

1. Describe what each program does **IN ENGLISH**.

a)

```
#include <iostream>
#include <fstream>
using namespace std;

int main() {
    const int SIZE = 100;
    char fileName[SIZE];
    char ch;
    ifstream inFile;
    int count1, count2;

    cout << "Enter the name of a text file: ";
    cin.getline(fileName, SIZE);
    inFile.open(fileName);
    if (!inFile) {
        cout << "Error opening file\n";
    } else {
        count1 = 0;
        count2 = 0;
        while(inFile.get(ch)) {
            if (ch == '\n') {
                count1++;
            } // end if
            count2++;
        } // end while
        cout << "count1 = " << count1 << endl;
        cout << "count2 = " << count2 << endl;
    } // end if
} // end main
```

b)

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

int main() {
    int size;
    int row;
    int column;

    cout << "Enter a size: ";
    cin >> size;

    for (row = 1; row <= size; row++) {
        for (column = 1; column <= size; column++) {
            cout << "* ";
        } // end for (column...)
        cout << endl;
    } // end for (row...)
} // end main
```

2. Many of you are struggling with loops (UNFORTUNATELY, THIS IS NORMAL), but you will get better with practice. To help, here are a series of questions that you can ask yourself when solving a programming problem.

After reading the programming problem carefully, ask yourself:

a) "Is looping needed?" What clues should you look for to answer this question?

b) If the answer to (a) is "Yes, a loop is needed", then ask yourself: "What type of loop (for or while loop)?"  
What clues should you look for to answer this question?

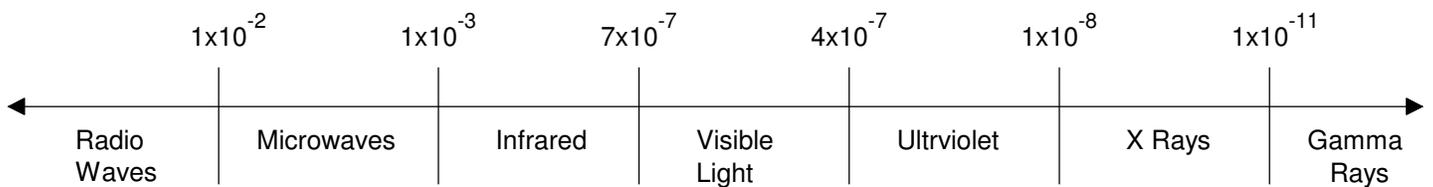
c) If the answer to (b) is "Use a for loop", then ask yourself: "What are you looping over, i.e., that loop-control variable, and what range of values?" What clues should you look for to answer these questions?

d) If the answer to (b) is "Use a while loop", then ask yourself: "Under what condition do I want to continue to loop?" What clues should you look for to answer these questions?

3. Apply your answers to the previous questions to the following problem.

a) Assuming the level of the Earth's oceans is rising at about 1.5 millimeters per year, write a program that displays a table showing the total number of millimeters that the ocean will have risen each year for the next 25 years.

b) If a scientist knows the wavelength of an electromagnetic wave, he or she can determine what type of radiation it is. Write a program that asks for the wavelength of an electromagnetic wave in meters and then displays what that wave is according to the chart below. (For example, a wave with a wavelength of  $1\text{E}-10$  meters would be an X-ray.)



c) Write a program that asks the user to enter a positive integer number. Your program should determine if the number is prime or not. Recall that a *prime number* is a positive integer such that it is not divisible by any integer other than 1 and itself.