1. The computer stores variables as a series of bits (0s and 1s) in memory. To give this bit string meaning, a coding scheme is used. How do you tell your program what coding scheme to use for a variable? List two common coding schemes you have used in your programs.

   The program tells what coding scheme to use for a variable by what type is used in the variable declaration. Two common schemes used in programs are int and double.

2. Give the syntax for declaring a variable and initializing it in the same statement, such as setting count to 0 when count is declared.

   ```
   type varName = value;
   Example: int count = 0;
   ```

3. Give the pseudocode for the following programming project:

   Write a program that will ask the user for the gallons of gas consumed and miles traveled for two cars. Define a function to compute the number of miles per gallon. For each car, compute the miles per gallon and output that amount. Determine which car has the better fuel efficiency (more miles per gallon) and output that car.

   **Main Pseudocode**
   - Input: gallons of gas and mileage for car1, gallons of gas and mileage for car2
   - Output: miles per gallon for car1, miles per gallon for car2, most efficient car
   - Steps:
     - (a) Get the gallons of gas and mileage for car1
     - (b) Get the gallons of gas and mileage for car2
     - (c) Compute the miles per gallon for car1
     - (d) Compute the miles per gallon for car2
     - (e) Output both miles per gallon
     - (f) Compare the miles per gallon
     - (g) Output the most efficient car

   **miles_per_gallon Function Pseudocode**
   - Input: gallons of gas and mileage for one car
   - Output: miles per gallon
   - Steps:
     - (a) Compute the miles per gallon
     - (b) Return the miles per gallon

4. What is the difference between the int type and the double type?

   The type int is used to represent whole numbers, for example: 1, 2, 3. The type double is used to represent fractions or decimals such as 15.5.
5. You have a program with variables named 'price' and 'tax'. You wish to output the following:

   The subtotal is $5.50 and the tax is $0.40. The total is $5.90.

Show the `cout` statement(s) to do this output.

   `cout << "The subtotal is $" << price << " and the tax is $";
   cout << tax << ". The total is $" << (price + tax) << "." << endl;`

6. Write a `for()` loop that will count from 0 to 10, incrementing by 2 each iteration.

   ```cpp
   for(int i = 0; i <= 10; i = i + 2)
   {
   }
   ```

7. What is the syntax for the if, else-if, else statement?

   ```cpp
   if(BooleanExpr)
   {
   }
   else if(BooleanExpr)
   {
   }
   else
   {
   }
   ```

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

   ```cpp
   for(i = 3; i < 10; i = i + 2)
   {
   cout << i << ": ");
   for(j = 2; j <= (i / 2); j++)
   {
   cout << j << " ");
   }
   cout << endl;
   }
   ```

   **Output:**
   
   3:
   5: 2
   7: 2 3
   9: 2 3 4
9. The following code has 5 common pitfalls and syntax errors. Identify each one by giving the line number it occurs on and describing what the error is.

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

int main()
{
    int count, double;

    cout << "Enter a number: 
    cin >> count;

    if (count > 5) && (count < 10)
    {
        cout << "Count is within range.\n";
    }
    else
    {
        cout << "Count is not within range.\n";
    }
    cout << "Count times 10 is " << (count * 10) << " and ";
    cout << " count divided by 10 is " << (count / 10) << ".\n";
    return 0;
}
```

- line 1 - no space between include and <iostream> - This is actually allowed by the compiler, but credit was given if you gave this answer.
- line 6 - double is a reserved word, it cannot be a variable name.
- line 8 - missing ; at the end of the line.
- line 12 - missing () around the whole Boolean expression.
- line 16 - the cout is breaking the if-else statement. It needs to be moved inside the curly brackets or removed.
- line 21 - the ; at the end of the line says the cout has ended, but the next line does not start with cout. Either remove the ; or add cout to the next line.
- line 22 - count/10 is integer division, not double division.
10. In the following code, what is the scope of 'min', 'num1', 'ret' and 'bob'? If the scope is local, name the function or code block that contains the variable.

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

int mini;

int find_minimum(int a, int b);

int main()
{
    int num1, num2;
    cout << "Enter two numbers: ";
    cin >> num1 >> num2;
    mini = find_minimum(num1, num2);
    cout << "The minimum is " << mini << ".\n";
    return 0;
}

int find_minimum(int a, int b)
{
    int ret;
    if( a < b )
    {
        ret = a;
    }
    else
    {
        char bob;
        ret = b;
    }
    return ret;
}
```

The scope of 'mini' is global, the whole program. The scope of 'num1' is the main() function. The scope of 'ret' is the find_minimum() function. The scope of 'bob' is the else statement within find_minimum().