Solutions to Practice Problems

Practice Problem 4.1
Write a declaration that could be used to hold the individual point grades for 250 midshipmen.

Solution:  float point_grade[250];

Practice Problem 4.2
Suppose we have 5 students in EC310. A portion of a C program that declares an array of integers named six_week_grade that will hold the midterm grades for the class is shown below. Your program should allow the user to enter the midterm grades at runtime, and should then print out the midterm grades. Your program output should appear as shown below:

```
#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 )
    {
        printf("Student %d:\t%f\n",
            number + 1 , six_week_grade[ number ] );
    }
}
```

Fill in the one missing line of code.
Practice Problem 4.3

Consider an array declared as

```c
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?


(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 4.4

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

```c
school[2] = 'A';
school[3] = 0;
printf( "%s", school );
```

Solution: The string USA would be displayed on the monitor.

Practice Problem 4.5

We want to write a C program that declares a string (a character array) and initializes it to "Military Academy", prints this string to the screen, then, within the program, changes the string to the name of your favorite college, and then, once again, prints the string to the monitor.

Your program output should appear as shown below:

```
midshipman@EC310-VM:~ $ ./a.out
Military Academy
Naval Academy
```

Fill in the three missing lines of code.

Solution:

```c
#include <stdio.h>
#include<string.h>
int main()
{
    char phrase[] = "Military Academy";

    printf("%s\n", phrase);
    strcpy( phrase, "Naval Academy" );
    printf("%s\n", phrase);
}
```
Practice Problem 4.6

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

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0x53</td>
<td>0x69</td>
<td>0x4C</td>
<td>0x32</td>
</tr>
<tr>
<td>0x39</td>
<td>0x00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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 4.7

(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