```
int xxx( int r)
{ int s=0;
  int i;
  for ( i=0; i<r; ++i)
  { s = s+2*i+1;}
  return s;
}
```

Invariant. i: $s = i^2$

~~Prese~~ $i=0$? ✓

say true for i.

then $s = i^2$

$s = s+2i+1$

$= (i+1)^2$

then i ~~be~~ is assigned i+1

✓

```
int yyy( int m, int n)
{ int x,y,z;
  x=m; y=n;
  while (y>0)
  { z = x%y;
    x=y; y=z; }
  return x;
}
```

Invariant.

Def gcd(x,y) is largest int dividing x and y.

: gcd(m,n) = gcd(x,y).

Fact. $x \geq y > 0 \Rightarrow gcd(x,y) = gcd(y, x \bmod y)$

Initially gcd(m,n) = gcd(m,n) ✓.

Invariant. Given gcd(x,y) = gcd(m,n)

After assignments we have x,y replaced by y, x mod y: and gcd(y, x mod y)

= gcd(x,y) = gcd(m,n) ✓.