Pract 5

```
import java.math.*;
import java.util.*;
class Main {
   public static void main(String args[])
   {
      int p, q, n, z, d = 0, e, i;

      // The number to be encrypted and decrypted
      int msg = 12;
      double c;
      BigInteger msgback;

      // 1st prime number p
      p = 3;

      // 2nd prime number q
      q = 11;
      // p*q calculate
      n = p * q;

      z = (p - 1) * (q - 1);//
      System.out.println("the value of z = " + z);

      for (e = 2; e < z; e++) {

         // e is for public key exponent
         if (gcd(e, z) == 1) {
            break;
         }
      }
      System.out.println("the value of e = " + e);
```

```
        for (i = 0; i <= 9; i++) {
            int x = 1 + (i * z);

            // d is for private key exponent
            if (x % e == 0) {
                d = x / e;
                break;
            }
        }
        System.out.println("the value of d = " + d);
        c = (Math.pow(msg, e)) % n;
        System.out.println("Encrypted message is : " + c);

        // converting int value of n to BigInteger
        BigInteger N = BigInteger.valueOf(n);

        // converting float value of c to BigInteger
        BigInteger C = BigDecimal.valueOf(c).toBigInteger();
        msgback = (C.pow(d)).mod(N);
        System.out.println("Decrypted message is : "
                + msgback);
    }
    static int gcd(int e, int z)
    {
        if (e == 0)
            return z;
        else
            return gcd(z % e, e);
    }
}
```