Solutions to Practice Problems

Practice Problem 3.1
Write a declaration that could be used to hold the percentage grades of 250 midshipmen.

Solution: float percent_grade[250];

Practice Problem 3.2
Consider an array declared as float pay[4];

(a) How much memory is reserved for this array?

Solution: 16 bytes

(b) What are the four variables that are collected into this array?

Solution: pay[0], pay[1], pay[2] and pay[3].

(c) What is the name of the array of four variables?

Solution: pay

(d) The first array element is stored at address 0x0000008e, what is the address of the second element?

Solution: 0x00000092

Practice Problem 3.3
Answer the questions about the character string in memory shown below, where the first element in the string is 0x53.

(a) What is the minimum number of bytes that could have safely been allocated for this string?

(b) Write this declaration, naming the array 'myString'.

(c) What is the address of 'myString[0]'?

(d) What character is at myString[1]?

Solution: (a) 6 (b) char myString[6]; (c) 00003D16 (d) 'i'
Practice Problem 3.4

```c
char school[5] = "Navy"
printf("%s\n", school);
school[0] = 'U';
school[1] = 'S';
school[2] = 'N';
school[3] = 'A';
printf("%s\n", school);
```

Continuing the example above, what would happen if we modified two lines of code as shown below:

```c
school[2] = 'A';
school[3] = 0; // Note: this value is the value 0 (NULL)
```

Solution: (program output)

USNA
USA

Practice Problem 3.5

For each of the `for` loops shown below, state how many times the loop will iterate.

a) `for( i = 1; i <= 100; i = i + 1)`
b) `for( i = 3; i > 1; i = i - 1)`
c) `for( i = 7; i <= 21; i = i + 7)`

Solution:

(a) 100 (b) 2 (c) 3

Practice Problem 3.6

Examine the following C program and describe the expected output.

```c
#include<stdio.h>
int main()
{
    int count;
    for(count = 1; count <= 2; count = count + 1 )
    {
        if(count > 1)
            printf("Cyber\n");
        else
            printf("Fun\n");
    }
}
```

Solution:

The for loop should iterate 2 times. Output ought to be:

`Fun
Cyber`
Practice Problem 3.7

Suppose we have 5 students in EC310. A portion of a C program that declares an array of floats named six_week_grade that will hold the midterm grades for the class is shown below. The program should allow the user to enter the midterm grades when the program runs, and should then print out the midterm grades. When the program runs, the program output should appear as shown below:

```
midshipman@EC310:~/work $ ./a.out
Enter score for student 1 : 98
Enter score for student 2 : 87.5
Enter score for student 3 : 94
Enter score for student 4 : 90
Enter score for student 5 : 92
Student 1: 98.000000
Student 2: 87.500000
Student 3: 94.000000
Student 4: 90.000000
Student 5: 92.000000
midshipman@EC310:~/work 
```

Fill in the one missing line of code.

```
#include <stdio.h>
int main()
{
    float six_week_grade[5];
    int number;
    for (number = 0; number < 5; number = number + 1 )
    {
        printf("Enter score for student %d : ", number + 1);
        scanf("%f", &six_week_grade[number]);
    }
    for (number = 0; number < 5; number = number + 1)
    {
        *** MISSING LINE OF CODE GOES HERE ***
    }
}

Solution:
printf( "Student %d:	%f
", number + 1, six_week_grade[number] );
```

Practice Problem 3.8

(a) Write the declaration for an array named LuckyNumbers which will hold 6 integers.

    Solution: int LuckyNumbers[6];

(b) Complete this statement to display the 4th LuckyNumber:

    printf("The fourth lucky number is %d\n", );

    Solution: printf("The fourth lucky number is %d\n", LuckyNumbers[3] );
(c) What happens if I attempt to display `LuckyNumbers[9]`?
   i. Will it return a value?
   ii. Will I receive an error message?
   iii. Will the program crash?

Solution:  
i: Yes  
ii: No  
iii: No