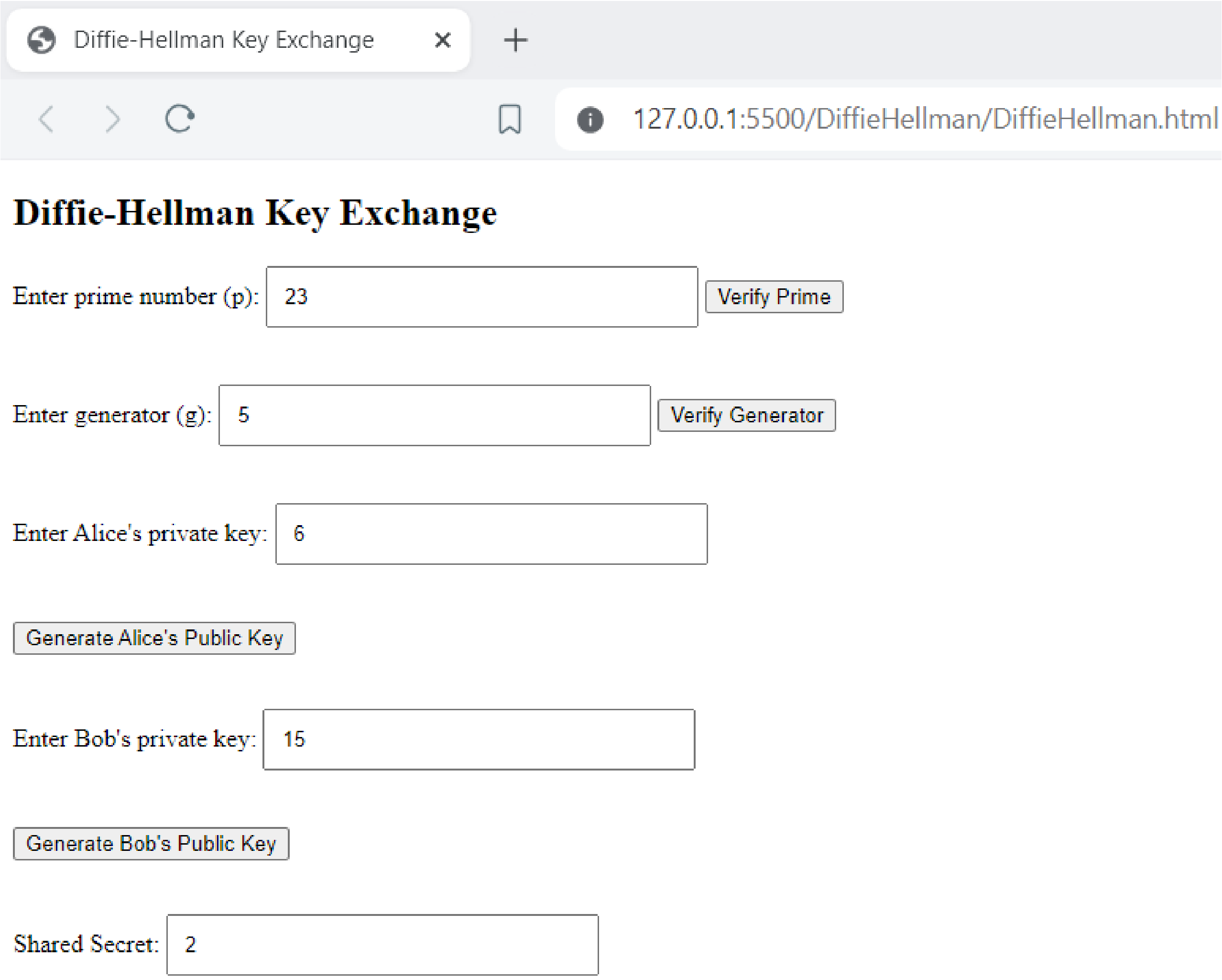
```html
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Diffie-Hellman Key Exchange</title>
<link rel="stylesheet" type="text/css" href="styles.css">
</head>
<body>
<h2>Diffie-Hellman Key Exchange</h2>
<p>Enter prime number (p): <input type="number" id="prime" class="inputBox" onchange="checkPrime()">
<button onclick="verifyPrime()">Verify Prime</button></p>
<p>Enter generator (g): <input type="number" id="generator" class="inputBox" onchange="checkGenerator()">
<button onclick="verifyGenerator()">Verify Generator</button></p>
<p>Enter Alice's private key: <input type="number" id="aliceSecret" class="inputBox"></p>
<button onclick="generateAlicePublicKey()">Generate Alice's Public Key</button><br><br>
<p>Enter Bob's private key: <input type="number" id="bobSecret" class="inputBox"></p>
<button onclick="generateBobPublicKey()">Generate Bob's Public Key</button><br><br>
<p>Shared Secret: <input type="text" id="sharedSecret" class="inputBox" readonly></p>
<script>
function modPow(base, exponent, modulus) {
  return BigInt(base) ** BigInt(exponent) % BigInt(modulus);
}
function isPrime(num) {
  if (num <= 1) return false;
  if (num <= 3) return true;

  if (num % 2 === 0 || num % 3 === 0) return false;

  let i = 5;
  while (i * i <= num) {
    if (num % i === 0 || num % (i + 2) === 0) return false;
    i += 6;
  }
return true;}
function checkPrime() {
  const p = document.getElementById('prime').value;
  if (!isPrime(p)) {
    alert("p should be a prime number");
    document.getElementById('prime').value = "";
  }
}
function verifyPrime() {
  const p = document.getElementById('prime').value;
  if (isPrime(p)) {
    alert(p + " is a prime number");
  } else {
    alert(p + " is not a prime number");
  }
}
function gcd(a, b) {
  if (!b) return a;
  return gcd(b, a % b);
}
function checkGenerator() {
  const p = document.getElementById('prime').value;
  const g = document.getElementById('generator').value;
  if (gcd(g, p - 1) !== 1) {
    alert("g should be coprime with (p-1)");
    document.getElementById('generator').value = "";}}

function verifyGenerator() {
  const p = document.getElementById('prime').value;
  const g = document.getElementById('generator').value;
  if (gcd(g, p - 1) === 1) {
    alert(g + " is coprime with (p-1)");
  } else {
    alert(g + " is not coprime with (p-1)");}}

function generateAlicePublicKey() {
  const p = document.getElementById('prime').value;
  const g = document.getElementById('generator').value;
  const aliceSecret = document.getElementById('aliceSecret').value;

  const alicePublicKey = modPow(g, aliceSecret, p);

  localStorage.setItem('A', alicePublicKey);
```

```
}
function generateBobPublicKey() {
  const p = document.getElementById('prime').value;
  const g = document.getElementById('generator').value;
  const bobSecret = document.getElementById('bobSecret').value;
  const bobPublicKey = modPow(g, bobSecret, p);
  const alicePublicKey = localStorage.getItem('A');
  const sharedSecret = modPow(alicePublicKey, bobSecret, p);
  document.getElementById('sharedSecret').value = sharedSecret;}
</script>
</body>
</html>
```

Output:



Diffie-Hellman Key Exchange
127.0.0.1:5500/DiffieHellman/DiffieHellman.html

Diffie-Hellman Key Exchange

Enter prime number (p): 23

Enter generator (g): 5

Enter Alice's private key: 6

Generate Alice's Public Key

Enter Bob's private key: 15

Generate Bob's Public Key

Shared Secret: 2