Declaration and Initialization

- Give the declaration for two variables called feet and inches. Both variables are of type *int* and both are to be initialized to zero in the declaration. Use both initialization alternatives.

```
int feet;
int inches;
```

```
int feet = 0;
 int inches = 0;
```

```
int feet = 0
inches = 0;
```

- Give the declaration for two variables called count and distance. count is of type *int* and is initialized to zero. distance is of type *double* and is initialized to 1.5.

```
int count;
double distance;

count = 0;
distance = 1.5;
```

Assignment

- Give a C++ statement that will change the value of the variable sum to the sum of the values in the variables n1 and n2. The variables are all of type *int*.

```
int sum;
int n1;
int n2;

sum = n1 + n2;
```

- Give a C++ statement that will increase the value of the variable length by 8.3. The variable length is of type *double*.

```
double length;
length = length + 8.3;
```

- Give a C++ statement that will change the value of the variable product to its old value multiplied by the value of the variable n. The variables are all of type *int*.

```
int product;
product = product * n;
```

- Which of the following are valid C++ assignment statements? Assume that i, x, and percent are double variables.

```
a. i = i + 5; valid

b. x + 2 = x; not valid
```

c. `x = 2.5 *x;` valid

d. `percent = 10%;` not valid

Identifiers and Reserved Words(keywords)

- Which of the following are valid identifiers:

  4th new-file file23 C++Program3 New_File 1_file

  no no yes no yes no

- Give good variable names for each of the following:
  a. A variable to hold the speed of an automobile automobile_speed
  b. A variable to hold the pay rate for an hourly employee hourly_pay
  c. A variable to hold the highest score in an exam exam_highest_score

- Which of the following is a reserved word (keyword) in C++?
  - `Const` not a keyword
  - `Include` not a keyword
  - `Char` not a keyword
  - `return` is a keyword
  - `void` is a keyword
  - `int` is a keyword
  - `Return` not a keyword

- What is the difference between a keyword and a user-defined identifier?

A keyword is a reserved word in the program that has a special meaning and use, a user-defined identifier is made by the programmer for their intended purpose. Keywords are usually lower case, while identifiers can be in both upper and lower case letters.

Input and Output

- Give an output statement that will produce the following message on the screen:
  The answer to the question of
  Life, the Universe, and Everything is 42.

  cout << "The answer to the question of\n" << "Life, the Universe, and Everything is 42.";

- Give an input statement that will fill the variable the_number (of type *int*) with a number typed in at the keyboard. Precede the input statement with a prompt statement asking the user to enter a whole number.

```
int the_number;
cout << "Please enter a whole number (integer): "
cin >> the_number;
```

- Give an output statement that produces the new-line character and a tab character.

  cout << \n\t";

- What is the output of the following program lines when embedded in a correct program that declares all variables to be of type char?

```
a = 'b';

b = 'c';

c = a;

cout << a << b << 'c';
```

Output: bcc

Math in C++

- Convert each of the following mathematical formulas to a C++ expression:
  - 3x number = 3 * x;
  - 3x + y number = (3 * x) + y;
  - (x+y)/2 number = (x + y) / 2;
  - 7z^3 + 2 number = 7 * (z * z * z) + 2
- Evaluate: 30-5/2.0 27.5
- Evaluate: 19+7%3-4 16

Writing simple programs

- Write a complete C++ program that writes the phrase "Hello world" to the screen. The program does nothing else.

```
#include <iostream>

using namespace std;

int main()

{
```

```
    cout << "Hello world";

    return 0;
}
```

- Write a complete C++ program that reads in two whole numbers and outputs their sum. Be sure to prompt for input, echo input, and label all output.

```
#include <iostream>

using namespace std;

int main()
{
    int num1;
    int num2;
    int sum;

    cout << "Please input two whole numbers".
        "Put a space between each number." << endl;
    cin >> num1 >> num2;

    sum = num1 + num2;

    cout << "The two whole numbers you inputted were "
        << num1 << " and " << num2 << "." << endl;
    cout << "The sum of the two numbers is: " << sum << endl;

    return 0;

}
```

- Write a program that contains statements that output the value of five or six variables that have been declared, but not initialized. Compile and run the program. What is the output? Check the program on a different environment or with another student. Do you get the same results? Explain.

```
#include <iostream>;

using namespace std;

int main ()
{
    int num1;
    int num2;
    int num3;
    int num4;
    int num5;
```

```
	cout << num1 << " " << num2 << " " << num3 << " " << num4 << " " << num5 << endl;

	return 0;

}
```

The output changes every time the program is run. On other IDE's and with other students, the outputs were also different.

When declaring variables without initializing them, the value of the variable would be indeterminate and could be any value that is contained in the datatype.

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