

Assignment 6

Give total correctness proofs of the following programs.

Q1)

```
[  $\top$  ]  
x = 5;  
while (x > 0) {  
    x = x - 1;  
}  
[ x = 0 ]
```

Q2)

```
[ n > 0 ]  
while (n > 0) {  
    n = n - 2;  
}  
n = n + 4;  
[ n > 1 ]
```

Q3)

```
[ x > y ]  
while (x > y) {  
    x = x - 1;  
    y = y + 1;  
}  
if (x < y)  
    x = x + 1;  
[ x = y ]
```

Q4)

```
[  $k \geq 0$  ]  
    n = 0;  
    x = 1;  
    while (n != k) {  
        x = x + x;  
        n = n + 1;  
    }  
[ x =  $2^k$  ]
```