DSA Worksheet

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Solutions:

1. **Important Pages:**

Code:

```
/* package codechef; // don't place package name! */

import java.util.*;
import java.lang.*;
import java.io.*;

/* Name of the class has to be "Main" only if the class is public. */
class Codechef
{
        public static void main (String[] args) throws java.lang.Exception
        {
           Scanner input = new Scanner(System.in);
           int A = input.nextInt();
           int B = input.nextInt();
           if(A == 1 && B == 1){
             System.out.println("https://discuss.codechef.com");
           }
           else if (A == 1 && B == 0){
             System.out.println("https://www.codechef.com/contests");
           }
           else if(A==0){
             System.out.println("https://www.codechef.com/practice");
           }
        }
}
```

2. Mixtures:

Code:

```
#include <bits/stdc++.h>

 using namespace std;

 const int N =105;

 int n, a[N], pref[N], dp[N][N];

 int main() {

while (cin >> n) {

   for (int i = 1; i <= n; ++i) {

      cin >> a[i];

      pref[i] = pref[i-1] + a[i];

   }

   for (int L = n; L >= 1; --L) {

for (int R = L; R <= n; ++R) {

   if (L == R) {

      dp[L][R] = 0;

      continue;

   }

   if (R - L == 1) {

      dp[L][R] = a[L] * a[R];

      continue;

   }

   dp[L][R] = INT_MAX;

   for (int P = L; P < R; ++P) {

      int a = (pref[P] - pref[L-1]) % 100;

      int b = (pref[R] - pref[P]) % 100;

      int c = (a * b);

      dp[L][R] = min(dp[L][R], dp[L][P] + dp[P+1][R] + c);
```

```
            }
        }
    }
    cout << dp[1][n] << endl;
        }
        return 0;
}
```

3. Fire and Ice:

Code:

```
#include <stdio.h>
#include<inttypes.h>
void multiply(uint64_t F[2][2], uint64_t M[2][2],uint64_t k);
void power(uint64_t F[2][2], uint64_t n,uint64_t k);
uint64_t fib(uint64_t n,uint64_t k)
{
  uint64_t F[2][2] = {{1,1},{1,0}};
  if (n == 0)
    return 0;
  power(F, n-1,k);
  return F[0][0];
}
void power(uint64_t F[2][2], uint64_t n,uint64_t k)
{
  if( n == 0 || n == 1)
     return;
  uint64_t M[2][2] = {{1,1},{1,0}};
  power(F, n/2,k);
```

```
  multiply(F, F,k);
  if (n%2 != 0)
     multiply(F, M, k);
}
void multiply(uint64_t F[2][2], uint64_t M[2][2],uint64_t k)
{
uint64_t x =  (F[0][0]*M[0][0] + F[0][1]*M[1][0])%k;
  uint64_t y =  (F[0][0]*M[0][1] + F[0][1]*M[1][1])%k;
  uint64_t z =  (F[1][0]*M[0][0] + F[1][1]*M[1][0])%k;
  uint64_t w =  (F[1][0]*M[0][1] + F[1][1]*M[1][1])%k;
  F[0][0] = x;
  F[0][1] = y;
  F[1][0] = z;
  F[1][1] = w;
}
int main()
{
  uint64_t n,k,t;
  scanf("%llu",&t);
  while(t--)
  {
  scanf("%llu",&n);
  scanf("%llu",&k);
  printf("%llu\n", (2*fib(n,k))%k);
  }
  return 0;
}
```

4. Binod and Chocolates:

Code:

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

int main()
{
   int T;
   cin>>T;
   while(T--)
   {
      int A,B;
      cin>>A>>B;
      if(A%3 == 0 || B%3 == 0 || (A+B)%3 == 0)
      {
         cout<<"YES"<<endl;
      }
      else
      {
         cout<<"NO"<<endl;
      }
   }
   return 0;
}
```

5. Special Fibonacci:

Code:

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

int main() {
    int t;
    cin>>t;
    while(t--){
       int a,b,n;
       cin>>a>>b>>n;
       if(n%3==0){
          cout<<a<<endl;
       }else if(n%3==1){
          cout<<b<<endl;
       }else{
          cout<<(a^b)<<endl;
       }
    }
    return 0;
}
```