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/* This program calculates the Key for two persons
using the Diffie-Hellman Key exchange algorithm */
#include<stdio.h>
#include<math.h>

// Power function to return value of a ^ b mod P
long long int power(long long int a, long long int b,
                                                    long long int P)
{
        if (b == 1)
                return a;

        else
                return (((long long int)pow(a, b)) % P);
}

//Driver program
int main()
{
        long long int P, G, x, a, y, b, ka, kb;

        // Both the persons will be agreed upon the
                // public keys G and P
        P = 23; // A prime number P is taken
        printf("The value of P : %lld\n", P);

        G = 9; // A primitive root for P, G is taken
        printf("The value of G : %lld\n\n", G);
```

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	// Alice will choose the private key a
	a = 4; // a is the chosen private key
	printf("The private key a for Alice : %lld\n", a);
	x = power(G, a, P); // gets the generated key

	// Bob will choose the private key b
	b = 3; // b is the chosen private key
	printf("The private key b for Bob : %lld\n\n", b);
	y = power(G, b, P); // gets the generated key

	// Generating the secret key after the exchange
		// of keys
	ka = power(y, a, P); // Secret key for Alice
	kb = power(x, b, P); // Secret key for Bob

	printf("Secret key for the Alice is : %lld\n", ka);
	printf("Secret Key for the Bob is : %lld\n", kb);

	return 0;
}
```