

CSE 331 – Section 1 – Code Reasoning

1. Use **forward** reasoning to determine the value of z at the end in terms of x and y .

```
// x > 0 and y > 0
w = x * y;
// _____
q = x * x;
// _____
z = w / q;
// _____
```

2. Use **forward** reasoning to find the possible values of z by the end of the code.

```
// x >= 0 and y >= 0
y = 25;
// _____
x = x + y;
// _____
x = sqrt(x);
// _____
z = y - x;
// _____
```

3. Use **forward** reasoning to determine what the possible values of z are by the end.

```
// x != 0 and y < 0
z = x * x;
// _____
z = z * y;
// _____
z = z * x;
// _____
```

4. Use **backward** reasoning to find the sufficient conditions for $z \neq -1$ at the end.

```
// _____
x = y / 2;
// _____
z = x * 2;
// _____
z = z + 1;
// z != -1
```

5. Use **backward** reasoning to determine what must be true initially for $y > 20$ at the end.

```
// _____  
x = 1 - x;  
// _____  
x = x + 10;  
// _____  
y = 2 * x;  
// y > 20
```

6. Use **backward** reasoning to find what must be true for $x > y$ and $y > z$ at the end.

```
// _____  
b = -b;  
// _____  
z = a * 2;  
// _____  
x = b + 4;  
// _____  
y = a + b;  
// x > y and y > z
```

7. Prove that the following code calculates the absolute value of x .

```
// true  
if (x > 0) {  
    // _____  
    abs = x;  
    // _____  
}  
else {  
    // _____  
    abs = -x;  
    // _____  
}  
// _____  
// abs = |x|
```