Solutions to Practice Problems

Practice Problem 2.1
What data type would be best to store the following examples of data?

(a) The number of jellybeans in a jar
(b) The cost of a Snickers bar
(c) The circumference of a lollipop
(d) The individual letters in the word "skittles"

Solution: (a) int  (b) float  (c) float  (d) char

Practice Problem 2.2
How many total bytes would be needed to store the following variables?

```c
int tacos, chimichangas;
int nachos = 14;
float pico, de, gallo;
char tortilla, guacamole;
float burritos = 2;
```

Solution: 30 bytes

Practice Problem 2.3
Consider the two lines of C code:

```c
int a;
a = 0.9999;
```

If we were to now print out the value of the variable `a` using `printf`, what value would be displayed?

Solution: 0

Practice Problem 2.4
What is the output produced by these two lines of C code:

```c
printf("Go Navy!");
printf("Beat Army!");
```

Solution: Go Navy!Beat Army! (followed immediately by the prompt)
Practice Problem 2.5

What is produced by each of these code snippets?

(a)    printf("Go Navy!\nBeat Army!\n");

(b)    printf("Go Navy!\tBeat Army!\n");

        printf("\"Go Navy!\nBeat Army!\"\n");
        printf("A\B\n");

Solution:

(a)    Go Navy!
        Beat Army!

(b)    Go Navy!   Beat Army!
        "Go Navy!
        Beat Army"
        A\B

Practice Problem 2.6

Explain what is printed out by the following line of C code:

    int number = 3050;
    float gpa_low = 3.13 , gpa_high = 3.95;
    printf("%d midshipmen have a GPA between %f and %f\n", number, gpa_low, gpa_high);

Solution:

    printf("%d midshipmen have a GPA between %f and %f\n", number, gpa_low, gpa_high);

3050 midshipmen have a GPA between 3.15 and 3.95

Practice Problem 2.7

What is the output produced by this complete C program? When prompted, the user enters 2017

    #include<stdio.h>
    int main()
    {
        int year_number;
        printf("Enter the year: ");
        scanf("%d", &year_number);
        printf("\nThe year is %d \n", year_number);
    }

Solution:

Enter the year: 2017
The year is 2017
Practice Problem 2.8

What is the output produced by this complete C program? When prompted the user enters: 2017 8

```c
#include<stdio.h>
int main()
{
    int year, month;
    printf("Enter the year and the month (1-12): ");
    scanf("%d %d", &year, &month);
    printf("\nIt is now %d / %d \n", month, year);
}
```

Solution:

Enter the year and the month (1-12): 2017 8
It is now 8 / 2017

Practice Problem 2.9

Add one line to the C program shown below (at the point indicated) so that the output shown below is produced when the user enters 3.5 when prompted.

```c
#include<stdio.h>
int main()
{
    float number;
    printf("Enter a number and I will multiply it by 2: ");
    scanf("%f", &number);
    // Enter one line of code here!
    printf("Twice the value you entered is: %f \n", number);
}
```

Output:

Enter a number and I will multiply it by 2: 3.5
Twice the value you entered is: 7.000000

Solution:

```c
number = number + number;
```

or

```c
number = number * 2;
```
### Practice Problem 2.10

Determine the error in the complete C program shown below:

```c
#include <stdio.h>
int main()
{
    int apples = 42;
    printf("There are %c apples in my barrel\n", apples);
}
```

Solution:

The conversion specifier in the `printf` statement should have been `%d` instead of `%c`.

### Practice Problem 2.11

Match the term on the left with its appropriate description on the right:

- (j) `printf`  
  (a) the C programming language
- (i) `instruction set`  
  (b) the C assignment operator
- (e) `scanf`  
  (c) translates assembly language into machine language
- (g) `machine language`  
  (d) the conversion specifier for an integer value
- (l) `&`  
  (e) allows the program to receive keyboard input
- (c) `assembler`  
  (f) the C escape sequence for a new line
- (a) `high-level language`  
  (g) instructions expressed as bits
- (k) `assembly language`  
  (h) program that converts source code to machine language
- (d) `%d`  
  (i) all of the simple instructions hard-wired on a CPU
- (b) `=`  
  (j) used to display text to the monitor
- (f) `
`  
  (k) English-like words that represent machine code
- (h) `compiler`  
  (l) the address operator

Solution: In order: (j) (i) (e) (g) (l) (c) (a) (k) (d) (b) (f) (h)