CMPS 221 Sample Final

1. What is the purpose of having the parameter "const int a[]" as opposed to "int a[]" in a function declaration and definition?

2. What is the difference between "cin.getline(str, 80);" and "cin >> str;". For example, if you were to type "Hello world!", what would be the value of str after each?

3. What is an index out of range error with an array? Give an example of accessing an array element in the array "int arr[5];" that would cause an index out of range error.

4. How do classes differ from structures? In particular, what do classes contain that structures do not?

5. A C style string is a character array that ends with the null character '\0'. What is the purpose of the null character?

6. One cannot use + to concatenate two C style strings or = to assign one C style string to another. What functions does one use for concatenation and assignment of C style strings?

7. You wish to prompt the user for a filename, read in the filename they have typed and then open that file. Write the code for doing these steps.

8. You already have successfully opened a file through the input file stream variable called "fin", created an integer array with the line `int array[50];` and created an integer variable called "count". Give the code for the loop that reads all the variables from the file into the array.

9. Write a void function called "get_input" that has an integer array parameter, an integer parameter for the maximum size of the array and a call-by-reference integer parameter to store the number of elements read in. Prompt the user for the number of elements he wishes to enter. Verify that this value is not greater than the maximum size of the array. Then read in that many values from the keyboard.

10. Write an integer function called "find_minimum" that has an integer array parameter and an integer parameter for the number of elements in the array. The function should find the smallest value in the array and return that value.

11. Write the complete code for the following programming project:

    Write a function that reads in a weight in pounds and ounces and outputs the equivalent weight in kilograms and grams. There are 2.2046 pounds in a kilogram and 16 ounces in a pound.

12. You currently have two integer pointers called p1 and p2 and two integer variables called v1 and v2 that have the following values:

```
Address:   80000    80004    80008    80012    80016    80020    80024
          ------------------------------------------------------------------
          |        |        |        |        |        |        |        |
Value:    |   0    |   0    |   0    |   0    |   58   |   0    |   17   |
          |_____|_____|_____|_____|_____|_____|_____|

Variable:   p1                p2                v1                v2
```

Show the effect of executing the following code:

```
p1 = &v1;
p2 = &v2;
p2 = p1;
*p1 = 30;
```

```
Address:   80000    80004    80008    80012    80016    80020    80024
          ------------------------------------------------------------------
          |        |        |        |        |        |        |        |
Value:    |        |        |        |        |        |        |        |
          |_____|_____|_____|_____|_____|_____|_____|

Variable:   p1                p2                v1                v2
```

13. What would be the output of the following code snippet? Trace the output in the space provided.

```cpp
#include <iostream>
#include <iomanip>
using namespace std;

int main()
{
  cout.setf(ios::fixed);
  cout.setf(ios::showpoint);
  cout.precision(2);
  cout.unsetf(ios::right);
  cout.setf(ios::left);
  cout << "|" << setw(10) << "Name" << "|" << setw(10) << "Integer";
  cout << "|" << setw(10) << "Double" << "|" << endl << "|";
  cout << setw(10) << "Alice";
  cout << "|" << setw(10) << 5 << "|" << setw(10) << 6.2 << "|" << endl;
  cout << "|" << setw(10) << "Bob";
  cout << "|" << setw(10) << 8 << "|" << setw(10) << 13.34 << "|" << endl;
  cout << "|" << setw(10) << "Carol";
  cout << "|" << setw(10) << 12 << "|" << setw(10) << 19.0 << "|" << endl;

  return 0;
}
```

14. There are 5 errors in the following code snippet. Identify each one by giving the line number on which it occurs. Describe the error and how to fix it.

```
1    #include <iostream>
2    using namespace std;
3
4    void print_array(const int a[][], int rows);
5    void clear_keyboard();
6
7    int main()
8    {
9      int arr[3];
10
11     cout << "Enter 9 integers: ";
12     for(int i = 0; i < 9; i++)
13     {
14       cin >> arr[i];
15       clear_keyboard;
16     }
17
18     print_array(arr, 3);
19     return 0;
20   }
21
22   void print_array(int a[], int rows)
23   {
24     void clear_keyboard()
25     {
26       char c;
27       do
28       {
29         cin.get(c);
30       } while(c != '\n');
31     }
32
33     for(int i = 1; i < 3; i++)
34     {
35       cout << setw(5) << a;
36     }
37   }
```

15. In the following code, what is the scope of each of the following variables: num1, j, ret, arr and i.
    If the scope is local, name the function or code block that contains the variable. Alternatively, list
    the line numbers for the scope of each variable or block out the scope of each variable next to the
    code.

```
1    #include <iostream>
2    using namespace std;
3
4    int arr[5];
5
6    double find_average(const int a[], int elements);
7
8    int main()
9    {
10     double num1;
11
12     cout << "Enter 5 integers: ";
13     for(int i = 0; i < 5; i++)
14     {
15       cin >> arr[i];
16     }
17
18     num1 = find_average(arr, 5);
19     cout << "The average is " << num1 << ".\n";
20
21     return 0;
22   }
23
24   double find_average(const int a[], int elements)
25   {
26     double sum = 0, ret;
27
28     for(int j = 0; j < elements; j++)
29     {
30       sum = sum + a[j];
31     }
32     ret = sum / elements;
33     return ret;
34   }
```