

York University  
Electrical Engineering and Computer Science

EECS2031: Software Tools  
SU2016  
Assignment #10

Chapter 20: Exercises

1. Show the output produced by each of the following program fragments. Assume that  $i$ ,  $j$ , and  $k$  are unsigned short variables.

```
(a) i = 8; j = 9;
    printf("%d", i >> 1 + j >> 1);
(b) i = 1;
    printf("%d", i & ~i);
(c) i = 2; j = 1; k = 0;
    printf("%d", ~i & j ^ k);
(d) i = 7; j = 8; k = 9;
    printf("%d", i ^ j & k);
```

3. Explain what effect the following macro has on its arguments. You may assume that the arguments have the same type.

```
#define M(x,y) ((x)^(y), (y)^(x), (x)^(y))
```

7. Write the following functions:

```
unsigned int rotate_left(unsigned int i, int n);
unsigned int rotate_right(unsigned int i, int n);
```

`rotate_left` should return the result of shifting the bits in  $i$  to the left by  $n$  places, with the bits that were “shifted off” moved to the right end of  $i$ . (For example, the call `rotate_left(0x12345678, 4)` should return `0x23456781` if integers are 32 bits long.) `rotate_right` is similar, but it should “rotate” bits to the right instead of the left.

10. Write the following function:

```
unsigned int reverse_bits(unsigned int n);
```

`reverse_bits` should return an unsigned integer whose bits are the same as those in  $n$  but in reverse order.