
7 int main()
8 {
9     int t;
10    cin>>t;
11
12    while(t-->0)
13    {
14        int n;
15        cin>>n;
16
17        int sum=0;
18
19        while(n>0)
20        {
21            sum+=(n%10);
22            n/=10;
23        }
24        cout<<sum<<"\n";
25    }
26    return 0;
27 }
28
29
30
```

SOLUTION:

Status: ✓ Correct Answer Submission ID: [84132934](#)

Time:	Memory:
0.00s	5.1M

Question 5. THE LEAD GAME

```
Language: C++14

1  #include <bits/stdc++.h>
2  using namespace std;
3
4  int main() {
5      int t;
6      cin>>t;
7      int max=0,leadp=0,c1=0,c2=0;
8      for(int i=0;i<t;i++){
9          int x,y;
10         cin>>x>>y;
11         c1+=x;
12         c2+=y;
13         if(c1>c2){
14             int lead=c1-c2;
15             if(lead>max){
16                 max=lead;
17                 leadp=1;
18             }
19         }
20         else{
21             int lead=c2-c1;
22             if(lead>max){
23                 max=lead;
24                 leadp=2;
25             }
26         }
27     }cout<<leadp<<" "<<max;
28     // your code goes here
29     return 0;
30 }
```

SOLUTION:

Status: ✓ Correct Answer Submission ID: [84198770](#)

Time:	Memory:
0.01s	5.3M

Question 6. SUMS IN A TRIANGLE

```
Language: C++14

1 #include <bits/stdc++.h>
2 using namespace std;
3
4 int solve(int i,int j,vector<vector<int>> tri,int n,vector<vector<int>> &dp)
5 {
6     if(i==n-1)
7         return tri[i][j];
8     if(dp[i][j]!=-1)
9         return dp[i][j];
10    int below=tri[i][j] + solve(i+1,j,tri,n,dp);
11    int diag=tri[i][j] + solve(i+1,j+1,tri,n,dp);
12    return dp[i][j]=max(below,diag);
13 }
14
15 int main() {
16     // your code goes here
17     int t;
18     cin>>t;
19     while(t-->0)
20     {
21         int n;
22         cin>>n;
23         vector<vector<int>> tri;
24         for(int i=1;i<=n;i++)
25         {
26             vector<int> temp;
27             for(int j=1;j<=i;j++)
28             {
29                 int x;
30                 cin>>x;
31                 temp.push_back(x);
32             }
33             tri.push_back(temp);
34         }
35     }
36 }
```

```

31         temp.push_back(x);
32     }
33     tri.push_back(temp);
34 }
35
36 vector<vector<int>> dp(n,vector<int>(n,0));
37
38 for(int k=0;k<n;k++)
39     dp[n-1][k]=tri[n-1][k];
40
41 for(int i=n-2;i>=0;i--)
42 {
43     for(int j=i;j>=0;j--)
44     {
45         int below=tri[i][j]+dp[i+1][j];
46         int diag=tri[i][j]+dp[i+1][j+1];
47         dp[i][j]=max(below,diag);
48     }
49 }
50 cout<<dp[0][0]<<endl;
51 }
52
53 return 0;
54 }
```

SOLUTION:

Status: ✓ Correct Answer Submission ID: [84199142](#)

Time: 0.12s Memory: 5.3M

Question 7. CHEF ON VACATION

```

Language: C++14

1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     // your code goes here
6     int t;
7     cin >> t;
8
9     while(t--){
10         long long int x,y,z;
11         cin >>x>>y>>z;
12
13         long long int goVacations = x+y;
14         if(goVacations <= z){
15             cout<<"YES"<<endl;
16         }
17         else{
18             cout<<"NO"<<endl;
19         }
20     }
21     return 0;
22 }
  
```

SOLUTION:

Status: ✓ Correct Answer Submission ID: [84133972](#)

Score: 100 Time: 0.01s Memory: 5.3M

Sub-Task	Task #	Result (time)
1	0	AC (0.004150)
1	1	AC (0.006497)
Subtask Score: 100.00%		Result - AC
Total Score = 100.00%		