```java
//*****************************************************
// TITLE: FastPower.java                              *
// AUTHOR: Kim Skak Larsen                            *
// DATE: 22/9 2001                                    *
//                                                    *
// Another example of a while loop invariant.        *
// The program computes x^p.                          *
//*****************************************************

import java.io.*;

public class FastPower
{
    public static void main ( String [] args )
    {
      int x, p, r, q, y;

      // Example values
      p = 5; x = 2;

      // Precondition: p >= 0

      r = 1; q = p; y = x;

      while /*I*/ ( q != 0)   // Invariant: r * y^q = x^p and q in
      {
         if ( q % 2 == 1)
         {
            r = r * y;
            q = q - 1;
         }
         else
         {
            y = y * y;
            q = q / 2;
         }
      }
```

```java
        // Postcondition: r = x^p

        System.out.print(r + "\n");

    } // main

} // FastPower
```