Solutions to Practice Problems

Practice Problem 2.1
What data type would be optimal to store the following classes of data?

(a) Number of jellybeans in a jar
(b) Cost of a Snickers bar
(c) The circumference of a lollipop
(d) 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`, what value would we see?

Solution: 0

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

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

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\n");
    printf("Beat Army\n");
(b)  printf("Go Navy\nBeat Army\n");
(c)  printf("Go Navy\tBeat Army\n");
    printf("\"Go Navy\nBeat Army\"\n");
    printf("A\n\rB\n");

Solution:

(a)  Go Navy
    Beat Army
(b)  Same as (a)
(c)  Go Navy  Beat Army
    "Go Navy
    Beat Army"
    A

Practice Problem 2.6

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

```c
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:

```c
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

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 printf statement expects a character, but the user intends an integer. The printf statement should be:

```c
printf("There are %d apples in my barrel\n", apples);
```
Practice Problem 2.8

What is the output produced by this complete C program:

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

Solution:

```
Enter the year: 2015
The year is 2015
```

Practice Problem 2.9

What is the output produced by this complete C program:

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

Solution:

```
Enter the year and the month (1-12): 2013 8
It is now 8 / 2013
```
Practice Problem 2.10

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:

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

or

```
number = number * 2;
```

Practice Problem 2.11

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

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

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