EXP NO:6

DATE:2/3/24 **DSA**

Aim: To implement Digital Signature Algorithm (DSA) using C.

Algorithm:

- Step 1: Include the necessary header files #include <stdio.h> and #include <math.h>.
- Step 2: Declare the required variables for the program, including integers for prime numbers, private keys, hash value, and computed values like ��g, ��r, and ��s.
- Step 3: Prompt the user to enter the prime number ��p and the prime divisor ��q of (��−1) (p−1). Also, prompt the user to enter *h*h such that it's greater than 1 and less than (��−1)(p−1).
- Step 4: Calculate ��g using the function power(h,t,p).
- Step 5: Prompt the user to enter their private key ��x and per-message secret key ��k. Also, prompt the user to enter the hash value ��M.
- Step 6: Compute ��r and ��s values for the signature using the provided formulas.
- Step 7: Print the computed values of ��g, ��y, ��r, and ��s.
- Step 8: Define the power function to calculate the power of a number modulo ��p.
- Step 9: Define the multiplicativeInverse function to find the multiplicative inverse of a number modulo ��n.

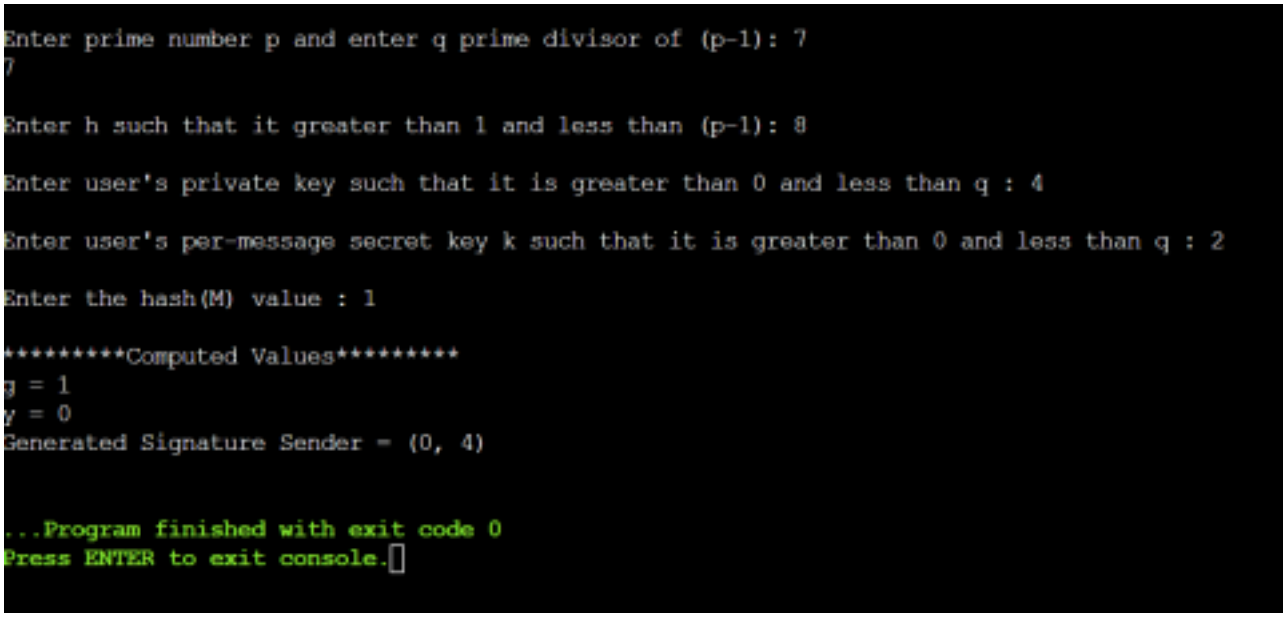
Program:

```
#include <stdio.h> #include
<math.h> int
power(int,unsigned int,int);
int multiplicativeInverse(int,int,int);
int main() {
int p,q,h,g,r,s,t,x,y,z,k,inv,hash;

printf("\nEnter prime number p and enter q prime divisor of (p-1): "); scanf("%d
%d",&p,&q);
printf("\nEnter h such that it greater than 1 and less than (p-1): ");
```

```
scanf("%d",&h); g = power(h,t,p);
printf("\nEnter user's private key such that it is greater than 0 and less than q : ");
scanf("%d",&x);
printf("\nEnter user's per-message secret key k such that it is greater than 0 and less
than q : ");
scanf("%d",&k);
printf("\nEnter the hash(M) value : "); scanf("%d",&hash);
r = z % q; inv = multiplicativeInverse(k,q,p); s
= inv * (hash + x * r) % q;
printf("\n*********Computed Values*********");
printf("\ng = %d",g); printf("\ny = %d",y);
printf("\nGenerated Signature Sender = (%d, %d) \n",r,s);
} int power(int x, unsigned int y, int
p)
{ int res =
1; x = x
% p; { res = (res
* x) % p;
} return res;
}
int multiplicativeInverse(int a, int b, int n)
{ int sum,x,y;
for(y=0;y<n;y++)
{
for(x=0;x<n;x++)
{
sum = a * x + b * (-y);
if(sum == 1) return x;
}
}
}
```

Output:



Result: To implement Digital Signature Algorithm (DSA) using C been Executed successfully.