

1. In a 32-bit machine, consider two arbitrary values x and y :

```
int x = random();      unsigned ux = (unsigned) x;  
int y = random();      unsigned uy = (unsigned) y;
```

For each of the following C expressions, indicate whether the expression always yields 1 (true). If it does not always yield 1, give an example that make it yield 0 (false).

a. $((x+y) \ll 4) + y - x == 17*y + 15*x$

b. $\sim x + \sim y + 1 == \sim(x+y)$ (Note: $-x = \sim x + 1$ except when $x = \text{Tmin}$)

c. $(ux - uy) == -(unsigned)(y - x)$

d. $(x < y) == (-x > -y)$

e. $ux - uy == -(y - x)$

f. $(x \geq 0) \parallel (x < ux)$