York University
Electrical Engineering and Computer Science

EECS2031: Software Tools
SU2016
Assignment #3

Chapter 6: Exercises

1. What output does the following program fragment produce?

```
i = 1;
while (i <= 128) {
  printf("%d ", i);
  i *= 2;
}
```

2. What output does the following program fragment produce?

```
i = 9384;
do {
  printf("%d ", i);
  i /= 10;
} while (i > 0);
```

3. What output does the following `for` statement produce?

```
for (i = 5, j = i - 1; i > 0, j > 0; --i, j = i - 1)
  printf("%d ", i);
```

13. Rewrite the following loop so that its body is empty:

```
for (n = 0; m > 0; n++)
  m /= 2;
```

Chapter 6: Programming Projects

2. Write a program that asks the user to enter two integers, then calculates and displays their greatest common divisor (GCD):

```
Enter two integers: 12 28
Greatest common divisor: 4
```

Hint: The classic algorithm for computing the GCD, known as Euclid's algorithm, goes as follows: Let `m` and `n` be variables containing the two numbers. If `n` is 0, then stop: `m` contains the GCD. Otherwise, compute the remainder when `m` is divided by `n`. Copy `n` into `m` and copy the remainder into `n`. Then repeat the process, starting with testing whether `n` is 0.

4. Add a loop to the `broker.c` program of Section 5.2 so that the user can enter more than one trade and the program will calculate the commission on each. The program should terminate when the user enters `0` as the trade value:

```
Enter value of trade: 30000
Commission: $166.00

Enter value of trade: 20000
Commission: $144.00

Enter value of trade: 0
```

5. Programming Project 1 in Chapter 4 asked you to write a program that displays a two-digit number with its digits reversed. Generalize the program so that the number can have one, two, three, or more digits. *Hint:* Use a `do` loop that repeatedly divides the number by 10, stopping when it reaches 0.

8. Write a program that prints a one-month calendar. The user specifies the number of days in the month and the day of the week on which the month begins:

```
Enter number of days in month: 31
Enter starting day of the week (1=Sun, 7=Sat): 3

       1  2  3  4  5
 6  7  8  9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31
```

Hint: This program isn't as hard as it looks. The most important part is a `for` statement that uses a variable `i` to count from 1 to `n`, where `n` is the number of days in the month, printing each value of `i`. Inside the loop, an `if` statement tests whether `i` is the last day in a week; if so, it prints a new-line character.

Chapter 7: Exercises

4. If `c` is a variable of type `char`, which one of the following statements is illegal?

(a) `i += c;  /* i has type int */`
(b) `c = 2 * c - 1;`
(c) `putchar(c);`
(d) `printf(c);`

4. Write a program that translates an alphabetic phone number into numeric form:

```
Enter phone number: CALLATT
2255288
```

(In case you don't have a telephone nearby, here are the letters on the keys: 2=ABC, 3=DEF, 4=GHI, 5=JKL, 6=MNO, 7=PRS, 8=TUV, 9=WXY.) If the original phone number contains nonalphabetic characters (digits or punctuation, for example), leave them unchanged:

```
Enter phone number: 1-800-COL-LECT
1-800-265-5328
```

You may assume that any letters entered by the user are upper case.

6. Write a program that prints the values of `sizeof(int)`, `sizeof(short)`, `sizeof(long)`, `sizeof(float)`, `sizeof(double)` and `sizeof(long double)`.

10. Write a program that counts the number of vowels (*a, e, i, o,* and *u*) in a sentence:

```
Enter a sentence: And that's the way it is.
Your sentence contains 6 vowels.
```