

CSC 209 Review 9 Solution

August 31, 2020

1. Notes

1. Bitwise Shift Operators

- has lower precedence than arithmetic operators

Example:

$i \ll 2 + 1$ means $i \ll (2+1)$ and not $(i \ll 2) + 1$

- \ll : Left Shift
- \gg : Right Shift
- *Tip:* Always shift only on unsigned numbers for portability

Example

```
unsigned short i, j;

i = 13;          /* i is now 13 (binary 0000000000001101) */
j = i << 2;      /* j is now 52 (binary 0000000000110100) */
j = i >> 2;      /* j is now 3 (binary 0000000000000011) */
```

Shifts to left

Shifts to right

As these examples show, neither operator modifies its operands. To modify a variable by shifting its bits, we'd use the compound assignment operators $\ll=$ and $\gg=$:

```
i = 13;          /* i is now 13 (binary 0000000000001101) */
i <<= 2;         /* i is now 52 (binary 0000000000110100) */
i >>= 2;         /* i is now 13 (binary 0000000000001101) */
```

- $\gg=$ / $\ll=$: Are bitwise shift equivalent of $+=$